INSPIREEEE

INSPIRATIONAL SCRITS, PERSONALITIES AND INNOVATIVE RESEARCHES

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K.L.N. COLLEGE OF ENGINEERING
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An ISO 9001 : 2008 Certified Institution
Pottapalayam - 630 611, Sivagangai Dt., Tamilnadu.

INSPIREEE

INspirational **S**cripts, **P**ersonalities and **I**nnovative **R**esearches of **EEE**

VISION :

To become a high standard of excellence in Education, Training and Research in the field of Electrical & Electronics Engineering and allied applications.

MISSION :

To produce excellent, innovative and Nationalistic Engineers with Ethical Values and to advance the field of Electrical & Electronics Engineering and allied areas.

K.L.N. College of Engineering

Pottapalayam – 630 611, Sivagangai District, Tamil Nadu, India

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MESSAGE FROM THE HEAD OF THE DEPARTMENT

Dr. S.M. Kannan, M.E., Ph.D., MIE, MISTE, MIEEE (USA)

HOD/EEE.

K.L.N.College of Enigneering.

MESSAGE

The articles for this issue have been fully prepared by the third year students of B.E.-EEE-2012-2016 batch. It shows many students have spent lot of time to browse the internet and chosen the innovation / article / breakthrough which attracted them the most. Some of the article such as vegetable power tips for exams is interesting. Students should not stop with collecting information alone, they should develop the habit of experimenting them to see their working and problems faced. Students should develop interest to innovate things which may solve our own social issues. Such issues can be converted into real time projects and later this can be converted into commercial. Try to find some devices for the issues such as effective mosquito repellent (this will solve many human diseases and may reduce huge expenditure for health problems), water contamination detector and remover (supply of good quality water is essential), effective garbage removal mechanism (many people dump their wastes in water channels, river side, drainages channels, a big environmental issue), ID card with signal tracker (to spot the boys and girls going for schools / colleges ,for safety purpose), avoiding electrical shocks, fire alarm, daily monitoring of building strength (building collapse causes many deaths), theft / burglar alarm, monitoring the conditions of the automobiles and alarm during abnormal conditions (to avoid two wheeler/four wheeler accidents). This requires updating news around us periodically. Hope in the next issue students may find solution for some issues.

Best wishes.

(Dr. S.M. Kannan)

Head of the Department - EEE

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SPARKERS OF ELECTRICAL ENGINEERING

LEON-CHARLES THEVENIN

R.NAVEEN RAJ(122033) – III YEAR , EEE - C SEC

LEON-CHARLES THEVENIN

Leon-Charles Thevenin (b.Meaux, France, 30th March 1857, d. Paris, 1926) was a French telegraph engineer and educator. He was the one to propose the equivalent generator theorem in 1883, 43 years before Norton's complementary theorem. The theorem is commonly called Thevenin's Theorem in his honour, but, in fact Hermann Von Helmholtz proposed it first in an 1853 paper.

INFO :

Thevenin graduated from the École Polytechnique in 1876 and became one of the first students to enrol in the Ecole Superieure de Telegraphie (EST) to be prepared for a career in the Government owned telegraph service. In the two-year program at the EST, he was introduced to Gustav Kirchhoff's laws of circuit analysis. His duties included administrative and educational activities. Thevenin devoted a considerable portion of his time to teaching, for which he had a liking. In connection with his teaching, he undertook an investigation of Kirchhoff's laws as applied to electric networks. This study resulted in his formulation of the equivalent generator theorem.

PASSION :

He was a talented violin player. Another favourite pastime of his was angling. He remained single but shared his home with a widowed cousin of his mother's and her two children whom he later adopted.

Thevenin consulted several scholars well known at that time, and controversy arose as to whether his law was acceptable or not.Later it was accepted all over the world. In 1926, he was taken to Paris for treatment. He left a formal request that no one should accompany him to the cemetery except his family and that nothing be placed on his coffin but a rose from his garden. This is how he was buried at Meaux. Thevenin is remembered as a model engineer and employee, hard-working, of scrupulous morality, strict in his principles but kind at heart.

GEORGE SIMON OHM

R.PREETHI (122316) – III Year, EEE - B Section

GEORGE SIMON OHM

Georg Simon Ohm (b. Erlangen, Germany, 16th March 1789, d. Munich, Germany, 6th July 1854) was a mathematician and a physicist. The SI unit of electrical resistance was named after him as the Ohm. His father, Johan Wolfgang Ohm, was a master locksmith. Johan Wolfgang married Maria Elizabeth Beck, daughter of a master tailor. They were a protestant couple. Of their seven children only three survived childhood: Georg Simon the eldest, Martin the mathematician, and Elizabeth Barbara. Johan Wolfgang gave his sons a solid education in mathematics, physics, chemistry and the philosophies of Kant and Fichte. Their mathematical talents were soon recognised by the Erlangen professor Karl Christian Von Langsdorf. Georg Simon matriculated on the 3rd of May 1805 at the University of Erlangen. He studied 3 semesters there until his father's displeasure at his supposed overindulgence in dancing, billiards, and ice skating forced him to withdraw to rural Switzerland.

He began to teach mathematics in September 1806 in Gottstadt. He received his PhD on the 25th of October 1811. Lack of money forced him to seek employment from the German government. But, the best he could obtain was a post as a teacher of mathematics and physics at a poorly attended 'Real schedule' in Bamberg. He worked there with great dissatisfaction. In 1817, Ohm was offered the position of 'Oberlehrer' of mathematics and physics at the Jesuit Gymnasium at Cologne. He began his experiments on electricity and magnetism after 1820. His first scientific paper was published in 1825 in which he sought a relationship between the decrease in the force exerted by current-carrying wires and the length of the wires. In April 1826, he published two important papers on galvanism electricity. He published his book on Ohm's law, Die Galvanische Kette Mathematische Bearbeit, in 1827. Sir John Leslie had already provided both theoretical discussion and experimental confirmation of Ohm's law in a paper written in 1791 and published in 1824, which was not accepted. Ohm's law was so coldly received that Ohm resigned his post at Cologne. Ohm obtained the professorship of physics at the Polytechninische Schedule in Nuremberg in 1833. Finally, his work began to be recognised. In 1841, he was awarded the Copley Medal of the Royal Society of London and was made a foreign member a year later.

EDWARD LAWRY NORTON

S.VARSHITHA (132019) - II YEAR, EEE-B Sec

INTRODUCTION :

Edward Lawry Norton (28 July 1898, Rockland, Maine–28 January 1983, Chatham, New Jersey) was an accomplished Bell Labs engineer and scientist famous for developing the concept of the Norton equivalent circuit. He attended the University of Maine for two years before transferring to M.I.T. and received a S.B. degree (electrical engineering) in 1922. He received an M.A. degree from Columbia University in 1925.

Although interested primarily in a communications circuit theory and the transmission of data at high speeds over telephone lines, Edward L. Norton is best remembered for development of the dual of Thevenin's equivalent circuit, currently referred to as Norton's equivalent Circuit.

"The illustrative example considered above gives the solution for the ratio of the input to output current, since this seems to be of more practical interest. An electric network usually requires the solution for the case of a constant voltage in series with an output impedance connected to the input of the network. This condition would require the equations of the voltage divided by the current in the load to be treated as above.

PROOF :

It is ordinarily easier, however, to make use of a simple theorem which can be easily proved, that the effect of a constant voltage E in series with an impedance Z and the network is the same as a current I=E/Z into a parallel combination of the network and the impedance Z. If, as is usually the case, Z is a pure resistance, the solution of this case reduces to the case treated above for the ratio of the two currents, with the additional complication of a resistance shunted across the input terminals of the network. If Z is not a resistance the method still applies, but here the variation of the input current E/Z must be taken into account."

NORTON EQUIVALENT :

In Europe, it is known as the Mayer-Norton equivalent. The German telecommunications engineer Hans Ferdinand Mayer published the same result in the same month as Norton's technical memorandum. Norton retired in 1961 and died on January 28, 1983 at the King James Nursing Home in Chatham, New Jersey.

HOMI BHABHA – FATHER OF INDIAN NUCLEAR PROGRAM

T.S.KESAVA PRASAD (122117) – III year – EEE , B section

HOMI JAHANGIR BHABHA, FRS (30 October 1909 – 24 January 1966) was an Indian nuclear physicist, founding director, and professor of physics at the Tata Institute of Fundamental Research. Colloquially known as "father of Indian nuclear programme", Bhabha was the founding director of two well-known research institutions, namely the Tata Institute of Fundamental Research (TIFR) and the Trombay Atomic Energy Establishment (now named after him), both sites were the cornerstone of Indian development of nuclear weapons which Bhabha also supervised as its director.

CAREER:

Starting his scientific career in nuclear physics from Great Britain, Bhabha returned to India for his annual vacation prior to start of the World War II in September 1939, prompting Bhabha to remain in India, and accepted a post of reader in physics at the Indian Institute of Science in Bangalore, headed by Nobel laureate C.V. Raman. As part of this vision, Bhabha established the Cosmic Ray Research Unit at the institute, began to work on the theory of the movement of point particles, while independently conduct research on nuclear weapons in 1944. In 1945, he established the Tata Institute of Fundamental Research in Bombay, and the Atomic Energy Commission in 1948, serving its first chairman. In 1948, Nehru led the appointment of Bhabha as the director of the nuclear program and tasked Bhabha to develop the nuclear weapons soon after. In the 1950s, Bhabha represented India in IAEA conferences, and served as President of the United Nations Conference on the Peaceful Uses of Atomic Energy in Geneva, Switzerland in 1955. During this time, he intensified his lobbying for developing the nuclear weapons, and soon after the Sino-Indo war, Bhabha aggressively and publicly began to call for the nuclear weapons .

RESEARCH IN NUCLEAR PHYSICS:

In January 1933, Bhabha received his doctorate in nuclear physics after publishing his first scientific paper, "The Absorption of Cosmic radiation". The paper helped him win the Isaac Newton Studentship in 1934, which he held for the next three years. The following year, he completed his doctoral studies in theoretical physics under Ralph H. Fowler. During his studentship, he split his time working at Cambridge and with Niels Bohr in Copenhagen. In 1935, Bhabha published a paper in the Proceedings of the Royal Society, Series A, in which performed the first calculation to determine the cross section of electron-positron scattering. Electron-positron scattering was later named Bhabha scattering, in honor of his contributions in the field.

In 1936, the two published a paper, "The Passage of Fast Electrons and the Theory of Cosmic Showers" in the Proceedings of the Royal Society, Series A, in which they used their theory to describe how primary cosmic rays from outer space interact with the upper atmosphere to produce particles observed at the ground level. Bhabha and Heitler then made numerical estimates of the number of electrons in the cascade process at different altitudes for different electron initiation energies. The calculations agreed with the experimental observations of cosmic ray showers made by Bruno Rossi and Pierre Victor Auger a

few years before. Bhabha later concluded that observations of the properties of such particles would lead to the straightforward experimental verification of Albert Einstein's theory of relativity. In 1937, Bhabha was awarded the Senior Studentship of the 1851 Exhibition, which helped him continue his work at Cambridge until the outbreak of World War II in 1939.

ATOMIC ENERGY IN INDIA:

When Bhabha was working at the Indian Institute of Science, there was no institute in India which had the necessary facilities for original work in nuclear physics, cosmic rays, high energy physics, and other frontiers of knowledge in physics. This prompted him to send a proposal in March 1944 to the Sir Dorabji Jamsetji Tata. The trustees of Sir Dorabji Jamsetji. Tata Trust decided to accept Bhabha's proposal and financial responsibility for starting the Institute in April 1944. Bombay was chosen as the location for the proposed Institute as the Government of Bombay showed interest in becoming a joint founder of the proposed institute. The institute, named Tata Institute of Fundamental Research, was inaugurated in 1945 in 540 square meters of hired space in an existing building.

In 1948 the Institute was moved into the old buildings of the Royal Yacht club. When Bhabha realized that technology development for the atomic energy programme could no longer be carried out within TIFR he proposed to the government to build a new laboratory entirely devoted to this purpose. For this purpose, 1200 acres of land was acquired at Trombay from the Bombay Government. Thus the Atomic Energy Establishment Trombay (AEET) started functioning in 1954. The same year the Department of Atomic Energy (DAE) was also established. He represented India in International Atomic Energy Forums, and as President of the United Nations Conference on the Peaceful Uses of Atomic Energy, in Geneva, Switzerland in 1955. He was elected a Foreign Honorary Member of the American Academy of Arts and Sciences in 1958.

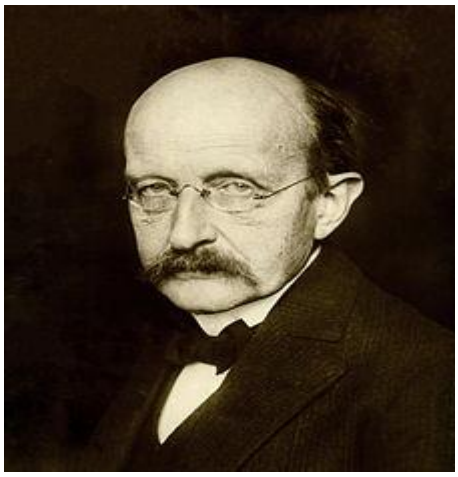
CONCLUSION :

Bhabha is generally acknowledged as the father of Indian nuclear power.

"India has the most technically ambitious and innovative nuclear energy program in the world. The extent and functionality of its nuclear experimental facilities are matched only by those in Russia and are far ahead of what is left in the US."

MAX PLANCK

G.DAVID(122019) – III YEAR EEE A SECTION



Early life and career:

Planck came from a traditional, intellectual family. Planck was born in Kiel, Holstein, to Johann Julius Wilhelm Planck and his second wife, Emma Patzig. He was baptised with the name of Karl Ernst Ludwig Marx Planck; of his given names, Marx was indicated as the However, by the age of ten he signed with the name Max and used this for the rest of his life. He was the 6th child in the family, though two of his siblings were from his father's first marriage. Planck graduated early, at age 17. This is how Planck first came in contact with the field of physics. Planck was gifted when it came to music. He took singing lessons and played piano, organ and cello, and composed songs and operas. However, instead of music he chose to study physics.

Academic career:

With the completion of his habilitation thesis, Planck became an unpaid private lecturer in Munich, waiting until he was offered an academic position. Although he was initially ignored by the academic community, he furthered his work on the field of heat theory and discovered one after another the same thermo dynamical formalism as Gibbs without realizing it. Clausius's ideas on entropy occupied a central role in his work. In April 1885 the University of Kiel appointed Planck as associate professor of theoretical physics. Further work on entropy and its treatment, especially as applied in physical chemistry, followed. He published his Treatise on Thermodynamics in 1897.

Black-body radiation:

In 1894 Planck turned his attention to the problem of black-body radiation. He had been commissioned by electric companies to create maximum light from light bulbs with minimum energy. The problem had been stated by Kirchhoff in 1859: "how does the intensity of the electromagnetic radiation emitted by a black body depend on the frequency of the radiation and the temperature of the body?". The question had been explored experimentally, but no theoretical treatment agreed with experimental values. Wilhelm Wien proposed Wien's law, which correctly predicted the behaviour at high frequencies, but failed at low frequencies. The Rayleigh–Jeans law, another approach to the problem, created what was later known as the "ultraviolet catastrophe", but contrary to many textbooks this was not a motivation for Planck.

Planck's first proposed solution to the problem in 1899 followed from what Planck called the "principle of elementary disorder", which allowed him to derive Wien's law from a number of assumptions about the entropy of an ideal oscillator,

creating what was referred-to as the Wien–Planck law. Soon it was found that experimental evidence did not confirm the new law at all, to Planck's frustration. Planck revised his approach, deriving the first version of the famous Planck black-body radiation law, which described the experimentally observed black-body spectrum well. It was first proposed in a meeting of the DPG on October 19, 1900 and published in 1901. This first derivation did not include energy quantization, and did not use statistical mechanics, to which he held an aversion. In November 1900, Planck revised this first approach, relying on Boltzmann's statistical interpretation of the second law of thermodynamics as a way of gaining a more fundamental understanding of the principles behind his radiation law. As Planck was deeply suspicious of the philosophical and physical implications of such an interpretation of Boltzmann's approach, his recourse to them was, as he later put it, "an act of despair ... I was ready to sacrifice any of my previous convictions about physics."

The central assumption behind his new derivation, presented to the DPG on 14 December 1900, was the supposition, now known as the Planck postulate, that electromagnetic energy could be emitted only in quantized form, in other words, the energy could only be a multiple of an elementary unit $E = h\nu$, where $h$is Planck's constant, also known as Planck's action quantum, and ν is the frequency of the radiation. Note that the elementary units of energy discussed here are represented by $h\nu$and not simply by h. Physicists now call these quanta photons, and a photon of frequency νwill have its own specific and unique energy. The amplitude of energy at that frequency is then a function of the number of photons of that frequency being produced per unit of time.

At first Planck considered that quantization was only "a purely formal assumption ... actually I did not think much about it..."; nowadays this assumption, incompatible with classical physics, is regarded as the birth of quantum physics and the greatest intellectual accomplishment of Planck's career. He discovery of Planck's constant enabled him to define a new universal set of physical units , all based on fundamental physical constants upon which much of quantum theory is based. In recognition of Planck's fundamental contribution to a new branch of physics, he was awarded the Nobel Prize in Physics in 1918.

Quantum mechanics:

At the end of the 1920s Bohr, Heisenberg and Pauli had worked out the Copenhagen interpretation of quantum mechanics, but it was rejected by Planck, and by Schrödinger, Laue, and Einstein as well. Planck expected that wave mechanics would soon render quantum theory his own child unnecessary. This was not to be the case, however. Further work only cemented quantum theory, even against his and Einstein's philosophical revulsions.

END OF LIFE:

He was died on October 4, 1947. Later in life, Planck's views on God were that of a deist.For example, six months before his death a rumour started that Planck had converted to Catholicism, but when questioned what had brought him to make this step, he declared that, although he had always been deeply religious, he did not believe "in a personal God, let alone a Christian God."

INNOVATIVE INVENTIONS

KITE-POWERED GENERATORS

T.K.BOOSUN (122107) – III YR EEE - A

INTRODUCTION

Wind is rapidly becoming an important renewable energy source as the worry about declining fossil fuel reserves and the global warming associated with their use continues to grow. There has been a great deal of success in generating power from large windmills, which accounted for **160 GW** of power production in 2009. While this accounts for only 2% of worldwide electrical energy consumption, wind-powered generation increased **31.7%** from 2008 to 2009 while worldwide primary energy consumption slightly decreased in the same timeframe. Even though wind power generation is growing, there are a number of shortcomings of current generating techniques using windmills. In particular, wind intermittency, costly and easily damaged machinery, and large land usage requirements (in addition to aesthetic and wildlife safety concerns) are some of the problems that need to be overcome.

A relatively new idea for wind power generation that can overcome many of these shortcomings uses large kites to extract power from high-altitude winds. In this scheme, very large and relatively inexpensive kites are tethered to ground-based generators. As the kite pulls on the tethers, power is generated. The details of the generation depend upon the exact scheme, but at the time of writing of this paper, many groups are working to achieve practical power generation with kites (**KiteGen, FlygenKite, Windlift, Festo,** and **kPower** are just a few companies working on this). In this report, one particular kite-powered system will be explained, followed by a detailed analysis of estimates for the power production and cost for this system. Lastly, kite-powered generators will be compared to current windmills.

KITEGEN

Simulations published by KiteGen, estimate that they can achieve **793 kW** average power generation with a kite that is **100 m^2** in size using an altitude-varying wind speed between 8 m/s at ground level and 24 m/s at 800 m. By scaling up the size of the kite to **500 m^2, 2 MW** can be generated at **9 m/s** constant wind speed, and much more power at higher wind speeds. In another design, called *carousel configuration*, they predict that a plant could generate up to **1000 MW** mean power with **12 m/s** winds and 100 kites that are each 500 m^2 in size. In actual prototype tests with small kites, KiteGen was able to generate positive net energy using small kites controlled by humans. More importantly, the power generated matched well to the power predicted by their model, suggesting that their model also provides a good estimate for higher-power generators.

KiteGen predicts they can achieve energy costs of \$0.02-\$0.05 per kWh,(i.e., **1.21 – 3.02 Rs** in India) as compared to \$0.05-\$0.09 per kWh for fossil energy and \$0.15 per kWh for current windmills.

POWER GENERATION

At the average altitude of the kite in the simulation (400 m), the air density is approx 1.17 kg/m^3, and they assume wind speeds of 17 m/s. According to the power density equation above, this leads to a wind power density of 2.9 kW/m^2. If we assume a kite size of 100 m^2 (the kite area used by canale, Fagiano and Milanese),

then this corresponds to a total wind power of 290 kW, which is much less than they claim they can achieve in their paper with a single kite, 793 kW. However, the wind power equation above assumes a stationary wind-power harvester. This is perhaps reasonable for a windmill, but breaks down in the case of a lift-generating wing flying with a large effective wind velocity. If we instead consider the energy density of the air and multiply by the volume of air that the kite interacts with in a certain amount of time, we can estimate the maximum amount of power that the kite could extract from the air.

POWER TRANSMISSION

In order to transmit the power from the kite to the ground-based generator, the tether lines need to be able to support the load. If 2000 kW peak power is generated by the system with a line speed of 2 m/s, the load on the lines at the generator is equivalent to 102 tones, or 51 tones per line. the 25 mm diameter lines assumed in the simulation would be able to handle this load with a 20% safety margin. This is in agreement with other research. If a breaking stress of 1.25 GPa is assumed then a line with a diameter of 25 mm could support 63 tones, which would be sufficient for the model KiteGen kite.

COST

KiteGen estimates that they can achieve energy costs of $0.02-$0.05 per kWh, in comparison to $0.05-$0.09 per kWh for fossil fuels, or $0.15 per kWh for current wind farms. They predict that the cost of a complete KiteGen system would be less than an order of magnitude below the cost of a windmill rated for the same power, would weigh about an order of magnitude less, and could require nearly and order of magnitude less land for the same power. Even if the generator for a kite-powered system is the same cost, the kite and lines would cost less than the rotor blades and tower combined. It is very difficult to estimate actual construction and running costs for a system that is in such an early phase, but the power generation estimates suggest that it is not unrealistic that kite-powered generators could cost less than windmills. However, the electricity costs for fossil fuels. appear to be exaggerated when compared to other sets of data. Estimates for the cost of energy from coal and gas are around $0.03 to $0.04 per kWh, and $0.05 per kWh for nuclear power. As a result, comparing KiteGen's cost estimates to the current market, kite-generated power is not likely to be substantially cheaper than other electricity sources, especially coal and gas. However, kite power could still be competitive, and has potential to be cheaper than electricity from current windmills.

MILITARY PLANE MADE FROM 'HUMAN SKIN'

K.CHANDRA(122026) – III Year – EEE , A section

INTRODUCTION :

HUMAN SKIN is actually tens of thousands of micro-sensors on the exterior of the plane, which work in a similar way to our own skin to feel when it suffers damage.

The smart skin, which could be the size of dust particles and sprayed over the entire plane, is being developed by **BAE Systems** and will have the ability to sense temperature, wind speed, movement and any physical strain that could result in damage or pre-empt problems before they prove too late.

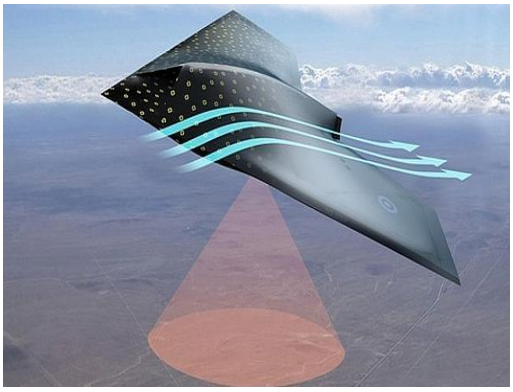
PREVENTION OF OVERHEATING:

"Observing how a simple sensor can be used to stop a domestic appliance overheating got me thinking about how this could be applied to my work and how we could replace bulky, expensive sensors with cheap, miniature, multifunctional ones," she said in the article.

"This in turn led to the idea that aircraft, or indeed cars and ships, could be covered by thousands of these motes creating a 'smart skin' that can sense the world around them and monitor their condition by detecting stress, heat or damage."

SMART SKIN SENSORS :

The smart skin sensors have been designed to house their own power source and would be able to communicate much like our own receptors do with our brains. The idea of applying the technology outside of just vehicles is also intriguing scientists as being able to sense slight variations such as minute cracks could be used as a pre-warning system for natural disasters to earthquakes or floods.



VEGETABLE POWER

AKSHATHA GANESAN (122301) & S.BHARANI(122039) – III YEAR – EEE, A SEC

INTRODUCTION :

Vegetable and fruits are a good source of proteins and carbohydrates but they also are good electrolytes. Have you ever thought if your iPod runs out of battery power, will a potato hold up in a pinch?

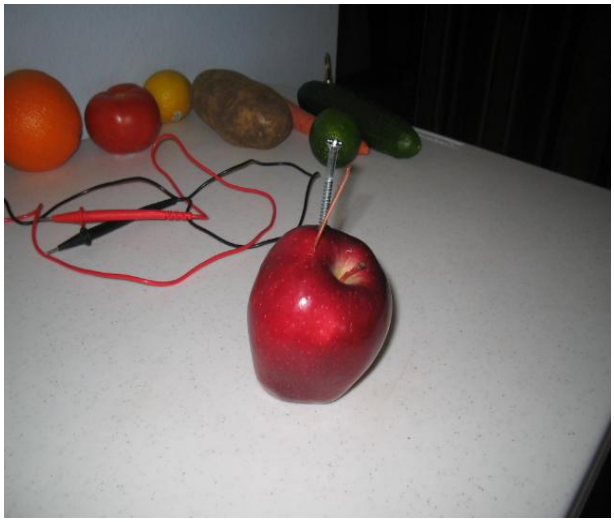
The answer is **yes,** it can .AS we know, electricity requires the presence of negatively and positively charged particles: electrons (-) and protons (+). In order for electricity to flow, there must be movement of electrons along a path. The flow of electrons (current) can be measured. An electrochemical cell uses electrical energy from chemical reactions taking place inside the cell. An electrochemical cell needs two different metals (one as the cathode and one as the anode), a conducting wire to connect them, and an electrolyte. Two commonly used metals are zinc and copper, where zinc is the anode (from which electrons flow away) and copper is the cathode (to which the electrons flow. An electrolyte is a solution containing ions (atoms with an electrical charge either negative or positive), such as hydrogen ions (H+)). Electrolytes are typically acids, bases, or salts. If an anode and a cathode are placed in an electrolyte solution and properly connected to a voltmeter, the electric current can be measured as it flows from anode to cathode. Fruits and vegetables contain electrolytes. This means that they can be used to make an electrochemical cell. A potato is commonly used to demonstrate this fact as potatoes contain phosphoric acid. The phosphoric acid contains free hydrogen ions (H+), which are reduced to hydrogen gas at the cathode.When the metals are placed in an electrolyte solution, chemical reactions occur at the anode and cathode.. Different vegetables contain different amounts of acid. Some fruits, such as lemons, are high in citric acid and can also be used to construct electrochemical cells.

EXPERIMENT :

Let do us a test ,Get all the fruits and vegetables from a store. We got a banana, apple, orange, carrot, potato, tomato and a lime.We also used an electrical meter, a battery, a ruler, and sandpaper.

TESTING:

First start by getting an electric meter. Then get a zinc and copper electrode put into a banana one inch apart. Then get the electric meter and measured the electricity in the banana. Then take the copper out and replaced it with steel and measured it again.



Then I got an apple and did the same thing with the apple and the other fruits and vegetables.

Tested fruits		Zinc/Steel	Zinc/Copper
Fruits and vegetables	**Apple**	0.27	0.82
	Orange	0.29	0.76
	Carrot	0.29	0.75
	Banana	0.26	0.73
	Lime	0.30	0.71
	Tomato	0.30	0.70
	Potato	0.23	0.64

Conclusions

All fruits and vegetables that we tested can make electricity.

- The electrodes react with the juice inside the fruits and vegetables to create electricity.
- The best electrodes are zinc and copper.
- The best fruit is an apple. The best vegetable is a carrot.
- The further apart the electrodes were the more electricity it could make.
- The best results were zinc and copper on opposite sides of an apple.
- If all the same size, the apple would be the best still.

WIRELESS POWER TRANSMISSION

S.S.BALAJI(122110) – III Year-EEE ,A section

INTRODUCTION :

Wireless power or **wireless energy transmission** is the transmission of electrical energy from a power source to an electrical load without man-made conductors. Wireless transmission is useful in cases where interconnecting wires are inconvenient, hazardous, or impossible. The problem of wireless power transmission differs from that of wireless telecommunications, such as radio. The most common form of wireless power transmission is carried out using direct induction followed by resonant magnetic induction. Other methods under consideration are electromagnetic radiation in the form of microwaves or lasers and electrical conduction through natural media.

MAJOR TECHNIQUES :

MICROWAVE METHOD:

Microwave power transmission

An artist's depiction of a solar satellite that could send electric energy by microwaves to a space vessel or planetary surface.

Power transmission via radio waves can be made more directional, allowing longer distance power beaming, with shorter wavelengths of electromagnetic radiation, typically in the microwave range. A rectenna may be used to convert the microwave energy back into electricity. Rectenna conversion efficiencies exceeding 95% have been realized. Power beaming using microwaves has been proposed for the transmission of energy from orbiting solar power satellites to Earth and the beaming of power to spacecraft leaving orbit has been considered.

Power beaming by microwaves has the difficulty that for most space applications the required aperture sizes are very large due to diffraction limiting antenna directionality. For example, the 1978 NASA Study of solar power satellites required a 1-km diameter transmitting antenna, and a 10 km diameter receiving rectenna, for a microwave beam at 2.45 GHz. These sizes can be somewhat decreased by using shorter wavelengths, although short wavelengths may have difficulties with atmospheric absorption and beam blockage by rain or water droplets. Because of the "thinned array curse," it is not possible to make a narrower beam by combining the beams of several smaller satellites.

LASER METHOD:

With a laser beam centered on its panel of photovoltaic cells, a lightweight model plane makes the first flight of an aircraft powered by a laser beam inside a building at NASA Marshall Space Flight Center.

In the case of electromagnetic radiation closer to the visible region of the spectrum (tens of micrometers to tens of nanometres), power can be transmitted by converting electricity into a laser beam that is then pointed at a photovoltaic cell. This mechanism is generally known

as "power beaming" because the power is beamed at a receiver that can convert it to electrical energy.

Compared to other wireless methods :

- Collimated monochromatic wavefr ont propagation allows narrow beam cross-section area for transmission over large distances.
- Compact size: solid state lasers fit into small products.
- No radio-frequency interference to existing radio communication such as Wi-Fi and cell phones.
- Access control: only receivers hit by the laser receive power.

Drawbacks :

- Laser radiation is hazardous. Low power levels can blind humans and other animals. High power levels can kill through localized spot heating.
- Conversion between electricity and light is inefficient. Photovoltaic cells achieve only 40%–50% efficiency. (Efficiency is higher with monochromatic light than with solar panels).
- Atmospheric absorption, and absorption and scattering by clouds, fog, rain, etc., causes up to 100% losses.
- Requires a direct line of sight with the target.

Laser "power beaming" technology has been mostly explored in military weapons and aerospace applications and is now being developed for commercial and consumer electronics. Wireless energy transfer systems using lasers for consumer space have to satisfy laser safety requirements standardized under IEC 60825.

MICROWAVE TECHNOLOGY

M.GOKILA (122030) – III Year- EEE, A Section

INTRODUCTION :

Microwaves are radio waves (a form of electromagnetic radiation) with wavelengths ranging from as long as one meter to as short as one millimeter. The prefix "micro-" in "microwave" is not meant to suggest a wavelength in the micrometer range. It indicates that microwaves are "small" compared to waves used in typical radio broadcasting, in that they have shorter wavelengths.

APPLICATION :

TELECOMMUNICATION :

Microwave technology is extensively used for point-to-point telecommunications (i.e., non-broadcast uses). Microwaves are especially suitable for this use since they are more easily focused into narrow beams than radio waves, allowing frequency reuse; their comparatively higher frequencies allow broad bandwidth and high data transmission rates, and antenna sizes are smaller than at lower frequencies because antenna size is inversely proportional to transmitted frequency.

Microwaves are used in spacecraft communication, and much of the world's data, TV, and telephone communications are transmitted long distances by microwaves between ground stations and communications satellites. Microwaves are also employed in microwave ovens and in radar technology.

MOBILE CHARGING:

With mobile phones becoming a basic part of life, the recharging of mobile phone batteries has always been a problem. The mobile phones vary in their talk time and battery standby according to their manufacturer and batteries. All these phones irrespective of their manufacturer and batteries have to be put to recharge after the battery has drained out. The main objective of this current proposal is to make the recharging of the mobile phones independent of their manufacturer and battery make. In this paper a new proposal has been made so as to make the recharging of the mobile phones is done automatically as you talk in your mobile phone! This is done by use of microwaves. The microwave signal is transmitted from the transmitter along with the message signal using special kind of antennas called slotted wave guide antenna at a frequency is 2.45 GHz.

II. FUNCTIONING

The basic addition to the mobile phone is going to be the rectenna. A rectenna is a rectifying antenna, a special type of antenna that is used to directly convert microwave energy into DC electricity. Its elements are usually arrangedin a mesh pattern, giving it a distinct appearance from most antennae. A simple rectenna can be constructed from a Schottky diode placed between antenna dipoles. The diode rectifies the current induced in the antenna by the microwaves. Rectenna are highly efficient at converting microwave energy to electricity. In laboratory environments, efficiencies above 90% have been observed with regularity. Some experimentation has been done with inverse rectenna, converting electricity into microwave energy, but efficiencies are much lower--only in the area of 1%. With the advent of nanotechnology and MEMS the size of these devices can be brought down to molecular level.

A rectenna comprises of a mesh of dipoles and diodes for absorbing microwave energy from a transmitter and converting it into electric power. Its elements are usually arranged in a mesh pattern, giving it a distinct appearance from most antennae. A simple rectenna can be constructed from a Schottky diode placed

between antenna dipoles as shown in Fig... The diode rectifies the current induced in the antenna by the microwaves. Rectenna are highly efficient at converting microwave energy to electricity. It has been theorized that similar devices, scaled down to the proportions used in nanotechnology, could be used to convert light into electricity at much greater efficiencies than what is currently possible with solar cells. This type of device is called an optical rectenna. Theoretically, high efficiencies can be maintained as the device shrinks, but experiments funded by the United States National Renewable energy Laboratory have so far only obtained roughly 1% efficiency while using infrared light. Another important part of our receiver circuitry is a simple sensor. The sensor circuitry is a simple circuit, which detects if the mobile phone receives any message signal. This is required, as the phone has to be charged as long as the user is talking. Thus a simple F to V converter would serve our purpose. In India the operating frequency of the mobile phone operators is generally 900MHz or 1800MHz for the GSM system for mobile communication. Recentness will be used to generate large-scale power from microwave beams delivered from orbiting SPS satellites.

III. LIMITATIONS

The Mobile Handset should additionally have a device, “Rectenna” which would make it bulky and hence device size up to molecular level is essential. The main disadvantages of wireless charging are its lower efficiency and increased resistive heating in comparison to direct contact. Implementations using lower frequencies or older drive Technologies charge more slowly and generate heat within most portable electronics. Due to the lower efficiency, devices can take longer to charge when supplied power is equal.

IV. INDUCTIVE CHARGING

Though some Handsets on the market currently provide wireless charging, the technology is not exactly same as mentioned here. For charging, phones are required to keep near the Charging Plate. It uses inductively coupled .

POWER TRANSFER SYSTEM.

A transmitter coil is positioned at the bottom (L1) and the receiver coil (L2) is situated at the top and these coils are embedded into different electrical devices. L1 would be the Nokia Wireless Charging Plate and L2 would be the Nokia Lumia 920, for example. In coming days, Microwave might fix various issues in the current system.

NEW RENEWABLE HYDROGEN FUEL GENERATION

S.DEEPTHIHASHINI (122012), III YEAR EEE A SECTION

We like the idea of hydrogen fuel cell vehicles which, in themselves, generate water vapor as their only emission. Hydrogen fuel, however, could prove to be a sticking point.

Considering that second point, **hydrogen fuel** cell vehicle opponents have pointed to hydrogen fuel generation's fossil-fuel roots as a clear indication that they aren't viable emissions-free technology. Actually, that's just one of a number of myths floating around hydrogen fuel cell vehicles, which we covered in a series, starting here. (The rest of the series is here: Fuel Cell Vehicle Myth 2, 3, 4, 5, 6,7, 8, 9, and 10) Turning our attention specifically to renewable hydrogen fuel generation, however, it's totally unfair to say that fossil fuels are *the only viable source.*

The only problem with renewable **hydrogen fuel** generation has to do with efficiency and cost, particularly with the catalysts required to split hydrogen from oxygen, via electrolysis.

True, wind power and solar power may be totally renewable, but a hydrogen fuel generation system connected to it must be able to produce enough fuel for a number of vehicles, which increases the costs associated with it. Some rare-earth and precious-metal catalysts, such as platinum or iridium, are prohibitively expensive, not to mention that they're also rare in supply. Platinum, for example, is currently worth $1,400/oz ($49.38/g) and iridium is a bargain at $630/oz ($22.22/g). Iron and nickel, on the other hand, are relatively abundant, worth less than 2.8¢/oz (0.01¢/g) and 52.9¢/oz (1.9¢/g), respectively.

Stanford University Professor Hongjie Dai has developed an electrolysis device based on these two cheap and abundant metals that splits water into hydrogen and oxygen. While electrolysis isn't unheard of, running it off of a single 1.5 V "AAA" battery is practically unheard of. Using a new nickel-metal / nickel-oxide electrode combination, researchers under Professor Dai found that it was at least as efficient as platinum. The miniscule costs of the materials, however mean that such electrolysis devices could be scaled to industrial capacity fairly cheaply. Additionally, the low-voltage requirements make renewable **hydrogen fuel** generation, even by solar power, more viable than ever.

MURATA-WIRELESS CHARGING

S.DEEPTHIHASHINI (122012), III YEAR EEE A SECTION

LEDs Lit up by Murata's new DC Magnetic Resonance Wireless Power Transmission.

Wireless charging for could be one of the game-changing technologies that helps to increase the adoption of electric vehicles. A few products are already being tested in the field, including electric buses in England and Germany.
At least one company here in the US is starting to deploy wireless charging systems that are compatible with any plug-in vehicle.

Current wireless charging systems are heavy and inefficient and only work over a short distance, typically less than a foot. They run on electrical alternating current, which generates a magnetic field. The receiving coil generates an electrical direct current when it is in range of the transmission coil. There are losses because the electricity has to be converted in voltage and current four or five times in the process.

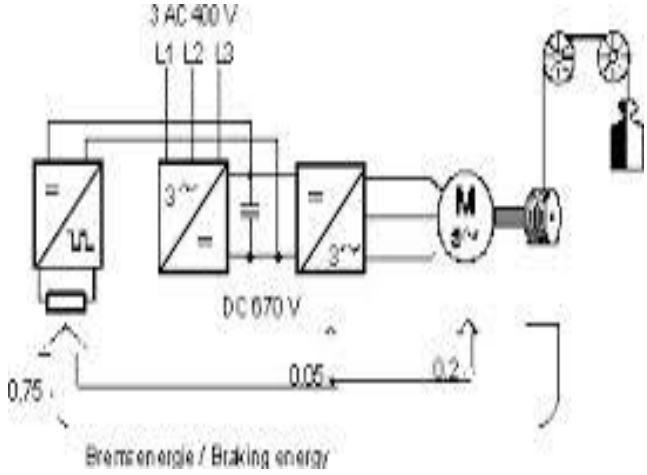
In order to improve the flexibility and efficiency of wireless charging, Murata Manufacturing in Japan has developed a wireless charging transmission coil that is powered by direct current. The new system is much more efficient and can transfer power over a longer distance and even to multiple receiving coils. The new coils are smaller and lighter as well. For now, Murata is looking to commercialize wireless charging for low-power mobile devices, but could scale the device for use with electric vehicles

A development by Murata Manufacturing could make electric vehicle wireless charging more flexible and efficient.

BRAKING CHOPPER

R.MATHANA ATHISHRI (122024) – III year , EEE B

- Braking chopper is a braking unit used in DC voltage intermediate circuits of frequency converter to control voltage, when the load feeds energy back to intermediate circuit.
- When the magnetized motor is being rotated by an overhauling load and functions as a generator feeding power to the DC voltage intermediate circuit.



OPERATION:

- A braking chopper is an electrical switch that limits the DC bus voltage by switching the braking energy to a resistor where the braking energy is converted to heat.
- Braking choppers are automatically activated when the actual DC bus voltage exceeds a specified level depending on the nominal voltage of the variable frequency drive.

FLUX BRAKING:

- Flux braking is another method, based on motor losses, for handling an overrunning load.
- When braking in the drive system is needed, the motor flux and thus also the magnetizing current component used in the motor are increased.
- The control of the flux can be easily through the direct torque control principle.
- During flux braking the motor is under Direct Torque Control which guarantees that braking can be made according to the specified speed ramp.

ADVANTAGES:

- Simple electrical construction.
- Low fundamental investment for chopper and resistor.
- The chopper works even if AC supply is lost.

DISADVANTAGES:

- The braking energy is wasted if the heated air cannot be utilized.

- The braking chopper and resistors require additional space.
- It requires extra investments in the cooling and heat recovery system.
- Increased risk of fire due to hot resistor and possible dust.
- The braking cycle is need.

APPLICATIONS:

- The total amount of braking energy is high in respect to the motoring energy needed.
- Braking operation is needed during main power loss.

REFERENCE:

- Werner Leonhard,-"Control of Electrical Drives"
- R.Krishnan-"Electric Motor Drives: Modeling, Analysis and Control"

DIMMER SWITCHES

J.LAVANYA(122109) & P.E.LAKSHMI(122102) – III Year – EEE, B section

INTRODUCTION :

Today's CFL light bulbs are a real improvement over early manifestations. Buzzing has largely been eradicated, many are now instant-on (or very close), and don't take the time to warm up that earlier CFLs did. Dimmable CFLs are now available, too, and some of them are pretty good. The mercury content of CFLs, too, has been a concern for some; but most high quality new compact fluorescent bulbs have so little mercury that it's not really a concern. (Many have a mercury content equivalent to that of a can of tuna, and less than would be released into the environment as a consequence of the extra fossil fuels burned to power an incandescent bulb.)

But there's one issue with CFLs that's a pretty big deal, and that needs to receive a lot more attention if we're going to see a peaceful transition to energy efficient light sources: non-dimmable CFLs cannot and should not ever be used with dimmer switches.
This isn't so much because they won't perform well (they won't, although some may appear fine, at least for a while), but because it actually presents a pretty serious fire hazard. Here's why:

How dimmer switches work:

To put it in layman's terms, most modern dimmer switches essentially function the same way as if you were to turn a light on and off really, really fast (about 100 times per second). They're designed to work with incandescent bulbs, and they work with incandescent bulbs really well. Dimming an incandescent bulb reduces the bulb's energy consumption, makes it look really nice, and the transition from 0-100% light output is pretty smooth.

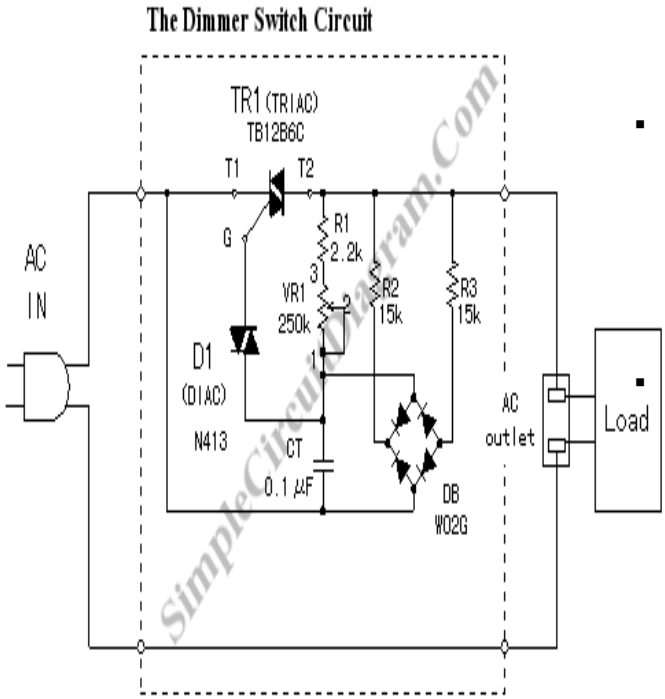
What happens when you screw a CFL into a dimmer switch:

CFLs are a more complicated piece of technology than incandescent bulbs, which presents a problem when they're connected to a dimmer switch. There's some really good info about the science of CFLs and dimmers here, but basically the problem is this: CFLs have less resistance than incandescent bulbs, which means that the floodgates are opened when they are exposed to the electrical fluctuations that a dimmer sends, and they actually can consume up to 5x the current as when they're not connected to a dimmer (and that's when the dimmer is set to max). This overheats the bulb and can actually cause it to light on fire. Bad news.
This is a pretty serious problem; while there aren't a ton of documented cases

of fires being started by CFLs being connected to dimmer switches, there are some.

So be sure to tell all your friends: non-dimmable CFLs shouldn't be plugged into dimmer switches. Not everybody takes the time to read the warning labels on everything they buy, but this is something we should all be aware of.

On a final note, for clarity, dimmable CFLs are fine. You'll want to pair them with the right type of dimmer to get the best performance, but you don't have to worry about them catching on fire.



We have a dimmer switch that gets warm when we turn it on, the wall even gets warm.

- There are two dimmers on the wall and both get warm.
- Other dimmers in the house do not do the same.
- We remodeled with an electrician several years ago and this has occurred since then.
- Should I be concerned? Call an electrician? It does not seem normal

Why a Dimmer Switch May Be Warm or Hot ?

- Dimmer switches have electronic components that produce heat and will make the cover plate warm, however they should never get hot.
- If you suspect that your dimmer switch is too warm then make a list of the number of lamps that are being controlled by each dimmer switch, and the watts of each lamp to come up with the total number of watts being controlled.

  There are different watt levels assigned to dimmer switches, and if the number of watts being controlled exceeds the rated amounts of watts then the dimmer switch can get too warm, and this could cause the dimmer switch to stop working prematurely or not work right.

Selecting the Right Dimmer Switch for Your Light Fixtures

- If you have 600 watts of lighting to be controlled by a dimmer switch it may be a good idea to install a 800 watt dimmer.
- The concern is to avoid loading the dimmer switch to full capacity, this way you will keep the heat level lower which will contribute to a longer lasting dimmer switch which will provide a wide range of dimming control for your light fixtures.

LASER NANOLITHOGRAPHY

J.R.THAKSHAAYANEE(112048) EEE- C FINAL YEAR

Laser nanolithography shows potential for improving nano materials for electronic and optoelectronic components. Researchers generated greenish-blue

Photoluminescence by fast-scanning a focused green (532 nm) laser beam with power of 5 to 105 mW over a nanowire array.

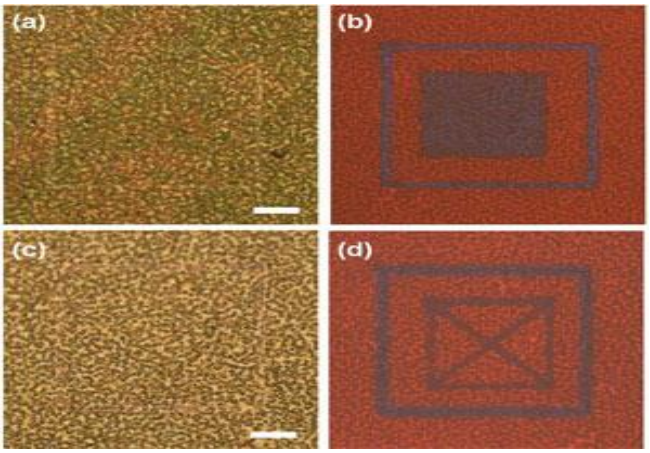
The technique was also used to create micro patterns that were invisible under a bright-field optical microscope but visible under a fluorescence microscope.

Using an optical microscope-focused laser beam, the Singapore researchers created micro domains with well-defined structures and controlled thickness on a 2-D film of MoS_2, a transition metal dichalcogenide compound.

The process increased the film's electrical conductivity by a factor of 10 and its **photoconductivity** by a factor of five, allowing them to create photo detectors with improved performance.

The approach is **simple and low-cost** and its selectivity has advantages over other techniques that modify films in their entirety. .

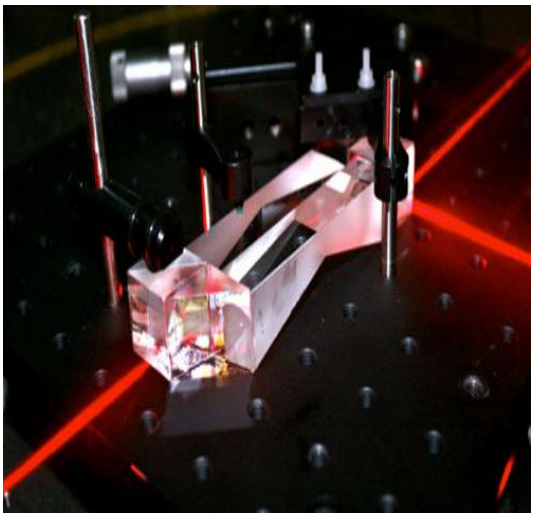
Image: Film of molybdenum disulfide(MoS2) and an array of mesoporous



META-ATOMS ALTER LIGHT POLARIZATION

J.R.THAKSHAAYENE(112048) EEE-C FINAL YEAR

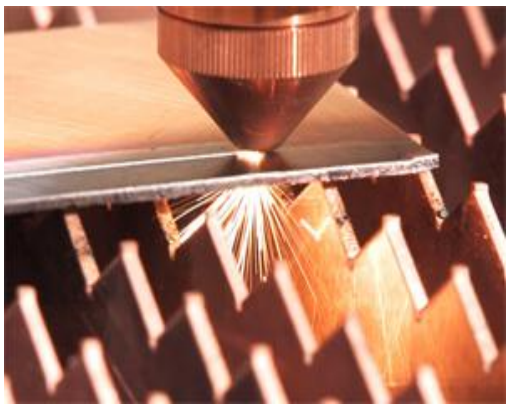
A new meta material that is deformed by light while altering its polarization could become a tool for developing photonic circuits. A team from Australian National University's Research School of Physics and Engineering (RSPE) made this new finding while developing meta materials. These were formed from a pattern of tiny metal shapes called meta-atoms, which were then used to achieve optical rotation. "This material can put a twist into light that is rotate its polarization, orders of magnitude more strongly than natural materials and can switch the effect on and off directly with light."



The researchers emonstrated that this effect is "now available in artificial electromagnetic systems, enabled by the advent of magneto elastic meta materials" that produce nonlinear effects including self-oscillation, according to the study. The researchers used a pair of c-shaped meta-atoms, one suspended above the other, to achieve optical rotation. When light shines on the pair of meta-atoms, the top one rotates, making the system asymmetric. Chiral symmetry breaking in the system's strong stationary response prompts nonlinear polarization change.

"Because light affects the symmetry of our system, and we can tune your material's response simply by shining a light beam on it. Tunability of a meta material is an important step toward building devices based on these artificial materials." Such materials could be "another completely new tool in the toolbox for processing light," according to RSPE researcher.

"Thin slices of these materials can replace bulky collections of lenses and mirrors. This miniaturization could lead to the creation of more compact optoelectronic devices, such as a light-based version of the electronic transistor."



HIGH VOLTAGE FUSE BLOWN INDICATOR WITH VOICE ALERT

T.PAVITHRA (122008) – III Year – EEE, B section

INTRODUCTION:

The purpose of this project is to alert the user in case of a fuse in a critical electrical equipment got fused.

This consists of two power sensors for sensing the presence of electrical power.one of the power sensor is connected before the fuse to be monitored and the other after the fuse.The power status from these sensors is fed to a microcontroller. Microcontroller continuously monitors the status of these two sensors. If the power status of second sensor is low and the first sensor is high, then the microcontroller Identifies this as a break in fuse circuit and gives an appropriate message. If both the sensors output goes low then microcontroller identifies this as power supply failure and gives an appropriate message.

IC PACKAGE :

The message to be announced is provided to the controller as a package in an IC. This IC is capable of recording few messages and plays them if operated in the playback mode. The controller is interfaced with this IC with proper precautions. The code inside the controller decides the appropriate message depending upon the situation.

OBJECTIVE:

1.Real time fuse monitoring.

2.Alarming in fuse blown situations.

3.Producing a voice announcement with the corresponding situation.

THE MAJOR BUILDING BLOCKS:

1.Microcontroller based control system with regulated power supply.

2.Two electrically isolated power status sensors.

3.Microcontroller to PC interfacing circuit.

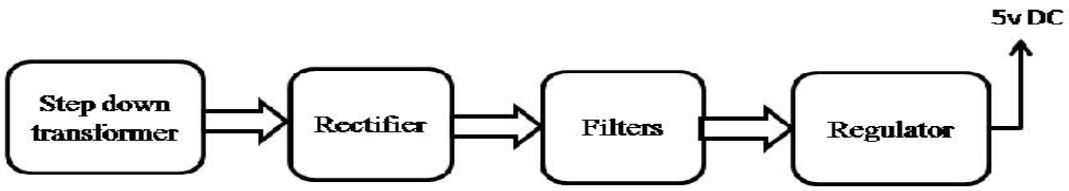
4.Voice based IC.

SOFTWARE'S USED:

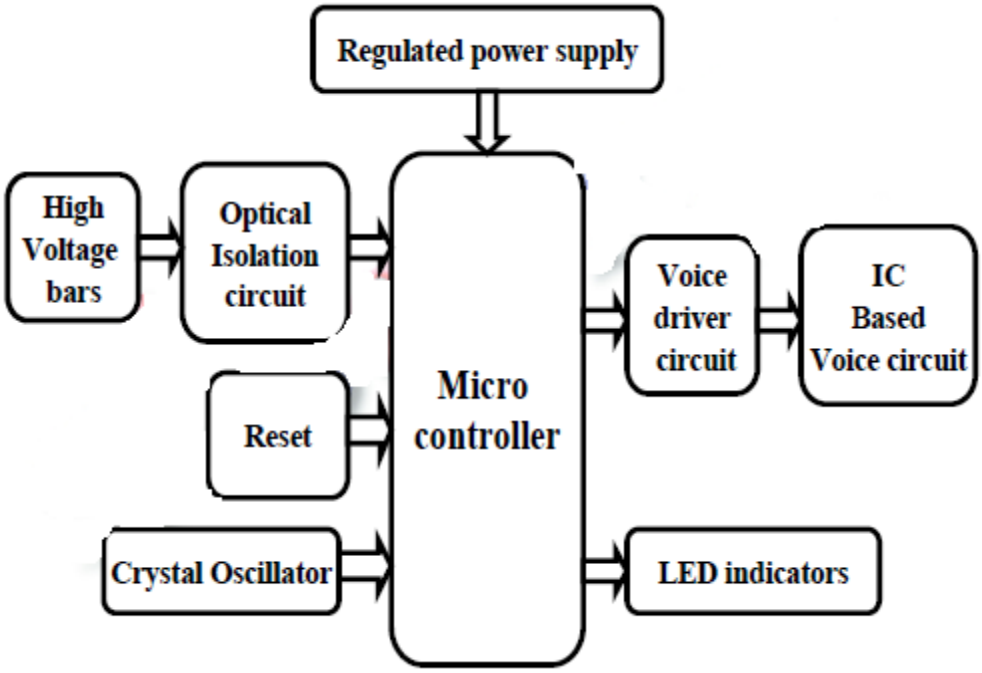
PIC-C compiler for Embedded C programming.

PIC kit 2 programmers for dumping code into Microcontroller.

Regulated power supply:



BLOCK DIAGRAM:



WIRELESS POWER TRANSMISSION

T.K.RISHIKESH (132021) , II Year – B section

INTRODUCTION:

Wireless power or wireless energy transmission is the transmission of electrical energy from a power source to an electrical load without man-made conductors. Wireless transmission is useful in cases where interconnecting wires are inconvenient, hazardous, or impossible. With wireless power, efficiency is the more significant parameter. A large part of the energy sent out by the generating plant must arrive at the receiver or receivers to make the system economical. The most common form of wireless power transmission is carried out using direct induction followed by resonant magnetic induction.

PRINCIPLE:

ELECTROMAGNETIC INDUCTION:

An electric current flowing through a conductor, such as a wire, carries electrical energy. When an electric current passes through a circuit there is an electric field in the dielectric surrounding the conductor; magnetic field lines around the conductor and lines of electric force radially about the conductor.

In an alternating current circuit, the fields also alternate; that is, with every half wave of current and of voltage, the magnetic and

the electric field start at the conductor and run outwards into space with the speed of light. Where these alternating fields impinge

on another conductor a voltage and a current are induced. This is as simple as the concept of mutual inductance also known as electromagnetic induction.

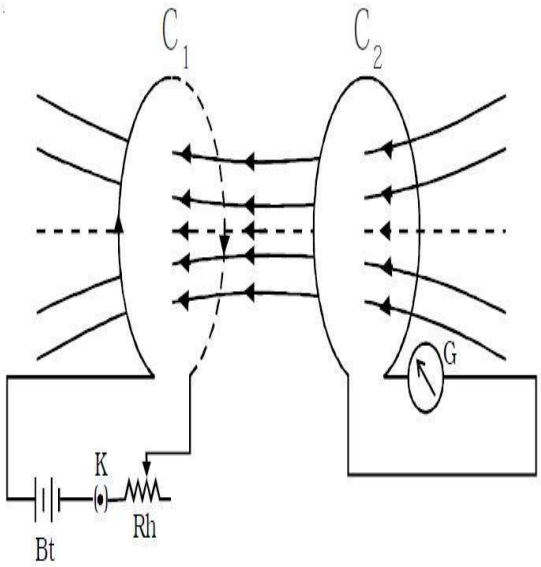
EXPERIMENTAL DEMONSTRATION

Faraday demonstrated the electromagnetic induction by an experiment. Figure shows two coils C1 and C2 placed close to each other. The coil C1 is connected to a battery Bt through a key K and a rheostat. Coil C2 is connected to a sensitive galvanometer G and kept close to C1. When the key K is pressed, the galvanometer connected with the coil C2 shows a sudden momentary deflection. This indicates that a current is induced in coil C2. This is because when the current in C1 increases from zero to a certain steady value, the magnetic flux linked with the coil C1 increases. Hence, the magnetic flux linked with the coil C2 also increases. This causes the deflection in the galvanometer. On releasing K, the galvanometer shows deflection in the opposite direction. This indicates that a current is again induced in the coil C2. This is because when the current in C1 decreases from maximum to zero value, the magnetic flux linked with the coil C1 decreases. Hence, the magnetic flux linked with the coil C2 also decreases. This causes the deflection in the galvanometer in the

Opposite direction. This principle is used in many places like alternators, generators, transformers etc.

Electromagnetic induction is proportional to the intensity of the current and voltage in the conductor which produces the fields and to the frequency. Higher the frequency, the more intense the inductive effect. Energy is transferred from a conductor that produces the fields (the primary) to any conductor on which the fields impinge (the secondary). Part of the energy of the primary conductor passes inductively across space into secondary

conductor and the energy decreases rapidly along the primary conductor .



ELECTROSTATIC INDUCTION:

Electrostatic induction or capacitive coupling is the passage of electrical energy through a dielectric. In practice it is an electric field gradient or differential capacitance between two or more insulated terminals, plates, electrodes, or nodes that are elevated over a conducting ground plane. The electric field is created by charging the plates with a high potential, high frequency alternating current power supply. The capacitance between two elevated terminals and a powered device form a voltage divider.

The electric energy transmitted by means of electrostatic induction can be utilized by a receiving device, such as a wireless lamp. Nikola Tesla demonstrated the illumination of wireless lamps by energy that was coupled to them through an alternating electric field.

The principle of electrostatic induction is applicable to the electrical conduction wireless transmission method.

EXAMPLE:

A simple example circuit is given in the circuit diagram. The circuit in the left side is the transmitting end and the circuit in the right hand side is the receiving end.

CONCLUSION:

Wireless power transmission is a promising field of Electrical Engineering and it has a very bright future scope.

UNDERFLOOR HEATING AND COOLING

R.ALAGU RAJA(122048), M.GOKULNATH(122106)

III YEAR – EEE , A SECTION

INTRODUCTION :

Underfloor heating and cooling is a form of central heating and cooling which achieves indoor climate control for thermal comfort using conduction, radiation and co nvection. The terms radiant heating and radiant cooling are commonly used to describe this approach because radiation is responsible for a significant portion of the resulting thermal comfort but this usage is technically correct only when radiation composes more than 50% of the heat exchange between the floor and the rest of the space.

Modern underfloor heating systems use either electrical resistance elements ("electric systems") or fluid flowing in pipes ("hydronic systems") to heat the floor. Either type can be installed as the primary, whole-building heating system or as localized floor heating for thermal comfort. Electrical resistance can only be used for heating; when space cooling is also required, hydronic systems must be used. Other applications for which either electric or hydronic systems are suited include snow/ice melting for walks, driveways and landing pads, turf conditioning of football and soccer fields and frost prevention in freezers and skating rinks.

Electric heating elements or hydronic piping can be cast in a concrete floor

slab ("poured floor system" or "wet system"). They can also be placed under the floor covering ("dry system") or attached directly to a wood sub floor ("sub floor system" or "dry system").

Some commercial buildings are designed to take advantage of thermal mass which is heated or cooled during off peak hours when utility rates are lower. With the heating/cooling system turned off during the day, the concrete mass and room temperature drift up or down within the desired comfort range. Such systems are known as thermally activated building systems or TABS.

HYDRONIC SYSTEMS :

Hydronic systems use water or a mix of water and anti-freeze such as propylene glycol as the heat transfer fluid in a "closed loop" that is recirculated between the floor and the boiler.

Various types of pipes are available specifically for hydronic underfloor heating and cooling systems and are generally made from polyethylene including PEX, PEX-Al-PEX and PERT. Older materials such as Polybutylene (PB) and copper or steel pipe are still used in some locales or for specialized applications.

Hydronic systems require skilled designers and trades people familiar with boilers, circulators, controls, fluid pressures and temperature. The use of modern factory assembled sub-stations, used primarily in district heating and cooling, can greatly simplify design requirements and reduce the installation and commissioning time of hydronic systems.

Hydronic systems can use a single source or combination of energy sources to help manage energy costs. Hydronic system **energy source** options are:

- Boilers (heaters) including Combined heat and power plants heated by:

- Natural gas or "methane" industry-wide is considered the cleanest and most efficient method of heating water, depending on availability. Costs about $7/million b.t.u.
- coal, oil or waste oil
- Electricity
- Solar thermal
- wood or other biomass
- bio-fuels

- Electric floor heating installation, cement being applied

- Electric systems are used only for heating and employ non-corrosive, flexible heating elements including cables, pre-formed cable mats, bronze mesh, and carbon films. Due to their low profile they can be installed in a thermal mass or directly under floor finishes. Electric systems can also take advantage of time-of-use electricity metering and are frequently used as carpet heaters, portable under area rug heaters, under laminate floor heaters, under tile heating, under wood floor heating, and floor warming systems, including under shower floor and seat heating. Large electric systems also require skilled designers and trades people but this is less so for small floor warming systems. Electric systems use fewer components and are simpler to install and commission than hydronic systems. Some electric systems use line voltage technology while others use low voltage technology. Power consumption of an electric system is not based on voltage but rather wattage output produced by the heating element.

FEATURES:

- Thermal comfort quality
- Indoor air quality
- Sustainability—energy
- Safety and Health
- Longevity, maintenance and repair

SOLAR POWERED AIRCRAFT DEVELOPMENTS
SOLAR ONE
S.R.AKSHAY SRINIVAS EEE – A (122108)

INTRODUCTION

The **Solar-Powered Aircraft Developments Solar One** is a British mid-wing, experimental, manned solar-powered aircraft that was designed by David Williams and produced by Solar-Powered Aircraft Developments under the direction of Freddie To and first flown on 13 June 1979. It was the third solar-powered aircraft to fly, after the unmanned AstroFlight Sunrise and the manned Mauro Solar Riser.

Design and development

Freddie To was a member of the Kremer prize committee who started a project to produce a human-powered aircraft to compete for the prize. The resulting aircraft, at 230 lb (104 kg), proved too heavy for human-powered **flight** and so was converted to solar power instead. A nose-mounted pod powerplant was installed consisting of four 1 hp (1 kW) permanent magnet 36 volt DC, 12 amp Bosch electric motors, powered by 750 **solar cells** of 3 inch diameter and a 65 lb (29 kg) Nickel-cadmium battery pack of 24 cells with a 25 amp hour capacity, connected in series. The motors are connected by a 3:1 bicycle chain reduction drive to a 63 in (160 cm) wooden two-bladed propeller, which turns at a maximum of 1,100 rpm, decreasing with battery discharge. The engines are controlled with a simple on/off switch. For flight the aircraft used its on-board solar cells to recharge the battery array on the ground and then the **batteries** provided power for flight as the aircraft had insufficient solar cells for sustained flight. This shortcoming was not a design feature, but a problem of the cost of the solar cells as the limited project **budget** of £16,000 did not allow the purchase of sufficient cells. The 750 installed solar cells cost £6,000 and were the most expensive part of the aircraft.he Solar One is constructed of a wooden structure covered with heat-shrunk Solarfilm model aircraft covering. The wing was built in three sections, a centre section and two outer wing panels to simply **storage** and transport. The wing spar is a laminated spruce girder box-**spar** design. The tail surfaces are quickly removable for storage.

The installed batteries provide for a climb of eight minutes plus a two-minute cruise allowance.

Operational history

The aircraft's first flight occurred at Lasham Airfield, Hampshire, United Kingdom and covered just under 0.75 mi (1.2 km). The pilot was Ken Stewart and the aircraft lifted off at 18 to 20 kn (33 to 37 km/h) and reached 35 kn (65 km/h) and 80 ft (24 m) in height. A second flight on the same day by Bill Maidment achieved a speed of 42 kn (78 km/h). All flights were made on battery power that had been recharged on the ground from the installed solar cells.

An intended flight across the English Channel was abandoned when the aircraft did not reach intended endurance targets.

Aircraft on display

- London Museum - sole example

Specificatioms (Solar One)

Data from History of Solar Flightand Flight Global

General characteristics

- **Crew:** one
- **Aspect ratio:** 17.8:1
- **Airfoil:** Wortman FX180
- **Empty weight:** 230 lb (104 kg)
- **Powerplant:** 4 × Bosch permanent magnet motors, 36 volt DC, 12 **amps** each, with a 3:1 bicycle chain reduction drive, powered by 750 solar cells of 3 inch diameter and a Nicad battery pack of 24 cells of 25 amp hour capacity connected in series, 1 hp (0.75 kW) each
- **Propellers:** 2-bladed wooden, 5 ft 3 in (1.60 m) diamete
- **Length:** 22 ft 0 in (6.71 m)
- **Wingspan:** 68 ft 0 in (20.73 m)
- **Wing area:** 260 sq ft (24 m^2)

Performance

- **Maximum speed:** 48 mph; 78 km/h (42 kn)
- **Service ceiling:** 80 ft (24 m)

ARTIFICIAL ELECTRONIC SUPER SKIN

S.DHARUN BASKAR(122007) & T.S.GOWTHAM(122112)

III YEAR – EEE , A SECTION

INTRODUCTION :

Zhenan Bao, **Stanford** researcher, is keen to create "Super skin." Taking her previously created super-sensitive sensor a step ahead, she is now creating a super skin that will be self-powered with renewable clean **solar energy**. Bao and her team have designed polymer solar cells that are flexible and can be stretched to power the 'super skin'.

Ms Bao had successfully built a sensor flexible and very sensitive to any pressure. It was able to detect even touch-down pressure of a fly. She had made this over a foundation of a flexible organic transistor made of supple polymers and materials which are carbon based. Touch-sensing is achieved by the fluctuations in the current flow which is caused by an elastic rubber layer shaped like myriad inverted pyramids.

RATIONALE FOR SENSING:

Changing the transistor's semiconducting material according to the type of material kept on sensor, the sensor can sense whether it is touching a chemical or a biological material. The semiconducting material can be just a nanometer or two layers only thick for the expected detection to occur. By changing the structural characteristics of the transistor as needed, the super skin detects chemicals in liquid or vapour state and bio matters like proteins.

DISEASE DETECTION:

Super skin being able to detect diseases by sensing the biomarker proteins corresponding to individual diseases, this can be taken a step further by fitting robots with super skins and allowing the robots to detect by touch whether a person has s disease-confirming biomarker or robot can test the sweat for drunkenness etc.

NEED OF POWER:

When the sensors detect the nature of the materials being tested, they have to send the data to a computer or a researcher. Instead of connecting to a power supply or batteries, incorporating polymer solar cells is a better idea as this will enable the sensors to be portable and less cumbersome and be more eco-friendly.

Stretchable solar cells

Bao's research papers mention of unidirectional stretchable nature of the solar cells, but Bao maintains that their solar cells are capable of stretching in both axes. Solar cells even in the stretched state generate power for sending the data collected by the sensors. A wavy microstructure is the reason for cells' stretchable nature. They expand to some 30% excess of their normal length and snap back to original condition. **Use for**

stretchable solar cells

Stretchable materials are stronger and it can be a very useful and valuable feature in many scenarios. Darren Lipomi, a graduate student & lead author said, "One of the applications where stretchable solar cells would be useful is in fabrics for uniforms and other clothes." The stretchable solar cells can also be integrated into curved areas like lenses, arches in buildings or car exteriors etc. also.

ECO FRIENDLY TRANSISTORS:

Today Bao has managed to make a green savvy version of the transistor made with materials that are biodegradable. Whatever materials go to make the transistor and its parts will not pose a threat to the environment. The super skin is much more than a human skin and now is totally eco-friendly, and will be powered by renewable energy source like solar energy.

NEW SOLAR TECHNOLOGY

T.L. SANTHANA KRISHNAN(132024) - II YEAR EEE-B

INTRODUCTION :

Teenage inventor, Aiden Dwyer 13 years old boy,created a new solar technology that emulates how trees convert sunlight into energy. Aiden studied trees to perfect a solar technology that generates electricity, faster and more efficiently than flat solar panels.

FUNCTION :

Trees,shrubs and plants use an inherent structures design to expose their leaves to sunlight for photosynthesis.How well they do this determines their survival,especially in forested areas that are densely populated with competing vegetation.Aiden utilized the information on how plants are structurally designed to create his new solar technology.This information originates from 1202, when the Italian mathematician **Fibonacci** published a book entitled "Liber Abaci" that introduced to western mathematicians a numerical sequence that originates in India.

The numerical sequence is 0,1,1,2,3,5,8,13 and so on.The first two numbers are 0 and 1, and each successive number is the sum of the previous two numbers.Therefore, 0+1 is 1,1+1 is 2, 1+2 is 3,2+3 is 5,3+5 is 8, 5+8 is 13 and so on.This sequence is known as the Fibonacci numbers.In botany,phyllotaxis is the structured pattern that leaves follow to arrange themselves on a plant.In many species of plants and trees, this arrangement coincides with the Fibonacci number sequence.For example,in this graphic of a plant,the leaves are numbered "1" to "13'.

Using a string,if we begin at leaf "1" and rotated the string clockwise around the stem to each leaf until we arrive at a leaf that was directly above "1", we would have made 3 complete rotations and would have met 5 leaves. The Fibonacci numbers are 3,5, or expressed as the ratio 3/5 beginning from the bottom leaf. In other words, 3 clockwise rotations for 5 leaves.If we continue rotating our string upwards,we would make 5 rotations to meet 8 leaves to get to 13. The Fibonacci numbers are 5,8,13. This leaf arrangement creates the maximum exposure to sunlight.Approximately 90 percent of plants are designed this wayhowever the patterns can begin at different ratios.

SOLAR TREE TECHNOLOGY:

Since the angle of the Sun's rays are not fixed,particularly during the changes in seasons,the use of fixed flat solar panels for homes is inefficient.Some residential solar systems are designed to move and track the sun but these systems substantially increase the cost of solar energy because they are expensive and require maintenance.Using the 2/5 number pattern for the oak tree,Aiden designed a solar tree using an array of solar panels as leaves. He also made of photovoltaic cells used in his solar tree.This allowed him to compare the effectiveness of both solar power kits.

The solar tree design produced 20% more electricity than the flat solar panel.It also captured 2.5 more hours of sunlight during the day,but when the sun was on the horizon,the solar tree produced 50% more electricity and captured 50% more hours of sunlight than the flat solar panel.

CONCLUSION :

Aiden's solar tree design **won him** the 2011 **Young Naturalist Award** from the American Museum of Natural History.Aiden is currently perfecting his new solar technology by studying the Fibonacci number arrangements of various trees at different latitudes.He has a patent pending for his invention and we look forward to the possibility that our streets and yards will be landscaped with his new solar technology tress.

TOP 5 INVENTIONS OF 2014

R.PRAVIN TANKRAJ (122034) – III Year – EEE 'B' Section

AFFORDABLE ROBOTIC EXOSKELETON

Physical therapy can be slow and strenuous with no guarantee of recovery. Robotic exoskeletons can sometimes provide the support a ravaged body needs to heal - and strength when it can't - but they typically cost more than a car and must be anchored to a wall and plugged into a socket. In late 2012, a team of mechanical engineering students at University of Pennsylvania set out to build a portable, affordable exoskeleton. Two semesters of late nights and long weekends later, Elizabeth Beattie, Nicholas McGill, Nick Parrotta, and Nikolay Vladimirov had the Titan Arm: an efficient, lightweight, and surprisingly powerful robotic limb. Its actuator, or electronic muscle, could provide resistance during therapeutic exercises and can augment strength, allowing its wearer to lift an additional 40 pounds with little effort.

To ensure a slimmer frame than other exoskeletons and make Titan Arm easier for patients to use, the team situated its actuator in a backpack instead of in the limb itself. They also milled load-bearing parts out of aluminium to limit weight and power consumption. McGill, the electronics lead, created a software-and-sensor package to track arm movements and wirelessly relay the data. This would allow a patient to use a Titan Arm at home and a therapist to remotely monitor the exercises.

Potential beneficiaries, including stroke victims and an injured snowboarder, have already reached out to the team with encouraging comments. The positive response to their $2,000 prototype has made Titan Arm's makers eager to push their invention toward a finished product and, to that end, they are now designing a more refined version. "We've been looking at 3-D printing to fully customize components, like tailoring a suit," says Parrotta.

1) POWER:

Lithium-polymer battery packs provide a day's worth of power.

2) MUSCLE:

An electric motor in the backpack winds steel cables to rotate pulleys and induce arm movement. Beattie (left) designed a support system to safely distribute weight across a hip belt, elbow straps, and back plate.

3) BRAINS:

Software reads the positions of magnetic sensors in the steel joints to instruct movement, which the operator controls from a handheld device

Inventors: Elizabeth Beattie, Nicholas McGill, Nick Parrotta, Nikolay Vladimirov

Development cost to date: $2, 000

CHARGE GADGETS WITH YOUR FOOTSTEPS

Take a hike, earn an iPhone battery's worth of energy. Each thud of a hiker's heel releases enough energy to illuminate a light bulb. Rather than waste that power, Matt Stanton, an

engineer and avid backpacker, created a shoe insole that stores it as electricity. The device promises to be an improvement over traditional, hefty power packs as well as solar chargers, which work slowly or not at all, depending on the weather.

Stanton worked closely with Hahna Alexander, a fellow Carnegie Mellon University engineering student, over three years to create the Sole Power system. Instead of using piezoelectric and other inefficient, bulky methods of generating electricity, the pair shrunk down components similar to those found in hand-cranked flashlights. The result is a near standard–size removable insole that weighs less than five ounces, including a battery pack, and charges electronics via USB.

Sole Power's current version, to be released later this year, requires a lengthy 15-mile walk to charge a smart phone. But Stanton says the company is working toward a design that can charge an i Phone after less than five miles of hiking and withstand about 100 million footsteps of wear and tear.

OPERATION :

1) A drive train converts the energy of heel strikes into rotational energy, spinning magnetic rotors.

2) The motion of the rotors induces an electrical current within coils of wire.

3) Electricity travels along a wire and into a lithium-ion polymer battery pack on a wearer's shoelaces.

Inventors: Hahna Alexander, Matt Stanton

Development cost to date: $300,000

Company: Sole Power LLC

ATLAS HUMANOID ROBOT

Even just to look at, the Atlas humanoid robot is impressive. At 6' 2" and 330 pounds, it's the size of an NFL defensive tackle. It can walk and lift heavy objects, replace its hands with customized attachments and complete tasks without direct human supervision, thanks to an on-board computer and plenty of sensors.

The hope is that Atlas someday soon will be working alongside human first responders to earthquakes, typhoons and other disasters, helping to carry supplies or clear debris. It also could be sent into situations deemed too dangerous for humans, such as the 2011 disaster at the Fukushima nuclear plant in Japan.

But Atlas has a ways to go before it's tackling search-and-rescue missions. The result of a $10.9 million contract with Boston Dynamics, the strapping robot must first take part in DARPA's Robotics Challenge, which invites teams of engineers to create a remotely controlled robot that can respond to disasters.

Variations of Atlas, programmed by different teams, will face off against other robots this December in a series of trials meant to test the machines' readiness for the field. In a series of disaster scenarios, the robots must be able to navigate rough terrain on foot, move debris, climb a ladder and tear down doors or walls to get to victims.

Since communication can be spotty after a disaster, they must also be able to operate semi-independently. The robots will even be tasked with driving a vehicle.

DARPA's ROBOTICS :

The top-performing robots will then receive further funding, undergo improvements and go on to compete in the DARPA's Robotics Challenge finals in December 2014. At least one version of Atlas is expected to be among them.

GOOGLE GLASS

People see what they want to see with Google Glass.For some, the wearable computer is the next step up from the smartphone. It's a real-time GPS, a videocamera, an Internet browser – and it does it all while perched on the bridge of your nose like eyeglasses. Just say "OK, Glass" or gesture with your hands, and Google Glass responds instantly, showing the results in a small display that floats just above your right eye.

It's been a source of amusement for people like author Gary Shteyngart, one of the first people in New York to try Glass, who wrote a humorous essay about reactions as he wore it around the city. It's also been a source of concern: Authorities consider it a driving distraction and even people who are impressed by the technology wonder if it's just Big Brother in colourful frames.

So far, Google has offered Glass only through its Explorer program, which requires a compelling reason and $1,500 for a tester model. But a mass-produced version is expected to hit the market in 2014.

Its capabilities are immense: integration with medical technology, on-the-spot journalism, "augmented reality," hands-free photography, even exchanging virtual lives. (But no sex, please – at least not unless you want to get Google mad.)

Google hasn't given a specific date Glass will go on sale. In fact, it hasn't acknowledged if Glass will sell widely at all. But there's a boat floating in San Francisco Bay that may offer some clues to the future. According to speculation, it's soon to be a Glass showroom.

NEW CAMERA SENSOR ELIMINATES NEED FOR FLASH

No flash? No problem. A new imaging sensor could soon make it possible for photographers to take clear, sharp photos, even in dim lighting.

INVENTOR :

Created by a team of researchers at Nanyang Technological University (NTU) in Singapore, the new sensor is highly sensitive to both visible and infrared light, which means it could be used in everything from the family Nikon to surveillance and satellite cameras.

SENSOR :

The sensor, which is 1,000 times more sensitive to light than the imaging sensors of most of today's cameras, gets this high photo response from its innovative structure.

It's made of graphene, a super strong carbon compound with a honeycomb structure that is as flexible as rubber, more conductive than silicon and which resists heat better than a diamond.

GRAPHENE :

Graphene, which is a one atom-thick layer of the mineral graphite, has already earned a reputation as the building material of the future. Andre Geim and Konstantin Novoselov took home the Nobel Prize in physics in 2010 for their work with the compound.

INVENTOR :

The inventor of the new sensor, Wang Qijie, an assistant professor at NTU's School of Electrical and Electronic Engineering, said this is the first time that a broad-spectrum, high photosensitive sensor has been made using pure graphene.

"We have shown that it is now possible to create cheap, sensitive and flexile sensors from graphene alone," said Wang. "We expect our innovation will have great impact not only on the consumer imaging industry, but also in satellite imaging and communication industries, as well as the mid-infrared applications."

Wang said the key to his new sensor is the use of "light-trapping" nanostructures that use graphene as a base. The nanostructures hold onto light-generated electron particles for much longer than conventional sensors.

This results in a stronger than usual electric signal, which can be processed into an image, like a photograph captured by a digital camera.

Most of today's camera sensors use a complementary metal-oxide semiconductor as a base. But Wang said that his graphene base is far more effective, producing clearer, sharper photos.

And, according to Wang, he even took current manufacturing practices into account when designing this new sensor. In principle, the camera industry will be able to keep using the same process to make its sensors, but simply switch out the base materials for graphene.

If the industry chooses to adopt his design, Wang said it could lead to cheaper, lighter cameras with longer battery lives for all.

FUTURE TRENDS IN ELECTRICAL ENGINEER

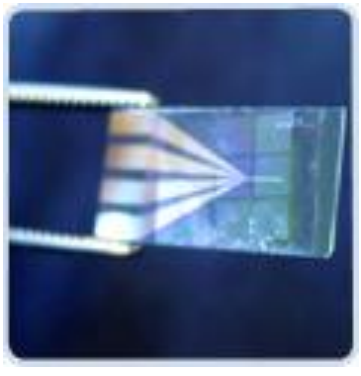
N.VIGNESH (122032) , III year – C section

INTRODUCTION :

The worldwide electrical and electronics industry is the most flourishing and extremely diversified sector. This sector has been growing at a rapid pace with human friendly innovations, inventions and technology trends. The following list is an attempt to enlist all such future trends and innovations.

CELL-SIZED BATTERIES:

These micro batteries could be only half the size of a human cell. Interestingly, these would be made of viruses. This rare innovation is set to provide us a relief from heavy 9-volts batteries and other models. This technology involves the use of micro contact printing. This printing fabricates and position micro battery electrodes. Further, it is probably the first use of virus in this field. These batteries could be used in a series of fields such as computers, cell phones and medical equipments which are implantable.

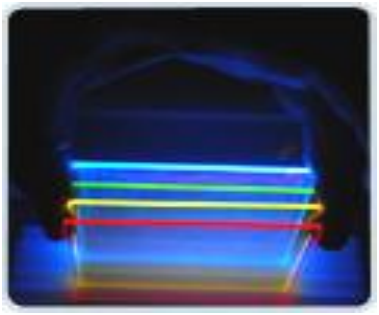


PRECISE PATTERN MICRO-CHIP:

This innovation is supposed to bring microchip technology at its peak. This system works when some molecules are made to assemble themselves into precise patterns. A self-assembling molecular system which is called block copolymers was known for many years. This system was not very effective as it could produce a molecular-orders or patterns in a very limited way via self-assembling. Thus to make it more equipped and advanced, this "limited self-assembly" was made to combine with conventional lithographic chip-making technology. These lithographic patterns cause a tight-hold over self-assembling molecules. Thus they become more structured.

HIGH-POWER SOLAR CONCENTRATORS:

As the initial research has proved to be fruitful, there are chances that in coming years we will see a sort of solar concentrator, which would be more efficient than the contemporary solar concentrators. The most striking part of this innovation is that it brings huge amount of solar light to the solar cells that too without tracking the sun. Though it showed only 92 percent of stability during the research, it is supposed to guarantee a 100 percent stability till it arrives in the market.



SMART OPTICAL MICROCHIPS:

Days are not far way when we could see a microchip not running by electricity but by light itself. This microchip is set to utilize a complete and unorthodox functional system. This chip may be capable of being adjusted to the "amount of bandwidth available in an optical network." Also this chip may " automatically process signals flowing through fiber-optic networks, without using any electrical power."

NEW ANALOG CIRCUITS:

These much optimized and latest analog circuits may one day eliminate all the operational amplifiers. However, it is said that it would be as useful as the existing operational amplifier-based circuits. The scientists call these analog circuits as comparator-based switched capacitor (CBSC) circuits. They are said to be more user-friendly and power efficient as they are well equipped to handle voltages in a much better way. This is being termed as something which can give a new dimension to the consumer electronics.

FACTS TO REMEMBER

RULES FOR WRITING - SI UNITS
G.KATHIRAVAN (122041) – III Year – EEE , B section

- The units named after scientists are not written with a capital initial letter.

For example : ampere, henry, watt

- The symbols of the units named after scientist should be written by a capital letter.

For example : N for newton, H for henry, W for watt

- Small letters are used as symbols for units not derived from a proper name.

For example : A for ampere is correct, amps is a wrong unit

- No full stop or other punctuation marks should be used within or at the end of symbols.

For example : 50 A not 50 A.

- The symbols of the units do not take plural form.

For example : 50 ampere not 50 amperes , 10 ohm not 10 ohms

- Some space is always to be left between the number and the symbol of the unit and also between the symbols for compound units.

For example:50A is wrong representation, 50 A is correct

- Only accepted symbols should be used.

For example : ampere is represented as A and not as amp. or am ; second is represented as s and not as sec.

- Numerical value of any physical quantity should be expressed in scientific notation.

For an example,
Permittivity of free space is $8.854*10^{-12}$ F/m not as 0.00000000008854 F/m.

FAMOUS QUOTES

K.R.SANTHOSH KUMAR (122303) – III year , C sec

My message, especially to young people is to have courage to think differently, courage to invent, to travel the unexplored path, courage to discover the impossible and to conquer the problems and succeed. These are great qualities that they must work towards. This is my message to the young people.

-A. P. J. Abdul Kalam

You have to dream before your dreams can come true.

-A. P. J. Abdul Kalam

If a country is to be corruption free and become a nation of beautiful minds, I strongly feel there are three key societal members who can make a difference. They are the father, the mother and the teacher.

-A. P. J. Abdul Kalam

One of the very important characteristics of a student is to question. Let the students ask questions.

-A. P. J. Abdul Kalam

We are in danger of destroying ourselves by our greed and stupidity. We cannot remain looking inwards at ourselves on a small and increasingly polluted and overcrowded planet.

-Stephen Hawking

Our population and our use of the finite resources of planet Earth are growing exponentially, along with our technical ability to change the environment for good or ill. -Stephen Hawking

I think the brain is essentially a computer and consciousness is like a computer program. It will cease to run when the computer is turned off. Theoretically, it could be re-created on a neural network, but that would be very difficult, as it would require all one's memories.

-Stephen Hawking

The roots of education are bitter, but the fruit is sweet. -Aristotle

Excellence is an art won by training and habituation. We do not act rightly because we have virtue or excellence, but we rather have those because we have acted rightly. We are what we repeatedly do. Excellence, then, is not an act but a habit.

-Aristotle

Design is not just what it looks like and feels like. Design is how it works.

-Steve Jobs

Sometimes life hits you in the head with a brick. Don't lose faith.

-Steve Jobs

We are all born ignorant, but one must work hard to remain stupid.

-Benjamin Franklin

RECRUITMENT QUERIES

TIPS FOR PREPARATION OF IAS

K.THENMOZHI(122013) & A.SUMAIYA (122053)
III YEAR –C SECTION

Transform yourself into a bookworm

Study from morning till night and from night till morning! Get your parents or friends to check your answers. Let them test you in every possible way. Writing/reading, objective type questions, the works.

Choose the Subjects

Choose wisely from beginning. The preliminaries will be the first obstacle you have to overcome. you will face objective type questions which have the inherent quality of actually being a prompter. If you were to be unsure of answers, you would be able to identify the right answer. Precise answers are possible in Mathematics and it could be your first choice.

Additional Subjects

History and geography should also be comparatively surmountable. Buy cheap editions of books pertaining to these subjects and read them. If you are an engineering student, you may well choose subjects you had studied during your course.

General Knowledge

General Knowledge is not actually one subject. It is a conglomeration of any number of subjects. The question setter, could be a vicious man taking some pleasure in asking questions like "How many strings did Eric Clapton break in his guitar during his 1999 concert in Madison Square garden?". I bet no one on this earth will know the answer including the the paper setter.

Watch knowledge TV channels

What you can do is read anything that comes your way, including the cheesecake wrapper that you throw away. Stop watching saas Bhahu and go instead for CNN and National Geographic. And, read as may newspapers as you can every day.

Dress well for the Interview

The face to face interview could prove to be intimidating. You should be dressed to kill with nary a deficiency nor an over-do. As far as possible, wear hand-stitched dresses that are skin fitting. Insert the shirt into the pants. Wear a sober tie and a decent pair of leather shoes.

Carry yourself with confidence

Your manners should show how sure you are about yourself. The intimidator should feel intimidated by your sure manners. Remember that men sitting on the other side of the table are people with flesh and blood just like you are.

At the Interview Table

The trick is for them to ask you what you may consider some inane and stupid questions but they are being asked to gauge how alert you are. Well, here again, it could be anything, like "How many glasses of water did you drink today?" You, of course, do not know the answer. But neither does he. Inform him emphatically without batting an eyelid, "15". Do not worry, you are safe.

Language Skills

The importance of language practice cannot be stressed enough. Be sure to know the nuances and intricacies of the language that the interview is going to be conducted in. Communication skills carry their own rather heavy weight in the IAS interviews.

Sleep in order to be awake

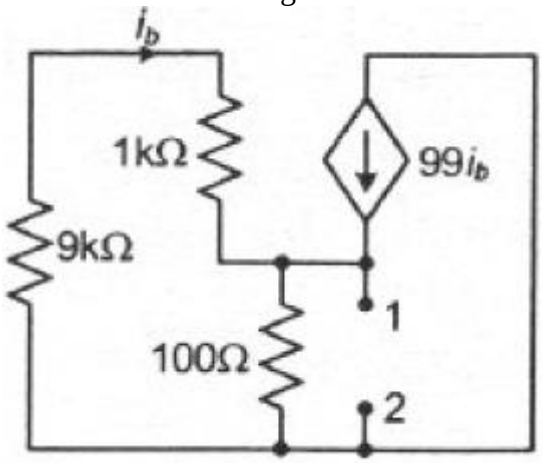
Whatever the examination, you to take complete rest the previous night. You are not going to be any wiser by reading at the eleventh hour.

TECHNICAL QUIZ IN EEE

SELVAPRIYA.S(122307) , RASHMI.B(122046) –

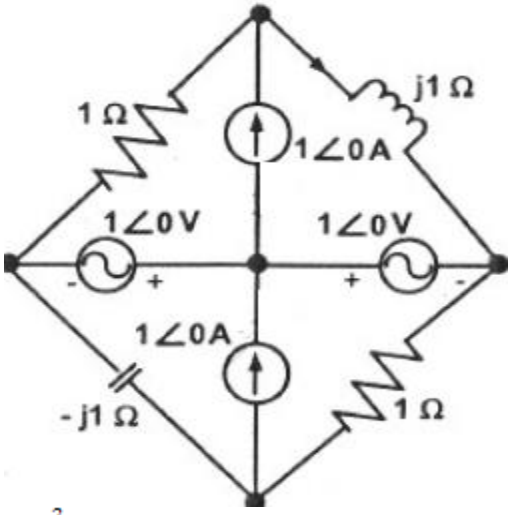
III year – C section

1. The impedance looking into nodes 1 and 2 in the given circuit is



a) 50Ω
b) 100Ω
c)5kΩ
d)10.1kΩ

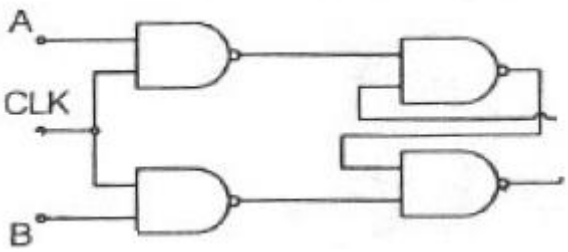
2.In the circuit shown below,the current through the inductor is



a)$\frac{2}{(1+j)}$A
b) $\frac{-1}{1+j}$ A

c)$\frac{1}{1+j}$ A
d)0 A

3. Consider the given circuit



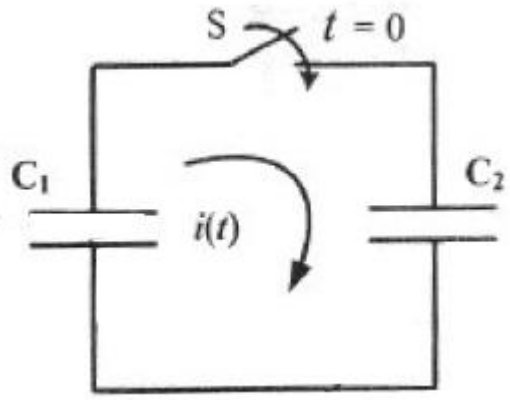
In this circuit,the race around
a)Does not occur
b)Occurs when CLK=0
c)Occurs when CLK = 1 and A = B = 1
d)Occurs when CLK = 1 and A = B = 0

4)The minimum resistance value for a blue,gray,red,silver resistor is
a) 612Ω
b) 6,120Ω
c) 6,800Ω
d) 6,460Ω

5. A certain appliance uses 350W.If it is allowed to run continuously for 24 days,how many kilowatt-hours of energy does it consume?
a) 20.16kWh
b) 201.6kWh
c) 2.01kWh
d) 8.4kWh

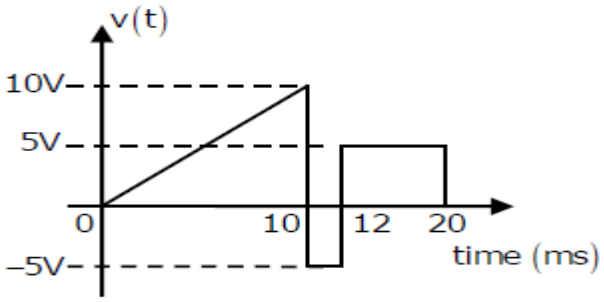
6. A power supply produces a 0.6 W output with an input of 0.7W.Its percentage of efficiency is
a) 8.57%
b) 42.85%
c) 4.28%
d) 85.7%

7. In the following figure,C_1 and C_2 are ideal capacitors,C_1 has been charged to 12V before the ideal switch S is closed at t=0.The current i(t) for all t is



a)Zero
b)A step function
c)An exponentially decaying function
d)An impulse function

8. A periodic voltage waveform observed on an oscilloscope across a load is shown.A permanent magnet moving coil(PMMC)meter connected across the same load reads



a)4 V
b)5 V
c)8 V
d)10 V

9. Two independent random variables X and Y are uniformly distributed in the interval [-1,1].The probability that max [X,Y] is less than ½ is
a)3/4
b)9/16
c)1/4
d)2/3

10. The bus admittance matrix of a three-bus three-line system is

$$Y=j\begin{bmatrix}-13 & 10 & 5\\ 10 & -18 & 10\\ 5 & 10 & -13\end{bmatrix}$$

If each transmission line between the two buses is represented by an equivalent π-network,the magnitude of the shunt susceptance of the line connecting bus 1 and 2 is
a) 4
b) 2
c) 1
d) 0

FAMOUS INDUSTRIES IN FIELD OF EEE AND THEIR PROFILES

A.VIJAY ARAVIND (122027) – III Year – EEE , C section

1. **BHARAT HEAVY ELECTRICALS LTD.:**

CORPORATE OFFICE - NEW DELHI

ESTABLISHMENT – 1964

BUSINESS - ELECTRICAL EQUIPMENTS

WEBSITE: www.bhel.com

BHEL is the largest engineering enterprise of India with an excellent track record of performance. The company now has 16 manufacturing divisions, 8 service centres and 4 power sector regional centres. Manufactures over 180 products under 30 major product groups and meets the needs of core-sectors like power, industry, transmission, transportation (including railways), defence, telecommunications and oil business.. It is currently operating more than 150 project sites across India and abroad. The company has added Power Plant Piping Unit, Thirumayam, Tamil Nadu as its 16th Manufacturing Unit on 2nd August 2013.

Job openings (18/08/14) : 32 jobs(India)
To check current job openings : **http://www.bhel.com/jobs.php**

2. ABB

CORPORATE OFFICE – SWITZERLAND
ESTABLISHMENT – 1988

BUSINESS – ELECTRICAL EQUIPMENTS

WEBSITE – www.abb.com

ABB is a global leader in power and automation technologies. The company employs 145,000 people and operates in approximately 100 countries. ABB has been successfully investing in the Indian subcontinent ever since and has steadily expanded its manufacturing, engineering and R&D footprint. Today, ABB employs over 10,000 people across more than 40 locations in Bangladesh, India and Sri Lanka. ABB has 12 manufacturing sites on the subcontinent and one of its seven corporate research centers around the world is based in India

Job openings (18/08/14) : 1344 jobs (worldwide), 51 jobs (India)

To check current job openings : **http://new.abb.com/careers/job-search.**

3. SIEMENS :

CORPORATE OFFICE – GERMANY
ESTABLISHMENT – 1847

BUSINESS – RENEWABLE ENERGY, POWER GENERATION & TRANSMISSION

WEBSITE : www.energy.siemens.com

The Siemens Group in India has emerged as a leading inventor, innovator and implementer of leading-edge technology enabled solutions operating in the core business segments of Industry, Energy, Healthcare and Infrastructure and Cities. The Group's business is represented by various companies that span across these various segments. Today, Siemens, with its world-class solutions plays a key role in India's quest for developing modern infrastructure. In India, Siemens has installed over 500 industrial steam and gas turbines with a capacity of over 9,000 MW, over 200 compressors and 500 high-voltage bays. Among its recent achievements is the

manufacture of the country's first 500 MVA HVDC transformer and the world's first 1200 kV SF6 high-voltage circuit breaker.

Job openings (18/08/14) : 1,460 Jobs (worldwide), 12 jobs (India)

To check current job openings: **https://jobsearch.siemens.biz/career?company=Siemens**

4. CROMPTON GREAVES :

CORPORATE OFFICE – MAHARASHTRA
ESTABLISHMENT – 1878

BUSINESS– ELECTRICAL EQUIPEMENTS

WEBSITE – www.cgglobal.com

CGL has grown from a single unit making AC Industrial Motors and Ceiling Fans to a multi-dimensional corporation with business interests in many product areas including Transformers, Motors, Switchgears, Control Panel Accessories, Water Pumps, Electronic and Telecom Equipments and Services. With its 28 manufacturing plants and countrywide marketing and support network, CGL effectively provides value to its customers. The manufacturer of the largest rating of power transformer (320 MVA) to leave Indian shores. The manufacturer of the largest Static Var Compensation (Statcom) system for wind-farm applications.

The first Indian company to introduce Polycrete insulation technology for medium-voltage outdoor dry type-voltage apparatus. The first Indian company to develop silicon-free electrical stampings, and to introduce low-voltage induction motors with silicon-free electrical stampings. The first company to develop brushless DC motors for fans used in Indian Railways. First ISMS - Information Security Management System certification in Engineering sector.

Total Vacancies Posted(18/08/14) : 162

To check current job openings : https://cghr4u.cgglobal.com/careers/jobs.asp

EXPECTATIONS FROM EMPLOYEES:

Expertise and experience (technologies, professional knowledge, methods, markets as well as projects, leadership and international experience).

Abilities (customer-oriented, results-focused, cultural understanding etc.)

ELECTRICAL ENGINEERING INTERVIEW QUESTIONS

B.D.SAKTHI MAI (122003), T.VANITHA(122042) III yr-EEE-C

1.Why star delta starter is preferred with induction motor?

• Starting current is reduced 3-4 times of the direct current due to which voltage drops and hence it causes less losses.
• Star delta starter circuit comes in circuit first during starting of motor, which reduces voltage 3 times, that is why current also reduces up to 3 times and hence less motor burning is caused.
• In addition, starting torque is increased and it prevents the damage of motor winding.

2.State the difference between generator and alternator.

Generator and alternator are two devices, which converts mechanical energy into electrical energy. Both have the same principle of electromagnetic induction, the only difference is that their construction. Generator persists stationary magnetic field and rotating conductor which rolls on the armature with slip rings and brushes riding against each other, hence it converts the induced emf into dc current for external load whereas an alternator has a stationary armature and rotating magnetic field for high voltages but for low voltage output rotating armature and stationary magnetic field is used.

3.Why AC systems are preferred over DC systems?

Due to following reasons, AC systems are preferred over DC systems:
a. It is easy to maintain and change the voltage of AC electricity for transmission and distribution.

b. Plant cost for AC transmission (circuit breakers, transformers etc) is much lower than the equivalent DC transmission
c. From power stations, AC is produced so it is better to use AC then DC instead of converting it.
d. When a large fault occurs in a network, it is easier to interrupt in an AC system, as the sine wave current will naturally tend to zero at some point making the current easier to interrupt.

4.How can you relate power engineering with electrical engineering?

Power engineering deals with generation, transmission and distribution of energy in electrical form. Design of all power equipments also comes under power engineering. Power engineers may work on the design and maintenance of the power grid i.e. called on grid systems and they might work on off grid systems that are not connected to the system

5.What are the various kind of cables used for transmission?
• Low-tension cables, which can transmit voltage up to 1000 volts.
• High-tension cables can transmit voltage upto 23000 volts.
• Super tension cables can transmit voltage 66 kV to 132 kV.

6.Why back emf used for a dc motor? highlight its significance.

The induced emf developed when the rotating conductors of the armature between the poles of magnet, in a DC motor, cut the magnetic flux, opposes the current flowing through the conductor, when the armature rotates, is called back emf. Its value depends upon the speed of rotation of the armature conductors. In starting, the value of back emf is zero.

7.What is slip in an induction motor?

Slip can be defined as the difference between the flux speed (Ns) and the rotor speed (N). Speed of the rotor of an induction motor is always less than its synchronous speed. It is usually expressed as a percentage of synchronous speed (Ns) and represented by the symbol 'S'.

8.Explain the application of storage batteries.

Storage batteries are used for various purposes, some of the applications are mentioned below:

- For the operation of protective devices and for emergency lighting at generating stations and substations.
- For starting, ignition and lighting of automobiles, aircrafts etc.
- For lighting on steam and diesel railways,trains.
- As a supply power source in telephone exchange, laboratories and broad casting stations.
- For emergency lighting at hospitals, banks, rural areas where electricity supplies are not possible.

9.What are the different methods for the starting of a synchronous motor.

Starting methods: Synchronous motor can be started by the following two methods:

- By means of an auxiliary motor: The rotor of a synchronous motor is rotated by auxiliary motor. Then rotor poles are excited due to which the rotor field is locked with the stator-revolving field and continuous rotation is obtained.
- By providing damper winding: Here, bar conductors are embedded in the outer periphery of the rotor poles and are short-circuited with the short-circuiting rings at both sides. The machine is started as a squirrel cage induction motor first. When it picks up speed, excitation is given to the rotor and the rotor starts rotating continuously as the rotor field is locked with stator revolving field

10.Name the types of motors used in vacuum cleaners, phonographic appliances, vending machines, refrigerators, rolling mills, lathes, power factor improvement and cranes.

Following motors are used: -

- Vacuum cleaners- Universal motor.
- Phonographic appliances – Hysteresis motor.
- Vending machines – Shaded pole motor.
- Refrigerators – Capacitor split phase motors.
- Rolling mills – Cumulative motors.
- Lathes – DC shunt motors.
- Power factor improvement – Synchronous motors.

NOTE:

- Real Power: It is the product of voltage, current and power factor i.e. P = V I cos j and basic unit of real power is watt. i.e. Expressed as W or kW.

• Apparent power: It is the product of voltage and current. Apparent power = V I and basic unit of apparent power is volt-ampere. Expressed as VA or KVA.
• Reactive Power: It is the product of voltage, current and sine of angle between the voltage and current i.e. Reactive power = voltage X current X sinj or Reactive power = V I sin j and has no other unit but expressed in VAR or KVAR.

(1) The statement that is not true for a continuous time causal and stable LTI system is
(A) Zeros of the system can lie anywhere in the s-plane
(B) All the poles must lie within | s | = 1.
(C) All the poles of the system must lie on the left side of the j? axis.
(D) All the roots of the characteristic equation must be located on the left side of the jw axis

ANSWER: All the poles must lie within | s | = 1.

(2) Let $v = 2x^2y + 3y^2z + 4z^2x$. The curl of the gradient of the scalar field v is

(A)0
(B)∞
(C)4ax + 6ay + 8az
(D) None of the above

ANSWER: 0

(3) On which factor the slip of an induction motor normally does not depend?

(A)Shaft torque
(B)Rotor speed
(C)Core loss component
(D) Synchronous speed

ANSWER: Core loss component

(4) For finding mutual inductance the bridge method that is commonly used is

(A)Schering bridge
(B)Heaviside Campbell bridge
(C)Wein bridge
(D) De sauty bridge

ANSWER: Heaviside Campbell bridge

(5) Which one of the following statement is true for a 4-point starter? A 4-point starter is used to start and control the speed of a

(A)Dc compound motor
(B)Dc series motor
(C)Dc shunt motor with field weakening control
(D)Dc shunt motor with armature resistance control

ANSWER: Dc shunt motor with armature resistance control

(6) The low-pass filter and high-pass filter are cascaded with each other. Cut-off frequency of low-pass filter and high-pass filter are 30Hz and 20 Hz respectively. The resultant system of filters will function as

(A)An all-stop filter
(B)An all-pass filter
(C)A band-pass filter
(D)A band-stop filter

ANSWER: A band-pass filter

(7) The base load power plants are

(A)Nuclear, run-of-river and diesel
(B)Nuclear and run-of-river
(C)Run-of-river and pump storage
(D)Pump storage and diesel

ANSWER: Nuclear, run-of-river and diesel

VISION

TO BECOME A HIGH STANDARD OF EXCELLENCE IN EDUCATION, TRAINING AND RESEARCH IN THE FIELD OF ELECTRICAL & ELECTRONICS ENGINEERING AND ALLIED APPLICATIONS.

MISSION

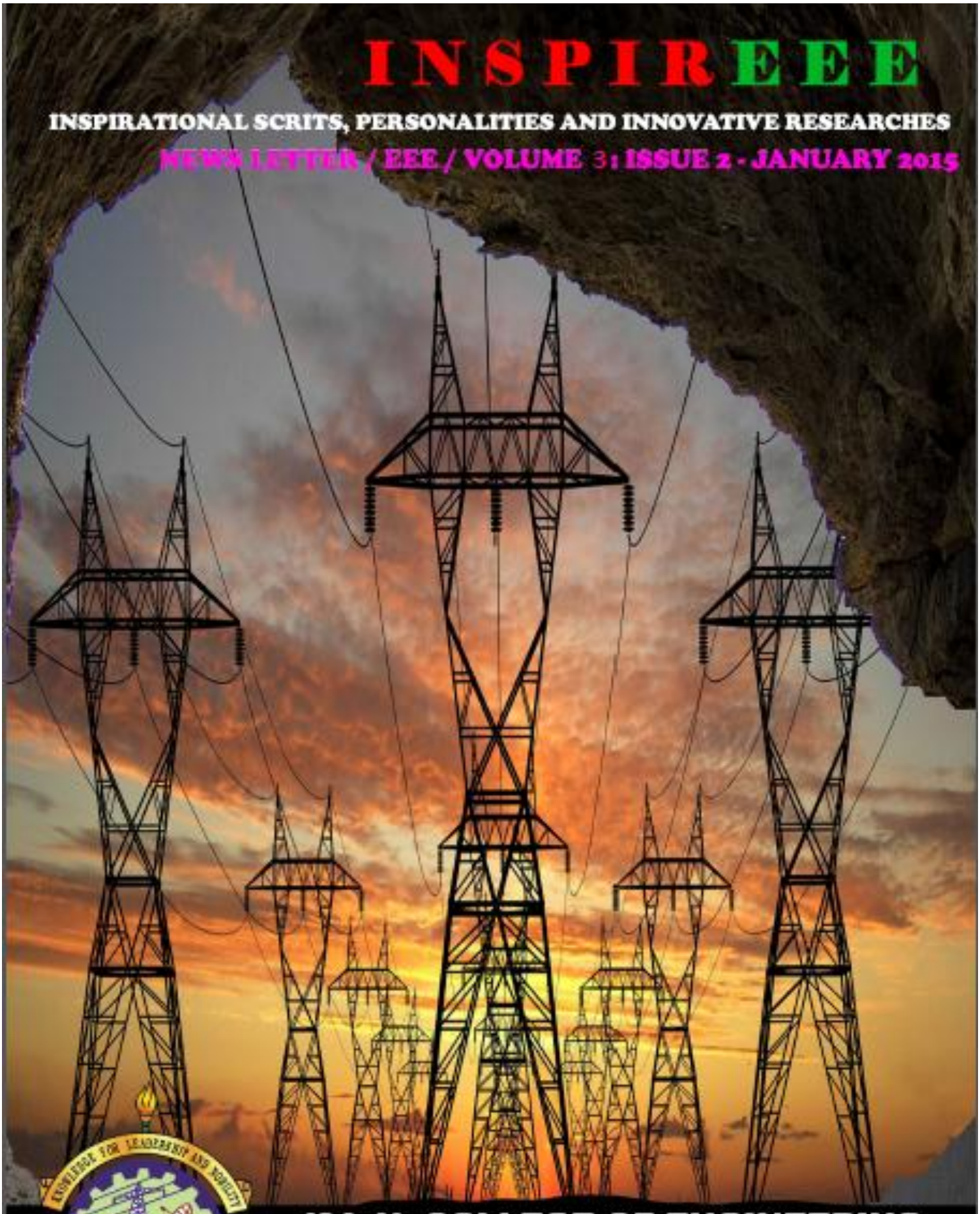
TO PRODUCE EXCELLENT, INNOVATIVE AND NATIONALISTIC ENGINEERS WITH ETHICAL VALUES AND TO ADVANCE THE FIELD OF ELECTRICAL & ELCTRONICS ENGINEERING AND ALLIED AREAS.

VOLUME 2 - ISSUSE 1 - SEPTEMBER 2014

INSPIREEEE

INSPIRATIONAL SCRITS, PERSONALITIES AND INNOVATIVE RESEARCHES

NEWS LETTER / EEE / VOLUME 3: ISSUE 2 - JANUARY 2015



K.L.N. COLLEGE OF ENGINEERING
Approved by AICTE and Afflicated to Anna University
An ISO 9001 : 2008 Certified Institution
Pottapalayam - 630 611, Sivagangai Dt., Tamilnadu.

INSPIREEE

INspirational **S**cripts, **P**ersonalities and **I**nnovative **R**esearches of **EEE**

VISION :

To become a high standard of excellence in Education, Training and Research in the field of Electrical & Electronics Engineering and allied applications.

MISSION :

To produce excellent, innovative and Nationalistic Engineers with Ethical Values and to advance the field of Electrical & Electronics Engineering and allied areas.

K.L.N. College of Engineering

Pottapalayam – 630 611, Sivagangai District, Tamil Nadu, India

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MESSAGE FROM HEAD OF THE DEPARTMENT

Dr. S.M. Kannan, M.E., Ph.D.,
MIE, MISTE, MIEEE (USA)
HOD/EEE,
K.L.N.College of Enigneering

MESSAGE

In this issue, concepts like conductive ink, thinnest Electric Generator interesting. While variety of Software for Electrical and Electronics Engineering presented, one should choose, carefully, at least four or five, in depth, to apply for solving Engineering Problems. Plenty of job Opportunities are exists in Government sector, that requires consistent preparation and best performance. Similarly the details of loan for starting own business may also be included. Congratulation for nice contribution.

Best wishes to all

(Dr. S.M. Kannan)

Head of the Department – EEE

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M.S.Ramya (140209 , M.E - I^{yr})	Overall editing
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C.Sakthi vinayagam(140212, M.E- I^{yr})	Text alignment

SPARKERS

OF

ELECTRICAL

ENGINEERING

HEINRICH RUDOLF HERTZ

DIVYA DHANALAKSHMI(140213)

M.E/PSE – I Year

The great German physicist, Heinrich Hertz made possible the development of radio, television, and radar by proving that electricity can be transmitted in electromagnetic waves. He explained and expanded the electromagnetic theory of light that had been put forth by Maxwell.

He was the first person who successfully demonstrated the presence of electromagnetic waves, by building an apparatus that produced and detected the VHF/UHF radio waves. His undertakings earned him the honor of having his surname assigned to the international unit of frequency (one cycle per second).

In August of 1879, Hertz won the prize for his evidence demonstrating that electricity had no inertia. Another prize problem was soon proposed by Helmholtz, who wanted students to attempt to prove which of the theories of electromagnetic phenomena then circulating was correct. Interestingly, Hertz did not choose to compete for this prize, but years later would be the first person to successfully provide the kind of definitive evidence that Helmholtz sought. At the time, Hertz instead embarked on a study of induction produced by rotating spheres. His work in this area helped him earn his doctorate degree ahead of schedule, in 1880, magna cum laude.

Hertz's first academic post was as lecturer of theoretical physics at the University of Kiel, but due to his dissatisfaction there he accepted a position at the Karlsruhe Polytechnic in 1885. It was at Karlsruhe, where he remained until he received an appointment as physics professor at the University of Bonn in 1889, that Hertz carried out his most important work. In 1886, Hertz began experimenting with sparks emitted across a gap in a short metal loop attached to an induction coil. He soon built a similar apparatus, but without the induction coil, to act as a detector. When the induction coil connected to the first loop (the transmitter) produced a high voltage discharge, a spark jumped across the gap, sending out a signal that Hertz detected as a weaker spark across the gap in the receiving apparatus, which he placed nearby. To determine the nature of the signals that he was able to transmit and receive, Hertz developed a number of innovative experiments.

By measuring side sparks that formed around the primary spark and varying the position of the detector, Hertz was able to determine that the signal exhibited a wave pattern, and to ascertain its wavelength. Then, by using a rotating mirror, he found the frequency of the invisible waves, which enabled him to calculate their velocity. Amazingly, the waves were moving at the speed of light. Thus, it

appeared to Hertz that he had discovered a previously unknown form of electromagnetic radiation, and in the process confirmed James Clerk Maxwell's theory of electromagnetism. To further prove that this was indeed the case, Hertz continued his experiments exploring the behavior of the invisible waves. He discovered that they traveled in straight lines and could be focused, diffracted, refracted and polarized. Hertz announced his initial discovery in late 1887 in his treatise *"On Electromagnetic Effects Produced by Electrical Disturbances in Insulators"*, which he sent to the Berlin Academy. He later published additional details following the series of experiments he carried out in 1888. For a time the waves he discovered were commonly referred to as Hertzian waves, but today they are known as radio waves.

In addition to his radio wave breakthrough, Hertz is notable for the discovery of the photoelectric effect, which occurred while he was investigating electromagnetic waves. Because of some difficulty in detecting the small spark produced in his receiving apparatus, Hertz sometimes placed the receiver in a dark case. This, he found, affected the maximum length of the spark, which was smaller than when he did not use the case. With further research into the phenomenon, Hertz discovered that the spark produced was stronger if it was exposed to ultraviolet light. Though he did not attempt to explain this fact, others, including J.J.Thomson and Albert Einstein, would soon realize its importance. The phenomenon of electrons being released from a material when it absorbs radiant energy, which was the cause of the stronger sparks observed by Hertz when ultraviolet radiation was used, would come to be known as the photoelectric effect.

After 1889, when Hertz was teaching at the University of Bonn, he studied electrical discharges in rarefied gases and spent a significant amount of time composing his *Principles of Mechanics*. Unfortunately, he never saw the work published due to his premature death associated with blood poisoning on New Year's Day 1894. Only 37 years old at the time, Hertz also never lived to see the tremendous impact the discovery of radio waves would have on the world in the 20th century.

CHARLES-AUGUSTIN COULOMB

M.RAJAPANDI(140216)

M.E/PSE – I Year

Charles-AugustinCoulomb (b. Angouleme, France, 14th June 1736, d. Paris, France, 23rd August, 1806) was a pioneer in the field of electricity, magnetism and applied mechanics. The SI unit of quantity of electric charge was named after him as the Coulomb. In his electrical studies Coulomb determined the quantitative force law, gave the notion of electric mass, and studied charge leakage and the surface distribution of charge on conducting bodies. In magnetism he determined the quantitative force law, created a theory of magnetism based on molecular polarisation, and introduced the idea of demagnetisation.

His father, Henrey, came from Montpellier, where the family was important in the legal and administrative history of Languedoc. His mother, Catherine Bajet, was related to the wealthy de Senac family. During Charles-Augustin's youth the family moved to Paris. Charles-Augustin attended lectures at the College Mazarin and the College de France. An argument with his mother over career plans caused Coulomb to follow his father to Montpellier who became penniless later through financial speculations.

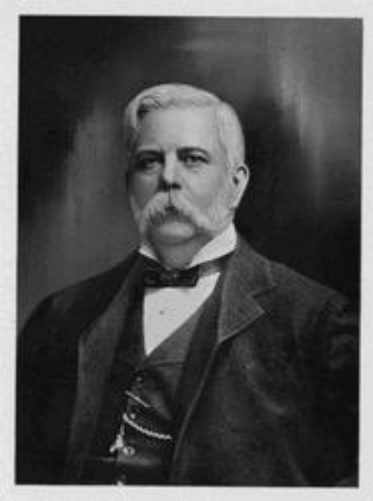
Coulomb graduated in November 1761 with the rank of lieutenant en premier in the Corps du Génie. He worked at Brest and then at Martinique. While he was in Martinique he became seriously ill several times. The research he did in Richefort won him the double first prize at the academy in Paris in 1781. He became a resident in Paris. He wrote 25 scientific Momoirs at the Academy from 1781 to 1806. He also participated in 310 committee reports to the Academy. In 1787 Coulomb was sent to England to investigate hospital conditions in London. In 1801 he was elected to the position of the president of the Institute de France. By 1791, the National Assembly reorganized the Corps du Génie. Coulomb had to resign from the corps. He received an annual pension which was reduced by two-thirds after the Revolution. He returned to his research in Paris in December 1795, upon his election as member for physique experiméntale in the new Institute de France. Coulomb's last public service was as inspector general of public instruction from 1802 until his death. Coulomb's health declined precipitously in the early summer of 1806 and he died. Secondary accounts indicate that Revolution took most of his properties and that he died almost in poverty.

GEORGE WESTINGHOUSE

M.S.RAMYA(140209)

M.E/PSE – I Year

George Westinghouse was a prolific inventor who influenced the course of history by enabling the growth of the railroads through his inventions and by promoting the use of electricity for power and transportation. As an industrial manager, George
Westinghouse's influence on industrial history is considerable, having formed and directed more than 60 companies to market his and others' inventions during his lifetime. His electric company became one of the greatest electric manufacturing organizations in the United States, and his influence abroad was evident by the many companies he founded in other countries.



The hydroelectric development of Niagara Falls by George Westinghouse in 1896 inaugurated the practice of placing generating stations far from consumption centers. The Niagara plant transmitted massive amounts of power to Buffalo, New York, over 20 miles away. With Niagara, Westinghouse convincingly demonstrated both the general superiority of transmitting power with electricity rather than by mechanical means (the use of ropes, hydraulic pipes, or compressed air had also been proposed) and the transmission superiority at that time of alternating current (ac) over direct current (dc). Niagara set a contemporary standard for generator size, and was the first large system supplying electricity from one circuit for multiple end-uses (railway, lighting, power).To solve the problem of sending electricity over long distances, George Westinghouse developed a device called a **transformer**. The transformer allowed electricity to be efficiently transmitted over long distances. This made it possible to supply electricity to homes and businesses located far from the electric generating plant.

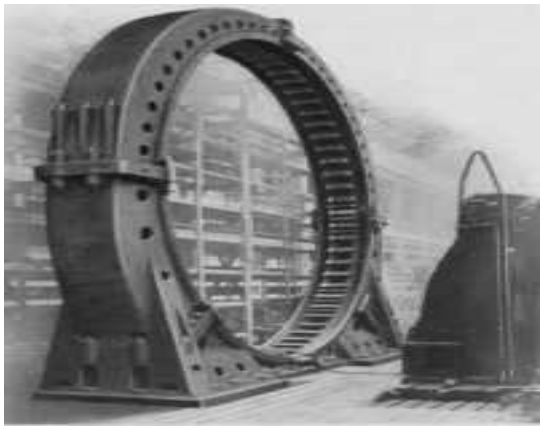
BIOGRAPHY

Born on October 6, 1846, in Central Bridge, NY, George Westinghouse worked in his early years in his father's shops in Schenectady where they manufactured agricultural machinery. He attended college for only 3 months in 1865, dropping out soon after obtaining his first patent on October 31, 1865 for a **rotary steam engine**. Later, he invented an instrument which replaced derailed freight cars on the train tracks and started a business to manufacture his invention.In April of 1869, he obtained a patent for one of his most important inventions, the **air brake** (patent #re. 5,504). This device enabled trains to be stopped with fail-safe

accuracy by the locomotive engineer for the first time and was eventually adopted on Seeing potential profit in the invention, Westinghouse organized theWestinghouse Air Brake Company in July of 1869 with himself acting as president. He continued to make many changes in his air brake design and later developed the automatic air brake system and the triple valve.His industry expanded as he opened companies in Europe and Canada. In the United States, he expanded into the railroad signaling industry by organizing the Union Switch and Signal Company. In this company, devices based on his own inventions and the patents of others were designed to control the increased speed and flexibility which was made possible by the invention of the air brake. Westinghouse saw the potential for electricity and formed the Westinghouse Electric Company in 1884, later known as the Westinghouse Electric & Manufacturing Company. He obtained exclusive rights to Nikola Tesla's patents for a polyphase system of alternating current in 1888, persuading the inventor to join the Westinghouse Electric Company.

There was opposition from the public to the development of alternating current electricity. Critics, including direct current proponent Thomas Edison, argued that it was dangerous and a hazard to health. This idea was emphasized in the public mind by New York state's adoption of alternating current electrocution for capital crimes. Undeterred, Westinghouse proved the viability of alternating current electricity by having his company design and provide the lighting system for the entire Columbian Exposition in Chicago in 1893.

Westinghouse's company took on another industrial challenge when it was awarded a contract with the Cataract Construction Company in 1893 to build 3 huge generators for harnessing the energy of the Niagara Falls water into electrical energy. Installation on this project began in April of 1895, and by November of 1895 all 3 generators were completed. A year later, engineers at Buffalo closed the circuits that finally completed the process to bring power from Niagara.



Westinghouse Generator for New York

Westinghouse made further industrial history by acquiring exclusive rights to manufacture the Parsons steam turbine in America and by introducing the first alternating current locomotive in 1905. The first major application of alternating current to railway systems was in the Manhattan Elevated railways in New York, and later in the New York subway system. The first single-phase railway locomotive was demonstrated in the East Pittsburgh railway yards in 1905With a total of 361 patents to his credit, his last patent was received in 1918, four years after his death.

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PRIZE

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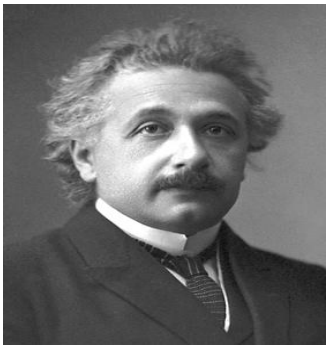
N.RAMYA SRI(140202)

M.E.PSE – I Year

ALBERT EINSTEIN



Albert Einstein

Born: 14 March 1879, Ulm, Germany

Died: 18 April 1955, Princeton, NJ, USA

Affiliation at the time of the award: Kaiser-Wilhelm-Institut (now Max-Planck-Institut) für Physik, Berlin, Germany

Prize motivation: "for his services to Theoretical Physics, and especially for his discovery of the law of the photoelectric effect"

Field: theoretical physics

Albert Einstein received his Nobel Prize one year later, in 1922.

ISAMU AKASAKI

The Nobel Prize in Physics 2014

Born: 1929, Chiran, Japan

Affiliation at the time of the award: Meijo University, Nagoya, Japan, Nagoya University, Nagoya, Japan

Prize motivation: "for the invention of efficient blue light-emitting diodes which has enabled bright and energy-saving white light sources"

Field: semiconductor tech

ROBERT ANDREWS MILLIKAN

The Nobel Prize in Physics 1923

Born: 22 March 1868, Morrison, IL, USA

Died: 19 December 1953, San Marino, CF, USA

Affiliation at the time of the award: California Institute of Technology (Caltech), Pasadena, CA, USA

Prize motivation: "for his work on the elementary charge of electricity and on the photoelectric effect"

Field: electromagnetism, particle physics

J.J. THOMSON

The Nobel Prize in Physics 1906
Joseph John Thomson

Born: 18 December 1856, Cheetham Hill, near Manchester, United Kingdom

Died: 30 August 1940, Cambridge, United Kingdom

Affiliation at the time of the award: University of Cambridge, Cambridge, United Kingdom

Prize motivation: "in recognition of the great merits of his theoretical and experimental investigations on the conduction of electricity by gases"

Field: atomic physics

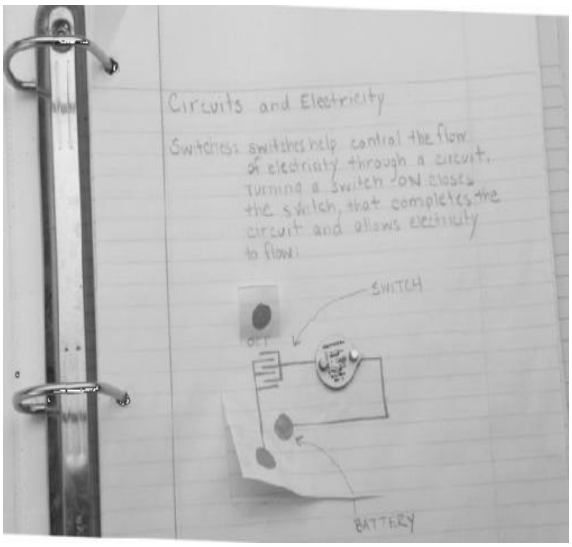
TECHNICAL CONTEXT

BALLPOINT PEN DRAWS ELECTRONIC CIRCUITS WITH CONDUCTIVE INK

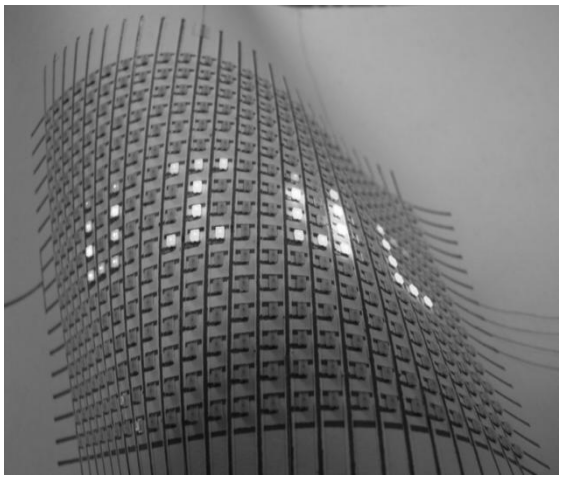
C. SAKTHI VINAYAGAM (140212)
M.E/PSE –I YEAR

Instead of regular ink, Circuit Scribe uses conductive silver allowing you to instantly create a fully functioning circuit.Circuit Scribe is a rollerball pen that uses a silver conductive ink to let you create fully functioning circuits as fast as you can can draw, making it cheaper, faster, and easier to test out electronics and prototype concepts.

Developed by Electroninks Incorporated, a company originally part of a University of Illinois research lap, Circuit Scribe tries to make the process as easy as possible. No wires, no boards, no soldering; all you need is a sketch and you can begin tinkering with nothing more than a coin battery and an LED.



Circuit Scribe offers a selection of components, from relatively simple buzzers and led lights, to more sophisticated parts like photo sensors and potentiometers. It can even interface with the Arduino MaKey MaKey, allowing for even more elaborate designs and making it ideal for hackers at any level. With Circuit Scribe you can create everything from a simple switch to a fully functioning touchpad. The water-based ink dries instantly so you can immediately begin testing on a freshly drawn circuit.



A flexible array of LEDs mounted on paper. Hand-drawn silver ink lines form the interconnects between the LEDs.

From kids just starting to learn about circuitry to tech hobbyists looking to knock out a quick prototype, Circuit Scribe is aimed at makers of all ages. Their goal is to help educate and make electronics available to as many people as possible.

We've long marveled at the wondrous creations enabled by 3-D printing. Well, now comes 3-D handwriting.

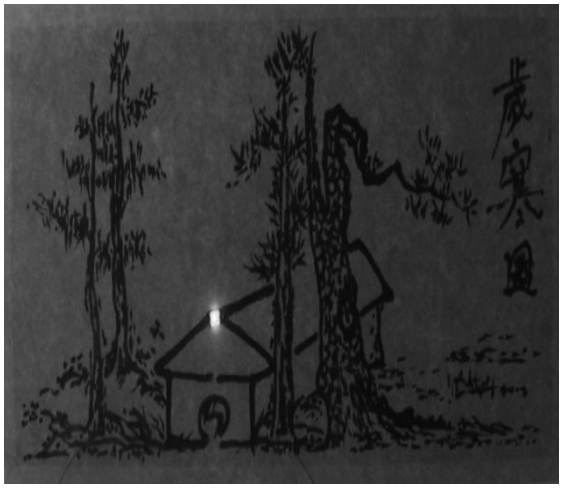
A plain rollerball pen filled with a conductive ink can draw circuits on a sheet of paper, where they can provide power to an LED display and an antenna, among other potential uses.

Researchers at the University of Illinois at Urbana-Champaign made a new type of liquid metal ink that stays liquid in a pen, but dries after being applied to paper, wood or another surface. The liquid consists of silver nanoparticles that were reduced in size using acid, and then modified with cellulose so the fluid has a more inky viscosity.

Draw a line, and when it dries, the result is a silver wire that can conduct electricity. Researchers built an LED display with their school's initials, UIUC, and the lovely sketch below depicting a house and trees. The ink serves as wiring for the LED mounted on the roof of the house, and it's powered by a five-volt battery connected to the edge of the painting, according to a UI press release.

While 3-D printers can also create customized circuitry, a handheld pen is a cheaper, more portable method, materials scientist Jennifer Lewis said. There's no software required — just a steady hand.

The pen would enable circuits to be drawn on small, oddly shaped surfaces, and it can work as fast as someone can move his or her hand.



The team folded the paper to see how the circuits would up and found they needed to be folded several thousand times before the lines were broken, according to via PhysOrg.

The circuit pen could enable new disposable, bendable electronics and folded 3-D objects, the researchers said. They want to expand their palette to other types of conductive materials, according to UIUC.

SELF-COOLING SOLAR CELLS

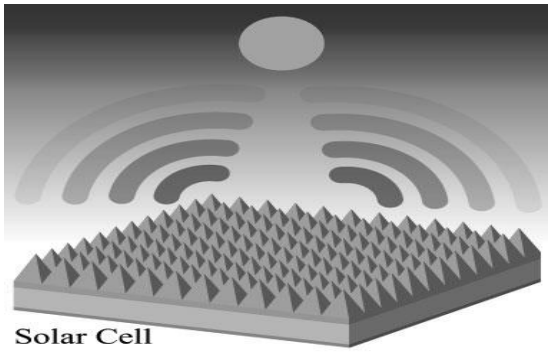
K.SHARANYA(140206)
M.E/PSE

Stanford-led team develops self-cooling solar cells that last longer and have more power By adding a specially patterned layer of silica glass to the surface of ordinary solar cells, a team of researchers led by Professor Shanhui Fan has found a way for the cells to shed unwanted thermal radiation.
Scientists may have overcome one of the major hurdles in developing high-efficiency, long-lasting solar cells – keeping them cool, even in the blistering heat of the noonday Sun.

By adding a specially patterned layer of silica glass to the surface of ordinary solar cells, a team of researchers led by Shanhui Fan, an electrical engineering professor at Stanford University, has found a way to let solar cells cool themselves by shepherding away unwanted thermal radiation. The researchers describe their innovative design in the premiere issue of The Optical Society's new open-access journal Optica.

Solar cells are among the most promising and widely used renewable energy technologies on the market today. Though readily available and easily manufactured, even the best designs convert only a fraction of the energy they receive from the sun into usable electricity.Part of this loss is the unavoidable consequence of converting sunlight into electricity. A surprisingly vexing amount, however, is causesd by solar cells overheating.

Under normal operating conditions, solar cells can easily reach temperatures of 130 degrees Fahrenheit (55 degrees Celsius) or more. These harsh conditions quickly sap efficiency and can markedly shorten the lifespan of a solar cell. Actively cooling solar cells, however – either by ventilation or coolants – would be prohibitively expensive and at odds with the need to optimize exposure to the sun.



This drawing demonstrates how solar cells cool themselves by shepherding away unwanted thermal radiation. The pyramid structures made of silica glass provide maximal radiative cooling capability.(Graphic: L. Zhu)

The newly proposed design avoids these problems by taking a more elegant, passive approach to cooling. By embedding tiny pyramid- and cone-shaped structures on an incredibly thin layer of silica glass, the researchers found a way of redirecting unwanted heat – in the form of infrared radiation – from the surface of solar cells, through the atmosphere, and back into space.

"Our new approach can lower the operating temperature of solar cells passively, improving energy conversion efficiency significantly and increasing the life expectancy of solar cells," said Linxiao Zhu, a physicist at Stanford and lead author on the Optica paper. "These two benefits should enable the continued success and adoption of solar cell technology."

Solar cells work by directly converting the sun's rays into electrical energy. As photons of light pass into the semiconductor regions of the solar cells, they knock off electrons from the atoms, allowing electricity to flow freely, creating

a current. The most successful and widely used designs, silicon semiconductors, however, convert less than 30 percent of the energy they receive from the sun into electricity – even at peak efficiency.

The solar energy that is not converted generates waste heat, which inexorably lessens a solar cell's performance. For every one-degree Celsius (1.8 degree F) increase in temperature, the efficiency of a solar cell declines by about half a percent.

"That decline is very significant," said Aaswath Raman, a postdoctoral scholar at Stanford and co-author on the paper. "The solar cell industry invests significant amounts of capital to generate improvements in efficiency. Our method of carefully altering the layers that cover and enclose the solar cell can improve the efficiency of any underlying solar cell. This makes the design particularly relevant and important."In addition, solar cells "age" more rapidly when their temperatures increase, with the rate of aging doubling for every increase of 18 degrees Fahrenheit.To passively cool the solar cells, allowing them to give off excess heat without spending energy doing so, requires exploiting the basic properties of light as well as a special infrared "window" through Earth's atmosphere.

Different wavelengths of light interact with solar cells in very different ways – with visible light being the most efficient at generating electricity while infrared is more efficient at carrying heat. Different wavelengths also bend and refract differently, depending on the type and shape of the material they pass through.The researchers harnessed these basic principles to allow visible light to pass through the added silica layer unimpeded while enhancing the amount of energy that can be carried away from the solar cells at thermal wavelengths.

"Silica is transparent to visible light, but it is also possible to fine-tune how it bends and refracts light of very specific wavelengths," said Fan, who is the corresponding author on the Optica paper. "A carefully designed layer of silica would not degrade the performance of the solar cell, but it would enhance radiation at the predetermined thermal wavelengths to send the solar cell's heat away more effectively."

To test their idea, the researchers compared two different silica covering designs: one a flat surface approximately 5 millimeters thick and the other a thinner layer covered with pyramids and micro-cones just a few microns (one-thousandth of a millimeter) thick in any dimension. The size of these features was essential. By precisely controlling the width and height of the pyramids and micro-cones, they could be tuned to refract and redirect only the unwanted infrared wavelengths away from the solar cell and back out into space.

"The goal was to lower the operating temperature of the solar cell while maintaining its solar absorption," Fan said. "We were quite pleased to see that while the flat layer of silica provided some passive cooling, the patterned layer of silica considerably outperforms the 5 mm-thick uniform silica design and has nearly identical performance as the ideal scheme."Zhu and his colleagues are currently fabricating these devices and performing experimental tests on their design. Their next step is to demonstrate radiative cooling of solar cells in an outdoor environment. "We think that this work addresses an important technological problem in the operation and optimization of solar cells," he concluded, "and thus has substantial commercialization potential."

REVVING UP FLUORESCENCE FOR SUPERFAST LEDs

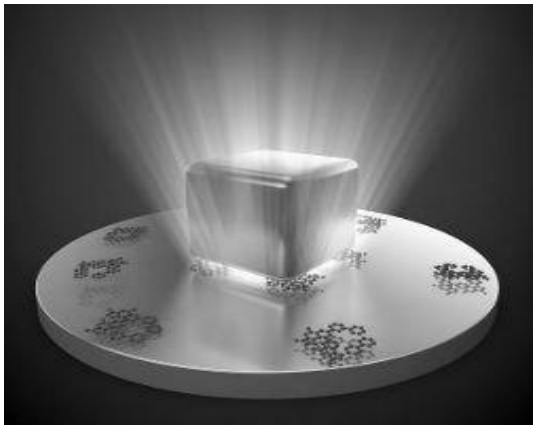
M.VASUKI (140210)

M.E/PSE – I Year

Duke University researchers have made fluorescent molecules emit photons of light 1,000 times faster than normal -- setting a speed record and making an important step toward realizing superfast light emitting diodes (LEDs) and quantum cryptography.

This year's Nobel Prize in physics was awarded for the discovery of how to make blue LEDs, allowing everything from more efficient light bulbs to video screens. While the discovery has had an enormous impact on lighting and displays, the slow speed with which LEDs can be turned on and off has limited their use as a light source in light-based telecommunications.

In an LED, atoms can be forced to emit roughly 10 million photons in the blink of an eye. Modern telecommunications systems, however, operate nearly a thousand times faster. To make future light-based communications using LEDs practical, researchers must get photon-emitting materials up to speed.



In a new study, engineers from Duke increased the photon emission rate of fluorescent molecules to record levels by sandwiching them between metal nanocubes and a gold film.

"One of the applications we're targeting with this research is ultrafast LEDs," said Maiken Mikkelsen, an assistant professor of electrical and computer engineering and physics at Duke. "While future devices might not use this exact approach, the underlying physics will be crucial."

Mikkelsen specializes in plasmonics, which studies the interaction between electromagnetic fields and free electrons in metal. In the experiment, her group manufactured 75-nanometer silver nanocubes and trapped light between them, greatly increasing the light's intensity.

When fluorescent molecules are placed near intensified light, the molecules emit photons at a faster rate through an effect called Purcell enhancement. The researchers found they could achieve a significant speed improvement by placing fluorescent molecules in a gap between the nanocubes and a thin film of gold.

To attain the greatest effect, Mikkelsen's team needed to tune the gap's resonant frequency to match the color of light that the molecules respond to. With the help of co-author David R. Smith, the James B. Duke Professor and Chair of Electrical and Computer Engineering at Duke, they used computer simulations to determine the exact size of the gap needed between the nanocubes and gold film to optimize the setup.

That gap turned out to be just 20 atoms wide. But that wasn't a problem for the researchers.

"We can select cubes with just the right size and make the gaps literally with nanometer precision," said Gleb Akselrod, a postdoc in Mikkelsen's lab and first author on the study. "When we have the cube size and gap perfectly calibrated to the molecule, that's when we see the record 1,000-fold increase in fluorescence speed."

Because the experiment used many randomly aligned molecules, the researchers believe they can do even better. They plan to design a system with individual fluorescent molecule placed precisely underneath a single nanocube. According to Akselrod, they can achieve even higher fluorescence rates by standing the molecules up on edge at the corners of the cube.

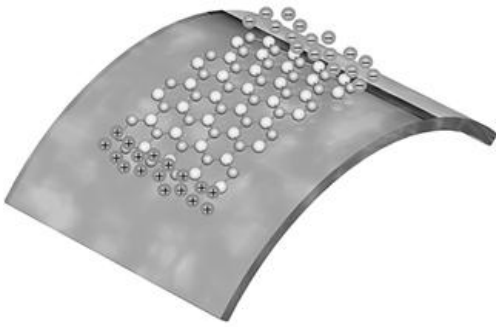
"If we can precisely place molecules like this, it could be used in many more applications than just fast LEDs," said Akselrod. "We could also make fast sources of single photons that could be used for quantum cryptography. This technology would allow secure communication that could not be hacked -- at least not without breaking the laws of physics."

WORLD'S THINNEST ELECTRIC GENERATOR

V.SELVALAKSHMI(140204)
M.E/PSE – I Year

Researchers from Columbia Engineering and the Georgia Institute of Technology report today that they have made the first experimental observation of piezoelectricity and the piezotronic effect in an atomically thin material, molybdenum disulfide (MoS_2), resulting in a unique electric generator and mechanosensation devices that are optically transparent, extremely light, and very bendable and stretchable.

In a paper published online October 15, 2014, in*Nature*, research groups from the two institutions demonstrate the mechanical generation of electricity from the two-dimensional (2-D) MoS_2material. The piezoelectric effect in this material had previously been predicted theoretically.



Positive and negative polarized charges are squeezed from a single layer of atoms, as it is being stretched. Image: Lei Wang/Columbia Engineering

Piezoelectricity is a well-known effect in which stretching or compressing a material causes it to generate an electrical voltage (or the reverse, in which an applied voltage causes it to expand or contract). But for materials of only a few atomic thicknesses, no experimental observation of piezoelectricity has been made, until now. The observation reported today provides a new property for two-dimensional materials such as molybdenum disulfide, opening the potential for new types of mechanically controlled electronic devices.

"This material—just a single layer of atoms—could be made as a wearable device, perhaps integrated into clothing, to convert energy from your body movement to electricity and power wearable sensors or medical devices, or perhaps supply enough energy to charge your cell phone in your pocket," says James Hone, professor of mechanical engineering at Columbia and co-leader of the research.

"Proof of the piezoelectric effect and piezotronic effect adds new functionalities to these two-dimensional materials," says Zhong Lin Wang, Regents' Professor in Georgia Tech's School of Materials Science and Engineering and a co-leader of the research. "The materials community is excited about molybdenum disulfide, and demonstrating the piezoelectric effect in it adds a new facet to the material."Hone and his research group demonstrated in 2008 that graphene, a 2-D form of carbon, is the strongest material. He and Lei Wang, a postdoctoral fellow in Hone's group, have been actively exploring the novel properties of 2-D materials like graphene and MoS_2 as they are stretched and compressed.Zhong Lin Wang and his research group pioneered the field of piezoelectric nanogenerators for converting mechanical energy into electricity. He and postdoctoral fellow Wenzhuo Wu are also developing

piezotronic devices, which use piezoelectric charges to control the flow of current through the material just as gate voltages do in conventional three-terminal transistors.

There are two keys to using molybdenum disulfide for generating current: using an odd number of layers and flexing it in the proper direction. The material is highly polar, but, Zhong Lin Wang notes, so an even number of layers cancels out the piezoelectric effect. The material's crystalline structure also is piezoelectric in only certain crystalline orientations.

For the Nature study, Hone's team placed thin flakes of MoS_2 on flexible plastic substrates and determined how their crystal lattices were oriented using optical techniques. They then patterned metal electrodes onto the flakes. In research done at Georgia Tech, Wang's group installed measurement electrodes on samples provided by Hone's group, then measured current flows as the samples were mechanically deformed. They monitored the conversion of mechanical to electrical energy, and observed voltage and current outputs.

The researchers also noted that the output voltage reversed sign when they changed the direction of applied strain, and that it disappeared in samples with an even number of atomic layers, confirming theoretical predictions published last year. The presence of piezotronic effect in odd layer MoS_2 was also observed for the first time.

"What's really interesting is we've now found that a material like MoS_2, which is not piezoelectric in bulk form, can become piezoelectric when it is thinned down to a single atomic layer," says Lei Wang.To be piezoelectric, a material must break central symmetry. A single atomic layer of MoS_2 has such a structure, and should be piezoelectric. However, in bulk MoS_2, successive layers are oriented in opposite directions, and generate positive and negative voltages that cancel each other out and give zero net piezoelectric effect."This adds another member to the family of piezoelectric materials for functional devices," says Wenzhuo Wu.

In fact, MoS_2 is just one of a group of 2-D semiconducting materials known as transition metal dichalcogenides, all of which are predicted to have similar piezoelectric properties. These are part of an even larger family of 2-D materials whose piezoelectric materials remain unexplored. Importantly, as has been shown by Hone and his colleagues, 2-D materials can be stretched much farther than conventional materials, particularly traditional ceramic piezoelectrics, which are quite brittle. "This is the first experimental work in this area and is an elegant example of how the world becomes different when the size of material shrinks to the scale of a single atom," Hone adds. "With what we're learning, we're eager to build useful devices for all kinds of applications."

Ultimately, Zhong Lin Wang notes, the research could lead to complete atomic-thick nanosystems that are self-powered by harvesting mechanical energy from the environment. This study also reveals the piezotronic effect in two-dimensional materials for the first time, which greatly expands the application of layered materials for human-machine interfacing, robotics, MEMS, and active flexible electronics.

For this study, the research team also worked with Tony Heinz, David M. Rickey Professor of Optical Communications at Columbia Engineering and professor of physics at Columbia's Graduate School of Arts and Sciences

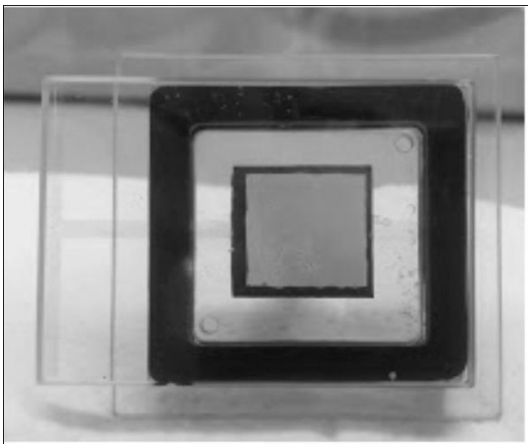
BEYOND LEDS: BRIGHTER, NEW ENERGY -SAVING FLAT PANEL LIGHTS BASED ON CARBON NANOTUBES

J.KOKILA(140207)

M.E/PSE – I Year

Planar light source using a phosphor screen with highly crystalline single-walled carbon nanotubes (SWCNTs) as field emitters demonstrates its potential for energy-efficient lighting device.

Even as the 2014 Nobel Prize in Physics has enshrined light emitting diodes (LEDs) as the single most significant and disruptive energy-efficient lighting solution of today, scientists around the world continue unabated to search for the even-better-bulbs of tomorrow.



Electronics based on carbon, especially carbon nanotubes (CNTs), are emerging as successors to silicon for making semiconductor materials. And they may enable a new generation of brighter, low-power, low-cost lighting devices that could challenge the dominance of light-emitting diodes (LEDs) in the future and help meet society's ever-escalating demand for greener bulbs.

Scientists from Tohoku University in Japan have developed a new type of energy-efficient flat light source based on carbon nanotubes with very low power consumption of around 0.1 Watt for every hour's operation--about a hundred times lower than that of an LED.

In the journal Review of Scientific Instruments, from AIP publishing, the researchers detail the fabrication and optimization of the device, which is based on a phosphor screen and single-walled carbon nanotubes as electrodes in a diode structure. You can think of it as a field of tungsten filaments shrunk to microscopic proportions.

They assembled the device from a mixture liquid containing highly crystalline single-walled carbon nanotubes dispersed in an organic solvent mixed with a soap-like chemical known as a surfactant. Then, they "painted" the mixture onto the positive electrode or cathode, and scratched the surface with sandpaper to form a light panel capable of producing a large, stable and homogenous emission current with low energy consumption.

"Our simple 'diode' panel could obtain high brightness efficiency of 60 Lumen per Watt, which holds excellent potential for a lighting device with low power consumption," said Norihiro Shimoi, the lead researcher and an associate professor of environmental studies at the Tohoku University.

Brightness efficiency tells people how much light is being produced by a lighting source when consuming a unit amount of electric power, which is an important index to compare the energy-efficiency of different lighting devices, Shimoi said. For instance, LEDs can produce 100s Lumen per Watt and OLEDs (organic LEDs) around 40.

Although the device has a diode-like structure, its light-emitting system is not based on a diode system, which are made from layers of semiconductors, materials that act like a cross between a conductor and an insulator, the electrical properties of which can be controlled with the addition of impurities called dopants.

The new devices have luminescence systems that function more like cathode ray tubes, with carbon nanotubes acting as cathodes, and a phosphor screen in a vacuum cavity acting as the anode. Under a strong electric field, the cathode emits tight, high-speed beams of electrons through its sharp nanotube tips -- a phenomenon called field emission. The electrons then fly through the vacuum in the cavity, and hit the phosphor screen into glowing.

“We have found that a cathode with highly crystalline single-walled carbon nanotubes and an anode with the improved phosphor screen in our diode structure obtained no flicker field emission current and good brightness homogeneity,” Shimoi said.

Field emission electron sources catch scientists’ attention due to its ability to provide intense electron beams that are about a thousand times denser than conventional thermionic cathode (like filaments in an incandescent light bulb). That means field emission sources require much less power to operate and produce a much more directional and easily controllable stream of electrons.

In recent years, carbon nanotubes have emerged as a promising material of electron field emitters, owing to their nano-scale needle shape and extraordinary properties of chemical stability, thermal conductivity and mechanical strength.

Highly crystalline single-walled carbon nanotubes (HCSWCNT) have nearly zero defects in the carbon network on the surface, Shimoi explained. “The resistance of cathode electrode with highly crystalline single-walled carbon nanotube is very low. Thus, the new flat-panel device has smaller energy loss compared with other current lighting devices, which can be used to make energy-efficient cathodes that with low power consumption.”

“Many researchers have attempted to construct light sources with carbon nanotubes as field emitter,” Shimoi said. “But nobody has developed an equivalent and simpler lighting device.”

Considering the major step for device manufacture--the wet coating process is a low-cost but stable process to fabricate large-area and uniformly thin films, the flat-plane emission device has the potential to provide a new approach to lighting in people’s life style and reduce carbon dioxide emissions on the earth, Shimoi said.

The article, " Planar light source using a phosphor screen with single-walled carbon nanotubes as field emitters," is authored by Sharon Bahena-Garrido, Norihiro Shimoi, Daisuke Abe, Toshimasa Hojo, Yasumitsu Tanaka, Kazuyuki Tohji.

GEL OFFERS NEW POSSIBILITIES FOR 'SOFT' ROBOTS

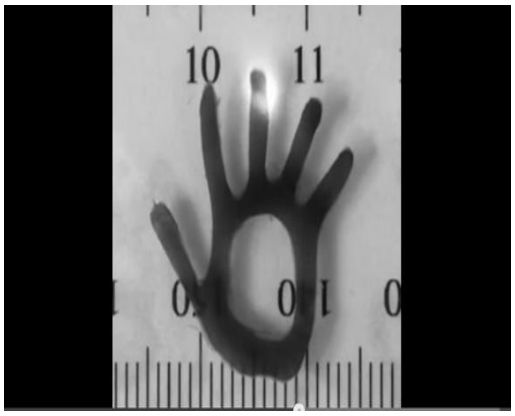
L.JEYAMALA(140217)
M.E/PSE –I Year

A new material controlled by light may help scientists build better soft-bodied robots.The developers of the gel say they were inspired by the way a plant grows to face the sunlight. Unlike plants, though, the gel can be made to flex and move almost instantaneously.The UC Berkeley scientists created the gel using graphene and a synthetic protein similar to elastin, which is found in humans' blood vessels, skin and more.

The synthetic elastin, created from genetically engineered bacteria, absorbs water at room temperature, but at higher temperatures it expels the water and shrinks. [Read also: " Soft Robots Make World Safer for Humans"]

Graphene produces heat when exposed to near-infrared light. Together, the two materials make a light-controlled gel, said professor Seung-Wuk Lee of UC Berkeley's department of bioengineering. "The graphene is heated by the light, and then the elastin is responding to the heat induced by the light."

By making parts of the new gel less porous, the team could control how the material bends. The more porous side absorbed and expelled water faster, making the material shrink unevenly, which resulted in a gel that could bend in a predictable, repeatable way.The material by itself — which Lee and his team have only thus far assembled into tiny structures — does not a robot make. So far, the "robots" built include a 0.4-inch (1 cm) "worm" that crawls when exposed to the infrared laser, and a roughly 0.8-inch (2 cm) hand that bends its fingers. But the proof of concept could someday be used to build complex robots, such as one that's shaped like and moves like an octopus, Lee said.The octopus example is an apt one. For now, since the new material needs to absorb and expel water to flex and stretch, the experiments with the material were conducted while it was submerged.



If octobots seem farfetched, Lee suggests that the new material could be used for drug delivery. Perhaps the material could soak up a liquid drug, injected into a patient's bloodstream, and then squeezed out of the material's pores at the right place. Since infrared light penetrates skin, it's not impossible to imagine in the future. Lee said, why not use the shape-changing gel as a replacement for lost limbs? "We could replace our tissues" with a light-controlled gel, he said.

LIST OF SOFTWARES NEEDED FOR ELECTRICAL AND ELECTRONICS ENGINEERING

M.S.RAMYA(140209)
M.E/PSE – I Year

AutoCAD

Popular Software for Electrical Design.
Offers Trial Version.
http://usa.autodesk.com/autocad-electrical/

ECAD software

KiCad (OSS)
Eagle

ETAP

Popular design software used across the industry for a wide range of design applications in areas such as power management, substation automation, load shedding, etc

MATLAB Programming

MATLAB is a high-level language which includes Algorithm development, Data acquisition, Modeling, simulation, and prototyping, Data analysis, exploration, and visualization, Scientific and engineering graphics, Application development, including graphical user interface building.

Scilab (sorta OSS, alternative to MATLAB)

MATPOWER

a set of functions freely downloadable for use with Matlabhttp://www.pserc.cornell.edu/matpower/ ,that can be used for load flow and optimal load flow.

PCSCHEMATIC

CAD software with free Trial version. www.pcschematic.com

PSCAD (Power System Computer Aided Design)

PSCAD/EMTDC is a general-purpose time domain simulation program for multi-phase power systems and control networks,mainly dedicated to the study of transients in power systems. A graphical user interface and numerous control tools make PSCAD a convenient and interactive tool for both analysis and design of any power system.

SIMPOWER SYSTEM TOOLS

SimPowerSystems work together with SIMULINK to model electrical, mechanical, and control systems. These case studies provide detailed, realistic examples of how to use SimPowerSystems for Series Compensated Transmission Network for studying subsynchronous resonance in AC Power Transmission systems.

MICRO-CAP

It is the only program which allows to model RC-oscillator. Micro-Cap is an integrated schematic editor and mixed analog / digital simulator that provides an interactive sketch and simulate environment for electronics engineers For very simple circuits **CircuitLab** could be used, is a free online schematic editor: https://www.circuitlab.com/

ANALYSIS

Spectrogram Version 16 (Wave analysis. Freeware)
CANDE- Culvert ANalysis and DEsign (design and analysis of buried structures. Free version)
SNAILZ (stability analysis of slopes. Free version)

CIRCUIT ANALYSIS AND SCHEMATICS

OrCAD-PCB BOARD DESIGNER
PSpice (student edition)
Circuit Maker 6 (student edition)
Multisim Designsuite 9 (freeware edition. Im not sure of the limitations yet)
SwCADIII (free version)
TINA:-SPICE-Based Analog Simulation Program from TI (Circuit Simulator)

MICROCONTROLLER STUFF

- PIC

MPLAB IDE (free version)
HI-TECH PICC-Lite (freeware with some limitations, quick registration)
WinPic800 (firmware burner)
PIC16F87x / 16F87xA bootloader (freeware)
Proton Development Suite (PICBASIC, free version available)

-ATMEL

Bascom AVR (IDE)

Embedded RTOS

Salvo Lite (free version with some limitations)

SMARTDRAW

Electrical Software for designing electronic Circuits, Automotive Wiring, Circuit Schematics and designing digital circuits.
www.smartdraw.com

XILINX ISE is good for digital logic design simulation and implementation.

QUARTUS II to be very helpful. The program provides an easy to navigate environment for practicing Verilog and VHDL.

ELECDES

Electrical Design Software with a free demo version. Suitable for Electrical Panel Design, Plant Instrumentation, Wiring Diagram, Plant Raceway Design, Cable Routing,
http://www.elecdes.com/

EASYPOWER

Software for Arc Flash Analysis and short circuit Calculations, Relay setting coordination and Equipment Sizing. Offers Trial Version.
http://www.easypower.com/

SCHNEIDER ELECTRIC CAD

Software for designing electrical installations in industrial and tertiary buildings. Trial version available.
http://www.soft.schneider-electric.com/

NETWORK TOOLS

Wireshark (awesome network protocol analyzer)
GNS3 (cisco network simulator based on Dynamips. Note: Still need a licenced IOS)

ROBOTICS

Microsoft Robotic Developer Studio (Express edition. Robot control and simulator)
Roborealm 1.0 (freeware version. Latest one is a trial version)
PHUN (a super fun physics simulator. xhx used it for our CE bot project)

CAREER

STEPPING

JOIN HANDS WITH GOVERNMENT OF INDIA

V.YOKESH(140208)

M.E/PSE – I Year

WHY SHOULD WE PREFER GOVERNMENT JOB?

If you choose your career in the field of public sectors then it was understood that you were blessed to serve our Motherland-BHARATH.Instead of going abroad or serving anyother private sectors located even in India,one must be proud to serve Motherland by joining hands with the Government of India.

VARIOUS COMPETITIVE EXAMS:

1)CENTRAL GOVERNMENT,

- SSC
- UPSC

2)STATE GOVERNMENT

- TNPSC

4)DEFENCE

3)OTHERS

- IBPS
- GATE
- SBI-CAREER
- INSURANCE OWNED BY GOVT OF INDIA
- INDIA POST etc.,

Eventually we graduates can differentiate the govt jobs as follows,

- Engineering-technical
- Banking services
- Insurance
- State government
- Central government
- Officers grade in defence

In choosing the above field you must be aware of some circumstances about particular field which are,

- Individual's field of interest
- Nature of job after the recruitment process,
- Salary,
- Job location.
- These considerations must be analysed before we start preparing for the competitive exams.

1)TECHNICAL

Clearly GATE is the best solution to the technical jobs.There are nearly 30 public sector undertakings(PSU) which recruits through GATE scores.If you get 50 to 60 marks in GATE then you will be called for direct Interview with the PSUs.GATE score is valid for 3years.It also leads to enter for the PG programmes in prestigious instituitions like IITs ans NITsThe separate syllabus were formed for different types of Engineering departments.But it consists of 12 engineering subjects for all engineering departments.So if you are well prepared with any 5 subjects out of 12 and with the 10 previous year quetion papers it assures you 50-60 marks.There are also oppurtunity for technical lovers in Defence.

2) BANKING SERVICES:

IBPS(*Institute of Banking Personnel Selection)* leads you to the Banking Services as

- Specialist Officers(IT officers),
- Probationary Officers,
- Assistants (Clerical Cadre).

It conducts exams like

- IBPS Probationary Officers,
- IBPS Specialist Officers,
- IBPS Assistants,
- IBPS RRB(Regional Rural Banks) for PO and Assistants.
- SBI-Associate Banks and Reserve Bank of India (RBI) also conducting exams like Probationary Officer
- Exams and Clerical cadre exams every year.

The Central government also offers you INDIAN ENGINEERING SERVICES through UPSC

Paper I (Objective type)	General Ability Test (Part A: General English) (Part B: General Studies)	200 Marks
Papers II & III (Objective type)	Civil Engineering / Mechanical Engineering / Electrical Engineering / Electronics & Telecommunication Engineering	200 Marks for each paper
Papers IV & V (Conventional type)	Civil Engineering / Mechanical Engineering / Electrical Engineering / Electronics & Telecommunication Engineering	200 Marks for each paper
	Total marks for written examination	1000 Marks
Interview	Personality Test	200 Marks

These exams will be conducted in 3 successive days in the month of july.The notification will be in February.

The Staff Selection Commission (SSC) also offers you the post of Junior Engineer in the following fields,

- Central Public Works Department,
- Department of Post
- Border Roads Organisation(BRO) ,
- Ministry of defence,
- Military Engineering Services(MES).

The State government also recruiting Junior engineers in PWD through TNPSC.

3) INSURANCE

There are totally 6 insurance companies owned by Govt of India,

- National Insurance Company Ltd (NIC)
- Oriental Insurance Company Ltd
- Agriculture Insurance Company of India Limited (AIC)
- General insurance company
- The New India Assurance Co.Ltd.
- United India Insurance Company Limited (UIIC).

Regarding these sectors the pattern and portion of examination and posting is similar to banking services they are,

- Reasoning,
- Aptitude
- General English,
- General Awareness(Banking Industry),
- Computer knowledge.

These sections constitute of 200 marks.

3) STATE GOVERNMENT:

TNPSC offers you the GROUP exams like I, II ,III & IV which leads you to the Administration fields.For engineering graduates it offers combined engineering services examination for the post of assistant engineer

4) CENTRAL GOVERNMENT:

Staff Selection Commission(SSC) and Union Public Service commission(UPSC) conducting exams for different educational qualifications from Higher Secondary to Graduations. Mainly the Civil services exam of UPSC offers you the posting in various fields like,

All India Services

- Indian Administrative Service
- India Foreign Service
- Indian Police Service

Group A Services

- Indian P & T Accounts & Finance Service
- Indian Audit and Accounts Service
- Indian Revenue Service (Customs and Central Excise)
- Indian Defence Accounts Service
- Indian Revenue Service (I.T.)
- Indian Ordnance Factories Service (Assistant Works Manager, Administration)
- Indian Postal Service
- Indian Civil Accounts Service
- Indian Railway Traffic Service
- Indian Railway Accounts Service
- Indian Railway Personnel Service
- Post of Assistant Security Commissioner in Railway Protection Force
- Indian Defence Estates Service
- Indian Information Service (Junior Grade)

Group - B Services

- Armed Forces Headquarters Civil Service (Section Officer's Grade)
- Delhi, Andaman & Nicobar Islands, Lakshadweep, Daman & Diu and Dadra & Nagar Haveli Civil Service
- Delhi, Andaman & Nicobar Islands, Lakshadweep, Daman & Diu and Dadra & Nagar Haveli Police Service
- Pondicherry Civil Service

The notification will be in every May month of the year.

5) DEFENCE:

INDIAN ARMY
INDIAN NAVY
INDIAN AIR FORCE
INDIAN COAST GUARD
These fields offers you for the entry of Officer postings like Lieutenant for graduates.

SOME USEFUL WEB-LINKS AND MAGAZINES :

- www.**iwantgovtjob.com**/
- **nirdeshak**.com/-
- EMPLOYMENT NEWS
- Buy BANKING SERVICES CHRONICLE(BSC)
- For civil services and Staff Selection Commission exams buy PRATIYOGITA DARPAN and RENU monthly magazines.
- To buy monthly magazines at low cost visit www.**readwhere**.com/ and order your magazines.

Have a good pray at Almighty for positive thoughts and successful career in life.Here in this article only a glimpses of opportunities were given,so go beyond this and search your dream job and serve the Motherland .

-jai hind

ELECTRICAL ENGINEERING INTERVIEW QUESTIONS

K.JEYANTHI(140211)

M.E/PSE – I Year

1)Why AC systems are preferred over DC systems?

a. It is easy to maintain and change the voltage of AC electricity for transmission and distribution.
b. Plant cost for AC transmission (circuit breakers, transformers etc) is much lower than the equivalent DC transmission
c. From power stations, AC is produced so it is better to use AC then DC instead of converting it.
d. When a large fault occurs in a network, it is easier to interrupt in an AC system, as the sine wave current will naturally tend to zero at some point making the current easier to interrupt.

2)Why back emf used for a dc motor? highlight its significance.

The induced emf developed when the rotating conductors of the armature between the poles of magnet, in a DC motor, cut the magnetic flux, opposes the current flowing through the conductor, when the armature rotates, is called back emf. Its value depends upon the speed of rotation of the armature conductors. In starting, the value of back emf is zero.

3)Why star delta starter is preferred with induction motor?

Star delta starter is preferred with induction motor due to following reasons:
• Starting current is reduced 3-4 times of the direct current due to which voltage drops and hence it causes less losses.
• Star delta starter circuit comes in circuit first during starting of motor, which reduces voltage 3 times, that is why current also reduces up to 3 times and hence less motor burning is caused.
• In addition, starting torque is increased and it prevents the damage of motor winding.

4)In the motors starting purpose why the armature rheostats at maximum position while the field rheostat is kept in minimum position?

In the time of starting a motor the field rheostat is kept in minimum state for the high starting torque.

5)Why link is provided in neutral of an ac circuit and fuse in phase of ac circuit?

Link is provided at a Neutral common point in the circuit from which various connection are taken for the individual control circuit and so it is given in a link form to withstand high Amps. But in the case of Fuse in the Phase of AC circuit it is designed such that the fuse rating is calculated for the particular circuit (i.e load) only.So if any malfunction happen the fuse connected in the particular control circuit alone will blow off.

6)What is ACSR cable and where we use it?

ACSR means Aluminium conductor steel reinforced, this conductor is used in transmission & distribution.

7)What is slip in an induction motor?

Slip can be defined as the distinction between the flux speed (Ns) and the rotor speed (N). Speed of the rotor of an induction motor is always less than its synchronous speed. It is usually expressed as a percentage of synchronous speed (Ns) and represented by the symbol 'S'.

8)How can you start-up the 40w tube lite with 230v AC/DC without using any choke/Coil?

It's possible by means of Electronic chokes,otherwise it's not possible to ionize the particles in tube light with normal voltage.

9)what is meant by armature reaction?

The effect of armature flu to main flux is called armature reaction. The armature flux may support main flux or opposes main flux.

10)Which motor has high Starting Torque and Staring current DC motor, Induction motor or Synchronous motor?

DC Series motor has high starting torque. We can not start the Induction motor and Synchronous motors on load, but can not start the DC series motor without load.

11)Difference between a four point starter and three point starter?

The shunt connection in four point stater is provided separately form the line where as in three point stater it is connected with line which is the drawback in three point stater

12)What is the difference between surge arrestor and lightning arrestor?

LA is installed outside and the effect of lightning is grounded,where as surge arrestor installed inside panels comprising of resistors which consumes the energy and nullify the effect of surge.

13)what is boucholz relay and the significance of it in to the transformer?

Boucholz relay is a device which is used for the protection of transformer from its internal faults, it is a gas based relay. whenever any internal fault occurs in a transformer, the boucholz relay at once gives a horn for some time, if the transformer is isolated from the circuit then it stop its sound itself other wise it trips the circuit by its own tripping mechanism.

14)what is ferrantic effect?

Output voltage is greater than the input voltage or receiving end voltage is greater than the sending end voltage.

15)Why series motor cannot be started on no-load?

Series motor cannot be started without load because of high starting torque. Series motor are used in Trains, Crane etc.

16)Why in a three pin plug the earth pin is thicker and longer than the other pins?

It depends upon R=rho l/a where area(a) is inversely proportional to resistance (R), so if (a) increases, R decreases & if R is less the leakage current will take low resistance path so the earth pin should be thicker. It is longer because the The First to make the connection and Last to disconnnect should be earth Pin. This assures Safety for the person who uses the electrical instrument.

MENTAL ABILITY

K.MAHAMARI(140205)

M.E/PSE – I Year

1)Four friends A, B, C and D distribute some money among themselves in such a manner that A gets one less than B, C gets 5 more than D, D gets 3 more than B. Who gets the smallest amount ?
(a) A
(b) B
(c) C
(d) D

2)There are some balls of red, green and yellow colour lying on a table. There are as many red balls as there are yellow balls. There are twice as many yellow balls as there are green ones. The number of red balls

(a) is equal to the sum of yellow and green balls.
(b) is double the number of green balls.
(c) is equal to yellow balls minus green balls.
(d) cannot be ascertained.

3)In a class of 45 students, a boy is ranked 20th. When two boys joined, his rank was dropped by one. What is his new rank from the end ?
(a) 25^{th}
(b) 26^{th}
(c) 27^{th}
(d) 28th

4)A thief running at 8 km/hr is chased by a policeman whose speed is 10 km/hr. If the thief is 100 m ahead of the policeman, then the time required for the policeman to catch the thief will be
(a) 2 min
(b) 3 min
(c) 4 min
(d) 6 min

5) A train travels at a certain average speed for a distance of 63 km and then travels a distance of 72 km at an average speed of 6 km/hr more than its original speed. If it takes 3 hours to complete the total journey, what is the original speed of the train in km/hr ?
(a) 24
(b) 33
(c) 42
(d) 66

6)A, B, C, D and E belong to five different cities P, Q, R, S and T (not, necessary in that order). Each one of them comes from a different city. Further it is given that:
1. B and C do not belong to Q.
2. B and E do not belong to P and R.
3. A and C do not belong to R, S and T.
4. D and E do not belong to Q and T.
Which one of the following statements is not correct?
(a) C belongs to P
(b) D belongs to R
(c) A belongs to Q
(d) B belongs to S

7)In a garrison, there was food for 1000 soldiers for one month. After 10 days,

1000 more soldiers joined the garrison. How long would the soldiers be able to carry on with the remaining food ?
(a) 25 days
(b) 20 days
(c) 15 days
(d) 10 days

8)Out of 120 applications for a post, 70 are male and 80 have a driver's license. What is the ratio between the minimum to maximum number of males having driver's license ?
(a) 1 to 2
(b) 2 to 3
(c) 3 to 7
(d) 5 to 7

9) The tank-full petrol in Arun's motor-cycle
lasts for 10 days. If he starts using 25% more everyday, how many days will the tank-full petrol last ?
(a) 5
(b) 6
(c) 7
(d) 8

10)A thief running at 8 km/hr is chased by a policeman whose speed is 10 km/hr.
If the thief is 100 m ahead of the policeman, then the time required for the policeman to catch the thief will be
(a) 2 min
(b) 3 min
(c) 4 min
(d) 6 min

11)A person can walk a certain distance and drive back in six hours. He can also walk both ways in 10 hours. How much time will he take to drive both ways ?
(a) Two hours
(b) Two and a half hours
(c) Five and a half hours
(d) Four hours

12)Consider the following matrix :

3	370	7
2	224	6
1	730	x

What is the number at 'X' in the above
matrix ?
(a) 5
(b) 8
(c) 9
(d) 1

ANSWERS:

1) a 2) b 3) c 4) b 5) c 6) d 7) d 8) c 9) d 10) d 11) a 12) 9

INOVATIVE

RESEARCH

NANOLUC LUCIFERASE TECHNOLOGY

P.NAGOJOTHI(140203)

M.E/PSE – I Year

Promega

Luminescence reporter assays have become indispensable tools for immunologists, cell and molecular biologists, geneticists, and other researchers seeking to shine a light on the molecular dynamics of a cell. Into the mix of luminescence options, which includes firefly luciferase and green fluorescent protein (GFP), Promega has now introduced a new fluorescent reporter enzyme called NanoLuc Luciferase, derived from an enzyme found in a deep-sea shrimp of genus Oplophorus.

The new tool offers several improvements over other luminescent reporters. Its small size—about 2/3 as large as GFP—makes NanoLuc less likely to disrupt the cellular processes researchers are using it to probe. It can also shine up to 240 times as brightly as firefly luciferase. "Bioluminescence has become one of the fundamental measurement technologies used in life science," says Promega head of research Keith Wood. "We think with NanoLuc we've advanced that technology in a number of ways."

NanoLuc user Samuel Hasson, a pharmacology research fellow at the

National Institute of Neurological Disease and Stroke, agrees. Without the small size and brighter glow of NanoLuc, Hasson says that his in vitro studies of mitochondrial dysfunction's role in Parkinson's disease would not even be possible. "The signal that you get from the NanoLuc is much brighter," he says. "So when you have cases of low gene expression, the level of signal you get is much higher" than with a firefly luciferase. Plus, "you perturb the natural process less when you have a smaller reporter tagged onto the mitochondrial protein."

The DNA plasmid containing the genetic content needed to produce NanoLuc runs about $320, and the substrate used to detect the molecule's glow is another $125, according to Kevin Kopish, global product manager for NanoLuc. Researchers can expect to pay recurring reagent costs.

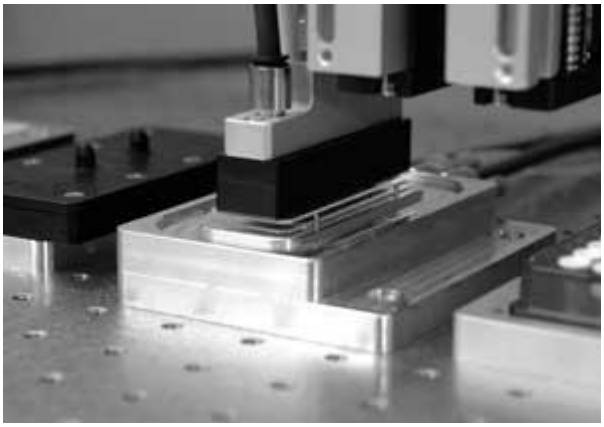
CHANDLER: The increased sensitivity, small size of the protein, and the high stability could result in dramatic changes in reporter assays across many systems.

BIOFAB

L.JEYAMALA(140217)

M.E/PSE – I Year

GEN9



Modern pharmaceutical, chemical, and fuel companies increasingly depend on synthetic biology to produce DNA tailor-made to suit their production needs. Making synthetic genes to program microorganisms used to require a lot of time, in addition to expensive robots and other equipment, but Gen9 has developed BioFab, a new system that can quickly and cheaply produce tens of thousands of double-stranded DNA fragments of between 500 and 1,000 base pairs in length. The company's system for "biological fabrication" couples inexpensively made small DNA fragments with patented or patent-pending chemical processes that accurately assemble them into larger DNA strands, which the platform can do in bulk. Though pricing varies with the amount of synthetic DNA and the modifications a customer needs, the cost can be less than 10 cents per base pair, which is as little as 1/5 of what some competitors charge, according to Gen9 President and CEO Kevin Munnelly. "The ability to synthesize large numbers of genes in parallel at low cost could transform the field of computational protein design," says molecular engineer David Baker of the University of Washington, who is a customer and a member of the Gen9 advisory board.

The company, which launched this summer, currently has about 20 customers—half from industry, half from academia. Gen9's high-throughput manufacturing process allows the company to reduce both the cost and the production time of synthetic DNA. By 2013, Gen9 hopes to singlehandedly surpass the world's current capacity to manufacture synthetic DNA.

WILEY: Brings the cost and speed of DNA synthesis down to the point where entire vectors can be designed and assembled from scratch. A critical component needed to make synthetic biology a reality.

AN ATOMIC CLOCK THAT CAN FIT IN YOUR POCKET

M.S.RAMYA(140209)
M.E/PSE – I Year

Knowing what time it is down to the very last sliver of a second is easy — but only if you happen to have an atomic clock in your pocket. Unfortunately, most such devices wouldn't fit. In fact, there probably wouldn't even be room in the average studio apartment. But all that may be about to change.

Researchers at the Massachusetts Institute of Technology (MIT) are developing what they say is a highly accurate atomic clock the size of a Rubik's cube, measuring about 2 inches (5 centimeters) in each dimension. The clock could one day be used to keep time in places where conventional clocks, like the ones on a cell phone, don't work — like underwater or in war zones, where signal jamming limits connectivity to satellite networks — the researchers said.

Like other atomic clocks, the MIT prototype keeps time by measuring the natural vibration, or oscillation, of cesium atoms in a vacuum. All atoms oscillate at a particular frequency when they move between two energy levels, but since the 1960s, cesium's frequency has been used to define the length of one second. Essentially, one second equals 9,192,631,770 oscillations of a cesium atom. [Wacky Physics: The Coolest Little Particles in Nature]

To keep track of cesium's oscillations, scientists typically use what's known as a fountain clock: a huge tabletop covered in wires and high-tech equipment that looks nothing at all like the clock on your kitchen wall. Resembling a fountain spewing water at the sky, the clock tosses small clouds of cesium atoms several feet (more than 1 meter) into the air and then keeps track of how many times they oscillate, or move up and down, through a microwave beam.

It takes a big clock to keep track of more than 9 billion oscillations. So, to shrink one of these oversized instruments, the researchers decided to measure fewer oscillations at a time — 10-milliseconds' worth, to be exact. By multiplying the number of oscillations that occur in 10 milliseconds by 100, the researchers can estimate how many oscillations would occur in a full second. They also changed the beam that the atoms are moving through from a microwave beam to a laser beam, which is easier to control in a small space.

With these modifications, the MIT team was able to make its fountain clock much more compact than, say, the NIST-F2 — the cesium fountain atomic clock that serves as America's master clock at the National Institute of Standards and Technology in Boulder, Colorado. However, MIT's miniaturized atomic clock isn't nearly as accurate as the NIST-F2, which can keep time without losing or gaining a single second for 300 million years.

"That's fine, because we're not trying to make the world's standard — we're trying to make something that would fit in, say, a Rubik's cube, and be stable over a day or a week," Krish Kotru, a graduate student in MIT's Department of Aeronautics and Astronautics and co-author of a new paper outlining the clock project, said in a statement.

If the researchers can shrink their clock down to a portable size, it can be used in places where cell phones, which also run on atomic time, won't work. Submarine crews or deep-sea divers may even be able to use these highly accurate clocks underwater. Furthermore, soldiers on the battlefield could use the devices even if satellite signals are jammed, the researchers said.

There are other miniaturized versions of these clocks, known as chip-size atomic clocks (CSACs), already on the market. CSACs, which are about the size of a matchbox, solve the portability problem, but they sacrifice a lot of the preciseness of conventional atomic clocks, according to the researchers.

"We have a path toward making a compact, robust clock that's better than CSACs by a couple of orders of magnitude, and more stable over longer periods of time," Kotru said. "Additional miniaturization could ultimately result in a handheld device with stability [that is] orders of magnitude better than compact atomic clocks available today."

To test the alleged robustness of their new clock, the team simulated carrying the device over rugged terrain by moving the clock's laser beam from side to side as it probed the cloud of cesium atoms. But even with its laser beam shaking around, the clock still kept time accurately, according to the researchers.

“Let’s say one day we got it small enough so you could put it in your backpack, or in your vehicle,” said Kotru. “Having it be able to operate while you’re moving across the ground is important.”

Such a device, he added, could take on more high-tech applications, such as synchronizing telecommunications networks.

INDUSTRIES

IN

DETAIL

ALSTOM

S.C.KANAKAVEL(140214)

M.E/PSE – I Year

INTRODUCTION:

Alstom is a French multinational company which holds interests in the electricity generation and rail transport markets. According to the company in 2012–2013 Alstom had annual sales of €20.3 billion, and employed approximately 96,000 people in around 100 countries. Alstom's headquarters are located in Levallois-Perret, west of Paris. Its CEO is Patrick Kron.

Alstom is active in the fields of electrical generation and transmission, with products including turbines for hydroelectric, gas, coal and nuclear-powered plants, as well as large-scale electrical grid infrastructure, solar-thermal, and geothermal systems. It is also a major rail vehicle manufacturer, active in the fields of passenger transportation, signalling and locomotives, with products including the AGV, TGV, Eurostar, and Pendolino high-speed trains, in addition to suburban, regional and metro trains, and Citadis trams.

Alstom (originally as Alsthom) was formed from a merger between Compagnie Française Thomson Houston and the Société Alsacienne de Constructions Mécaniques in 1928; significant acquisitions included the Constructions Electriques de France (1932), shipbuilder Chantiers de l'Atlantique (1976), and parts of ACEC.A merger with parts of the General Electric Company plc (UK) formed GEC-Alstom in 1989; the company became Alstom in 1998.

In 2004, Alstom was in financial crisis due to massive inherited unexpected costs (€4 billion) arising from a design flaw inherited from the acquisition of ABB Group's turbine business, in addition to losses in other areas of the business. The company required a €3.2 billion state-backed bailout in 2003 – and as a result was required to sell several divisions including shipbuilding and electrical transmission to comply with EU rules on state aid.

In 2014, Alstom and General Electric (GE) announced that a US$17 billion (€12.4 billion) bid for the company's power and grid divisions had been made and provisionally accepted. The proposed takeover became a political issue, with the French state intervening, enacting a decree, nicknamed *décret Alstom*, giving the French state additional powers to veto foreign takeovers. GE's bid was later modified, matching elements of a rival offer from Siemens and Mitsubishi.

Company Structure,Products:

Power generation:

Alstom power activities, collectively called Alstom Power Systems, include the design, manufacturing, services and supply of products and systems for the power generation sector and industrial markets. The group covers most energy sources, including gas, coal, nuclear, hydro, wind. Power Systems provides components for power generation including: boilers, steam turbines and gas turbines, wind turbines, generators, air quality control systems and monitoring and control systems for power plants, as well as related products. It has a special focus on boilers and emissions control equipment.

Power Systems also provides services such as product retrofitting for nuclear and fossil steam turbines and refurbishment of existing power plants. It performs maintenance and servicing under long-term agreements for its own turbines, as well as those manufactured by GE and Siemens.

In Russia, the company services nuclear equipment under a join agreement with Atomenergomash. In Brazil, Alstom, together with Bardella, run a joint venture called Indústria Metalúrgica e Mecânica da Amazônia to build hydroelectic power plants throughout the Amazon and Latin American regions.

In India, Alstom has a joint venture with Bharat Forge to manage power production from start to finish.

Transport:

Alstom Transport develops and markets a complete range of systems, equipment and service in the railway industry. The division has annual sales of €5.5 billion as of 2013. It is one of the world's largest manufacturers of high-speed trains, tramways and metros, electrical and diesel trains, information systems, traction systems, power supply systems and track work. The company also operates in the rail infrastructure market, designing, producing and installing infrastructure for the rail network. These includes information solutions, electrification, communication systems, track laying, station utilities, as well as workshops and depots. Maintenance, rebuilding, and renovation services are also provided by the company. Alstom Transport operates in 70 countries and employs 26,000 people.

Alstom Grid

A third business section based on power transmission was formed on 7 June 2010 with the acquisition of the transmission business of Areva SA. The division manufactures equipment for the entire chain of electrical power transmission, including ultra-high voltage transmission lines (both AC and DC). Alstom Grid is headquartered at La Défense, the business district west of Paris, and has four main businesses: electrical transmission system products, power electric system, automation, and service. Alstom Grid has roughly 10% of the global market share.

ELECTRICAL INDUSTRIES LIMITED

M.RAJAPANDI (140216)
M.E/PSE – I YEAR

Electrical Industries Limited (EIL) is the largest manufacturer of electrical products in the English-speaking Caribbean. Manufacturing since 1969, our products can be found in many countries worldwide including U.S.A, UK, Malta, Puerto Rico, Costa Rica, Honduras, Suriname and throughout the English-speaking Caribbean.

ABOUT

Electrical Industries Limited (EIL), traditionally a strong manufacturing company with the largest copper cable manufacturing plant in the Caribbean and the leading manufacturer of Switchgear in Trinidad with a cadre of technical experience in engineering design, realized that a huge opportunity existed to capitalize on the GE brand and their basket of products. In 2003 the Project Engineering Division was created and mandated to service the Electrical Contractors, Industrial Sector, Utilities, State Enterprises and Private Developers. This undertaking meant that EIL would have to liaise with key industry players including the Electrical Consultants, General Contractors, Architects and other professional Electrical bodies in Trinidad.

Creating vital partnerships within the industry with General Contractors as Sub-contractors and electrical contractors, EIL successfully completed large projects which individually we would not have qualified to do. EIL Project Engineering has also conducted training seminars with the local electrical fraternity with the aim of educating our valued partners on industry best practice. These types of interaction over the years has gained EIL is recognition as an Industry leader and a responsible corporate citizen.

The Project Engineering Division continues to look for innovative ways to partner with others in our industry while we seek to broaden and deepen our existing product lines with quality suppliers and service.

FOCUS

The division is dedicated to building long-term relationships with customers through quality training and support, and its main goal is to grow steadily, by strategically partnering with quality suppliers and local Service providers. It is the focus of the Project Engineering Division is to be the premier provider of Quality Electrical Solutions to the Caribbean.

COREVALUES

Electrical Industries Limited is committed to the core values of:

- Integrity
- Innovation and
- Social Responsibility

QUALITYCERTIFICATION

In accordance with our mission and vision for quality and excellence EIL was the first Trinbagonian company to obtain ISO 9000 certification and has since been upgraded to ISO 9001 compliance.

Not only have we accomplished a milestone in our quality certification; in 2006 EIL was honoured as the Overall Winner of the Excellence in Business Award and was deemed winner of the category for Excellence, Technology and Innovation. We were also the 2006 Overall Winner of the Excellence in Business Award and secured the Award for Excellence in Business Export and Competitiveness. In 2001 we were the Prestigious winner of the Prime Minister's Exporter of the Year Award for Quality Construction Material.

PRODUCTS

EIL manufactures and exports a wide range of products including electrical cable, fluorescent lighting and low and medium voltage switchgear.

An exclusive distributorship has been secured globally from such recognized brands as, General Electric (GE), Power Measurements Limited – Canada, Lucy Switchgrear and WEG Motors and Drives. With these brands we market a range of high quality accessories that complements our locally manufactured products.

VISION&MISSION

Our vision is to be the première organization, in the private sector in Trinidad and Tobago. In keeping with this vision, we strive to continuously improve in order to offer a higher standard of service to you, our clients.

HAVELLS

C.SAKTHIVINAYAGAM(140212)

M.E/PSE – I Year

Type	Public company
Traded as	BSE: 517354
Industry	Power distribution & Electrical equipments
Founded	1958
Founders	Qimat Rai Gupta
Headquarters	Noida, India
Key people	Qimat Rai Gupta Founder &Chairman
Products	Fast Moving Electrical Goods
Revenue	₹82.62 billion (US$1.3 billion) (2014)
Employees	6,500
Divisions	Lighting Sector, Power Distribution Sector

Havells India Ltd is a billion-dollar-plus electrical equipment company founded in 1958, with products ranging from industrial & domestic circuit protection switchgear, cables & wires, motors, fans, power capacitors, compact fluorescent lamps (CFL), luminaries for domestic, commercial & industrial applications, modular switches covering household, commercial and industrial electrical needs, water heater and domestic appliances.

Havells owns global brands like Crabtree, Sylvania, Concord, Lumiance and has 91 branches / representative offices with over 6500 professionals in over 50 countries. As of 2013 It has 12 manufacturing plants in India located at Haridwar, Baddi, Noida, Faridabad, Alwar, Neemrana and 6 manufacturing plants are located across Europe, Latin America & Africa and with more than 20,000 global distribution network.[5] In 2014, Havells was listed 125th among 1200 of India's most trusted brands according to the Brand Trust Report 2014, a study conducted by Trust Research Advisory.

Global Presence

In late 90's Standard Electrical Company became a 100% Subsidiary of the company. The company gained IEC certification for industrial switchgear and CSA certification for all manufacturing plants in 1991. Soon production started in their plant located at Baddi (H.P.) for manufacturing domestic switchgear. Setting up a manufacturing plant for manufacturing of ceiling fans at Noida, UP. In 1999 Havell's opened their first international sales office in London through their wholly owned subsidiary company Havells U.K. Ltd. In December 2004, placed 235 fully convertible debentures of Rs.1 million on M/s. Shine Ltd., Mauritius and the debenture were converted in June 2006 Attained the CE certificate for CFLs. In March,2005 Havells Started the manufacturing of the Electric Fans at its plant located near Haridwar, Uttarakhand and got Award for the KEMA certification by The Dutch Council for Accreditation, making QRG the only group to attain this certification in India. The company started their first R&D Center in Noida. In November, 2005

Crabtree India merged with Havells India. adding a CFL production unit in Haridwar manufacturing plant. Expansion at Alwar manufacturing plant for increase of production capacity and another expansion at the Baddi manufacturing plant and set-up of an Export Oriented Unit started in that same year. In 2006 it became one of the India's first Company to get the ISI mark Certification from the Bureau of Indian Standards for complete range of CFLs.The company is setting up new fully automatic water heater manufacturing plant in Neemrana,Rajasthan under the leadership of Mr, Sunil Sikka,Mr. Ajay Bhanut,Mr. Daljit Singh and team.

Expansion era

In, 2007 Havells creation of a capacitor manufacturing plant in Noida, UP with the capacity of 6,00,000 KVAr per month was completed. Later it acquired the lighting business of a Frankfurt based company Sylvania, a global leader in the lighting business and now for the first time in its history the company's turnover exceeded US$1 billion. By 2007 Havell's were well known for its electrical switches, energy meters and miniature circuit breakers (MCBs). In March 2007, Havells acquired SLI Sylvania of Netherlands for $300 million, making it the fourth largest lighting business in the world, worth over a billion USD. This was, at that time, the biggest overseas takeover by an Indian electrical equipment manufacturer. This takeover helped to give the Havells brand access to over 20,000 dealers across Latin America, Europe, Asia and Africa. The combined Havells-Sylvania generated over a $1 billion in revenue with more than 60% coming from international sales. Due to past mergers Havells' portfolio includes many well known brands like the Crabtree, Sylvania, Concord, Luminance, Linolite & SLI Lighting. In 2008 it became one of the first Indian CFL manufacturers to have adopted RoHS, European norms on restriction of hazardous substances in CFLs. In October 2008 Havell's moved to its new corporate headquarters, QRG Towers located at Expressway Noida. With an investment of Rs.500 million in Global Center for Research and Innovation (CRI) construction of a fully automatic plant for Havells Lafert Motors at Neemrana also started in that same year. In, 2010 it acquired 100% interest in Standard Electricals to set up the world's first new generation CMH lamp plant at Neemrana. In 2012, Indian actor Rajesh Khanna endorsed Havells Fan TVC titled Havells Fans Forever. Later in that same year Havells India expressed its plans to expand its presence in Turkey, Russia, Indonesia and Malaysia and is in the process of acquiring various companies in China and Africa. In September 2013 Havells have launched the domestic pumps for Indian market. Initially company plans to launch the monoblock pumps and expand the product range gradually. Monoblock pumps of Havells are being manufactered at Neemrana Motor factory utilising the production capacity of the unit.

PRODUCTS

- Building Circuit Protection
- Miniature Circuit Breaker
- Industrial Circuit Protection
- Motors
- Foot Cum Flange Motor
- Professional and Consumer Luminaires
- Small Domestic Appliances
- Capacitors
- HPF Green CFL
- Ceiling Fans
- CFL
- Water Heater
- Domestic Water Pumps

GENERAL

CONTENTS

CYBERSPYING TOOL
M.P.RAMESH(140209)
M.E/PSE – I Year

WASHINGTON: A sophisticated cybersespionage tool has been stealing information from governments and businesses since 2008, researchers said, and one report linked it to US and British intelligence.

The security firm Symantec identified the malware, known as Regin, and said it was used "in systematic spying campaigns against a range of international targets," including governments, businesses, researchers and private individuals.

The news website The Intercept reported that the malware appeared to be linked to US and British intelligence, and that it was used in attacks on EU government networks and Belgium's telecom network.

The report, citing industry sources and a technical analysis of the malware, said Regin appears to be referenced in documents leaked by former National Security Agency contractor Edward Snowden about broad surveillance programs. Symantec's report said the malware shares some characteristics with the Stuxnet worm — a tool believed to have been used by the US and Israeli governments to attack computer networks involved in Iran's nuclear program.

Because of its complexity, the Symantec researchers said in a blog post that the malware "would have required a significant investment of time and resources, indicating that a nation state is responsible."

The researchers added that "it is likely that its development took months, if not years, to complete and its authors have gone to great lengths to cover its tracks."

Lurking in shadows

"Regin's developers put considerable effort into making it highly inconspicuous," Symantec said.

"Its low key nature means it can potentially be used in espionage campaigns lasting several years. Even when its presence is detected, it is very difficult to ascertain what it is doing. Symantec was only able to analyse the payloads after it decrypted sample files."

The researchers also said many components of Regin are still probably undiscovered and that there could be new versions of this tool which have not yet been detected. The infections occurred between 2008 and 2011, after which the malware disappeared before a new version surfaced in 2013. The largest number of infections discovered — 28% — was in

Russia, and Saudi Arabia was second with 24%. Other countries where the malware was found included Mexico, Ireland, India, Afghanistan, Iran, Belgium, Austria and Pakistan. There were no reported infections in the United States.

Around half of all infections occurred at addresses belonging to Internet service providers, but Symantec said it believes the targets of these infections were customers of these companies rather than the companies themselves. Telecom companies were also infected, apparently to gain access to calls being routed through their infrastructure, the report noted.

Regin appeared to allow the attackers to capture screenshots, take control of the mouse's point-and-click functions, steal passwords, monitor traffic and recover deleted files.

Symantec said some targets may have been tricked into visiting spoofed versions of well-known websites to allow the malware to be installed, and in one case it originated from Yahoo! Instant Messenger. Other security experts agreed this was a dangerous tool likely sponsored by a government.

"Regin is a cyberattack platform, which the attackers deploy in victim networks for total remote control at all levels," said a research report from Kaspersky Lab. Kaspersky added that Regin also appears to have infiltrated mobile communications through GSM networks, exposing "ancient" communication protocols used by cellphone networks.

Antti Tikkanen at Finland-based F-Secure called it "one of the more complex pieces of malware around," and added that "our belief is that this malware, for a change, isn't coming from Russia or China." The news comes amid heightened concerns on cyberespionage.

Last month, separate teams of security researchers said the Russian and Chinese governments are likely behind widespread cyberespionage that has hit targets in the US and elsewhere

EDUCATIONAL SITES

C.SAKTHIVINAYAGAM(140212)
M.E/PSE-I Year

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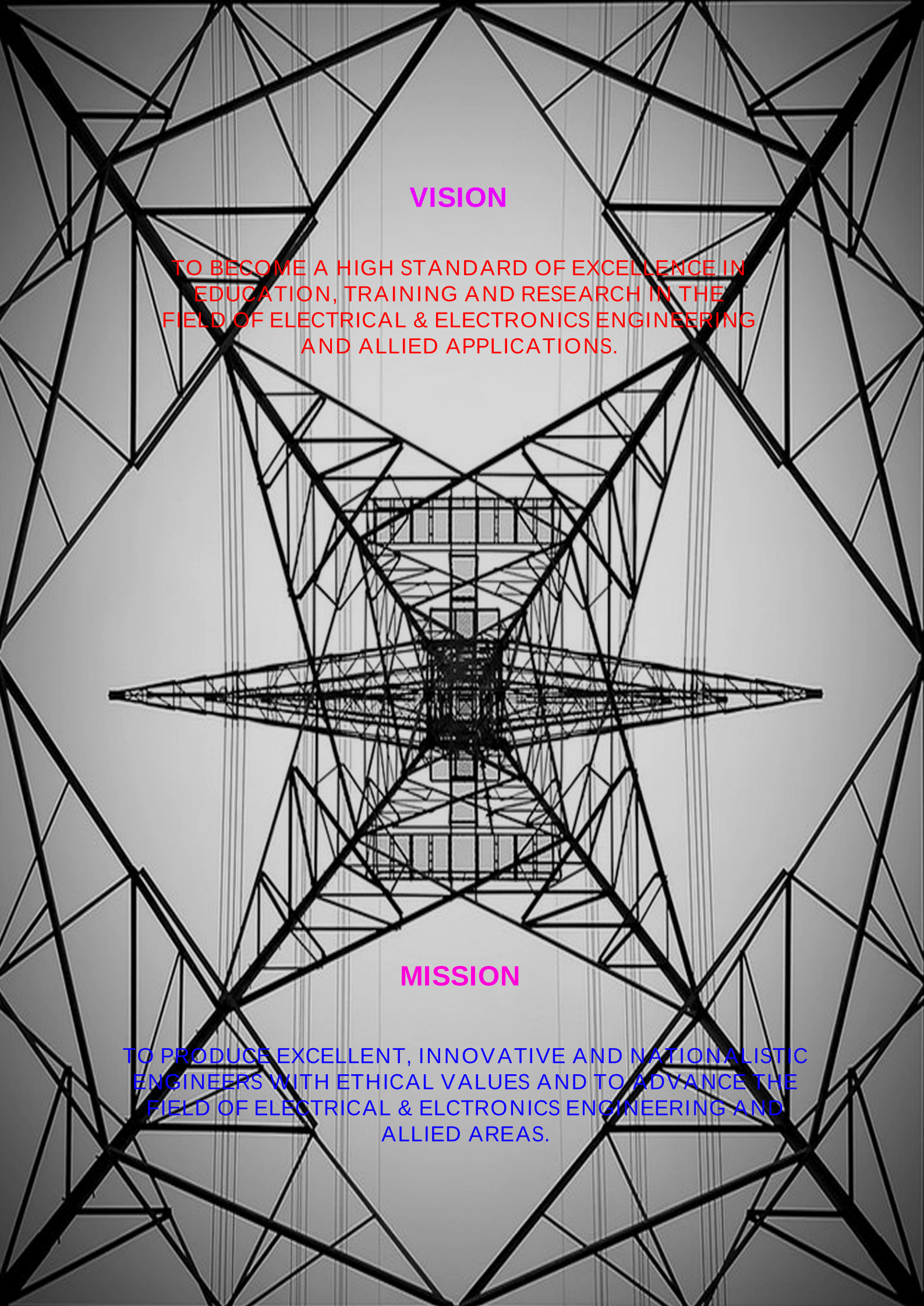

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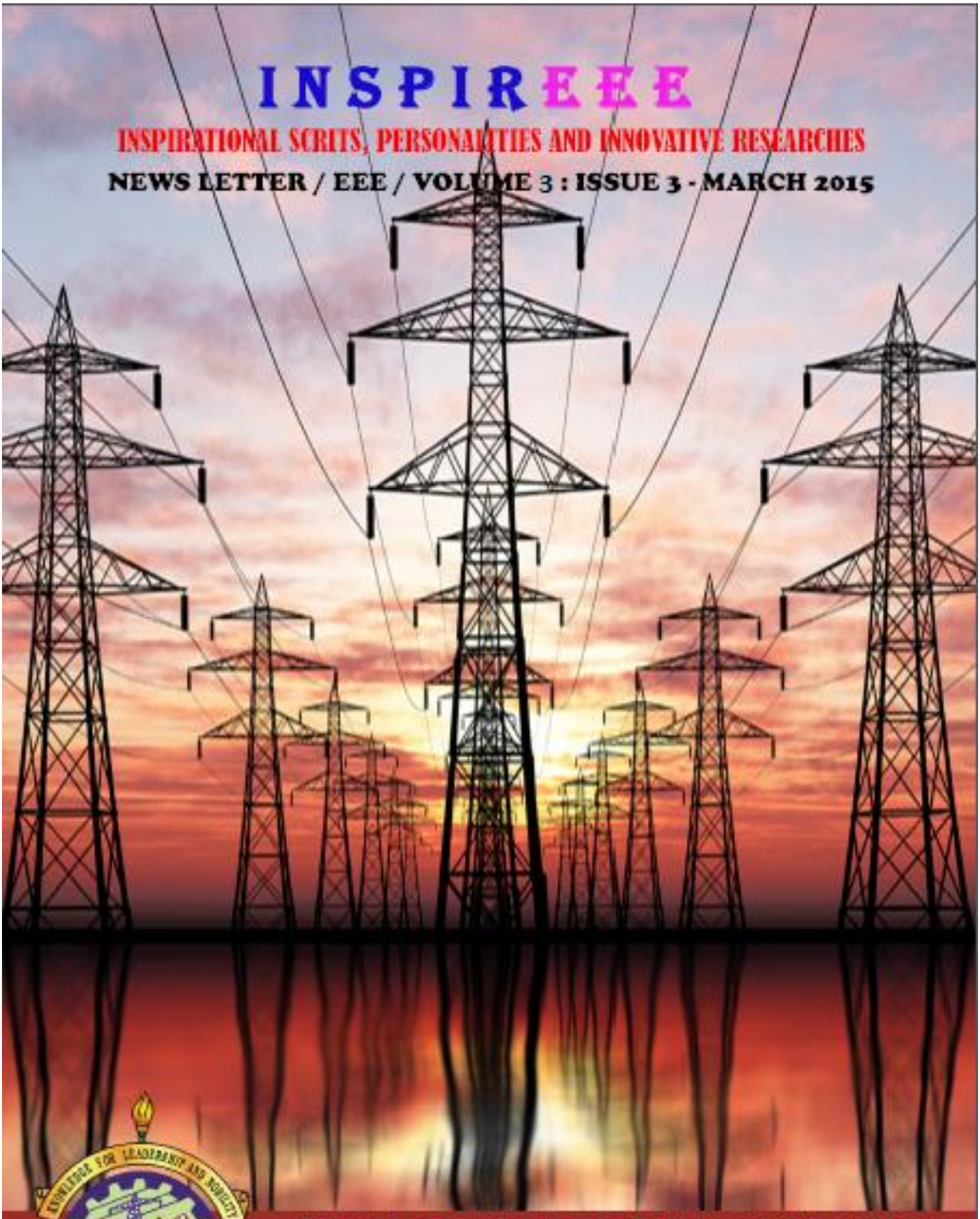
TO BECOME A HIGH STANDARD OF EXCELLENCE IN EDUCATION, TRAINING AND RESEARCH IN THE FIELD OF ELECTRICAL & ELECTRONICS ENGINEERING AND ALLIED APPLICATIONS.

MISSION

TO PRODUCE EXCELLENT, INNOVATIVE AND NATIONALISTIC ENGINEERS WITH ETHICAL VALUES AND TO ADVANCE THE FIELD OF ELECTRICAL & ELCTRONICS ENGINEERING AND ALLIED AREAS.



INSPIREEE

INSPIRATIONAL SCRITS, PERSONALITIES AND INNOVATIVE RESEARCHES

NEWS LETTER / EEE / VOLUME 3 : ISSUE 3 - MARCH 2015

K.L.N. COLLEGE OF ENGINEERING
Approved by AICTE and Afflicated to Anna University
An ISO 9001 : 2008 Certified Institution
Pottapalayam - 630 611, Sivagangai Dt., Tamilnadu.

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INspirational **S**cripts, **P**ersonalities and **I**nnovative **R**esearches of **EEE**

VISION :

To become a high standard of excellence in Education, Training and Research in the field of Electrical & Electronics Engineering and allied applications.

MISSION :

To produce excellent, innovative and Nationalistic Engineers with Ethical Values and to advance the field of Electrical & Electronics Engineering and allied areas.

K.L.N. College of Engineering

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MESSAGE FROM HEAD OF THE DEPARTMENT

Dr. S.M. Kannan, M.E., Ph.D., MIE, MISTE, MIEEE (USA)

HOD/EEE,

K.L.N.College of Engineering

MESSAGE

This issue contains the profile of famous Scientists and Engineers. The technical content such as blade less wind turbine, electricity from ambient vibrations is interesting. Such innovations by others may be implemented by us, just by incorporating 10 % modifications. It was found that mini latest information were identified and presented in the News letter. Everything is in paper only. If properly guided, it can be implemented and patented.

Information GATE examinations will definitely create an awareness among the students. Innovative research topics are highly advanced and very informative. The difference between Electrical and Electronics engineering quotes are really very interesting.

Best wishes to all

(Dr. S.M. Kannan)
Head of the Department – EEE

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SPARKERS

OF

ELECTRICAL

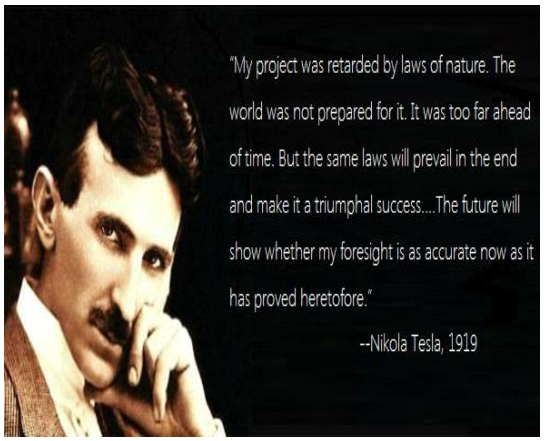
ENGINEERING

NIKOLA TESLA

S.Radhika (132036) &M.Parameswari (132020)

II year – EEE – B sec

Alternating Current -- This is where it all began, and what ultimately caused such a stir at the 1893 World's Expo in Chicago. A war was leveled ever-after between the vision of Edison and the vision of Tesla for how electricity would be produced and distributed. The division can be summarized as one of cost and safety: The DC current that Edison (backed by General Electric) had been working on was costly over long distances, and produced dangerous sparking from the required converter (called a commutator). Regardless, Edison and his backers utilized the general "dangers" of electric current to instill fear in Tesla's alternative: Alternating Current.



Light-- Of course he didn't invent light itself, but he did invent how light can be harnessed and distributed. Tesla developed and used fluorescent bulbs in his lab some 40 years before industry "invented" them.

X-rays -- Electromagnetic and ionizing radiation was heavily researched in the late 1800s, but Tesla researched the entire gamut. Everything from a precursor to Kirlian photography, which has the ability to document life force, to what we now use in medical diagnostics, this was a transformative invention of which Tesla played a central role. X-rays, like so many of Tesla's contributions, stemmed from his belief that everything we need to understand the universe is virtually around us at all times, but we need to use our minds to develop real-world devices to augment our innate perception of existence.

Radio -- Guglielmo Marconi was initially credited, and most believe him to be the inventor of radio to this day. However, the Supreme Court overturned Marconi's patent in 1943, when it was proven that Tesla invented the radio years previous to Marconi. Radio signals are just another frequency that needs a transmitter and receiver, which Tesla also demonstrated in 1893 during a presentation before The National Electric Light Association.

Remote Control -- This invention was a natural outcropping of radio. Patent No. 613809 was the first remote controlled model boat, demonstrated in 1898. Utilizing several large batteries; radio signals controlled switches, which then energized the boat's

propeller, rudder, and scaled-down running lights.

Electric Motor -- Tesla's invention of the electric motor has finally been popularized by a car brandishing his name. While the technical specifications are beyond the scope of this summary, suffice to say that Tesla's invention of a motor with rotating magnetic fields could have freed mankind much sooner from the stranglehold of Big Oil. However, his invention in 1930 succumbed to the economic crisis and the world war that followed. Nevertheless, this invention has fundamentally changed the landscape of what we now take for granted: industrial fans, household appliance, water pumps, machine tools, power tools, disk drives, electric wristwatches and compressors.

Robotics -- Tesla's overly enhanced scientific mind led him to the idea that all living beings are merely driven by external impulses. He stated: "I have by every thought and act of mine, demonstrated, and does so daily, to my absolute satisfaction that I am an automaton endowed with power of movement, which merely responds to external stimuli." Thus, the concept of the robot was born.

Laser -- Tesla's invention of the laser may be one of the best examples of the good and evil bound up together within the mind of man. Lasers have transformed surgical applications in an undeniably beneficial way, and they have given rise to much of our current digital media. However, with this leap in innovation we have also crossed into the land of science fiction

J.P. Morgan backed Tesla with $150,000 to build a tower that would use the natural frequencies of our universe to transmit data, including a wide range of information communicated through images, voice messages, and text. This represented the world's first wireless communications, but it also meant that aside from the cost of the tower itself, the universe was filled with free energy that could be utilized to form a world wide web connecting all people in all places, as well as allow people to harness the free energy around them. Essentially, the 0's and 1's of the universe are embedded in the fabric of existence for each of us to access as needed.

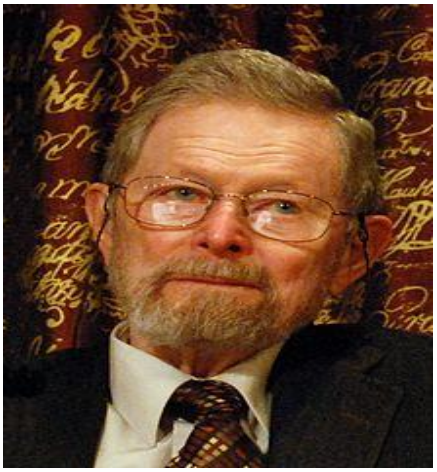
GEORGE E. SMITH

M.MeenaPriyadharshini (132051) &J.MeribaCecili (132032)

II year – EEE – B sec

Biography

Smith was born in White Plains, New York. Smith served in the US Navy, attained his B.Sc. at the University of Pennsylvania in 1955 and his PhD from the University of Chicago in 1959 with a dissertation of only eight pages. He worked at Bell Labs in Murray Hill,New Jersey from 1959 to his retirement in 1986, where he led research into novel lasers and semiconductor devices. During his tenure, Smith was awarded dozens of patents and eventually headed the VLSI device department.



He was made a fellow of the Institute of Electrical and Electronic Engineers, Fellow of the American Physical Society and a member of the National Academy of Engineering. He hold 31 US patents and the author of over 40 papers. He was founding editor of the IEEE publication "Electron Device Letters".

AWARDS:

1973 *Ballantine Medal of the Franklin Institute* – "For the invention of the Charge-Coupled Device structure, a conceptually simple semiconductor technology with significant application to image sensing, serial memory and signal processing."

1974 *Morris N. Liebman Award of the Institute of Electrical and Electronic Engineering* – "For the invention of the Charge-Coupled Device and leadership in the field of MOS device physics."

1986 *Progress Medal of the Photographic Society of America* – "For the Charge-Coupled Device's applications to electronic imaging devices."

1999 *IEEE Device Research Conference Breakthrough* – "For pioneering work in the field of Buried-Channel Charge Coupled Devices".

1999 *Computer and Communications Prize* – "For the Invention of the Charge Coupled Device (CCD)".

2001 *Edwin Land Medal* – "For the invention and development of the Charge-Coupled Device, a contribution that has had extraordinary impact on image creation and utilization".

2006 *Charles Stark Draper Prize* – "For the invention of the Charge- Coupled Device (CCD), a light-sensitive component at the heart of digital cameras and other widely used imaging technologies.

TECHNICAL CONTEXT

Bladeless Wind Turbine produces energy with no moving parts

R.R.Priyanka (132031) &M.Ponsarumathi (132028)

II year - EEE – B sec

This turbine produces electricity with charged water droplets.

While most wind turbines generate electricity by converting kinetic energy into mechanical energy of the blades rotating, which in turn generates electrical energy. EWICON stands for Electrostatic WInd Energy CONverter) creates electrical energy directly from wind energy.

It does this through the displacement of charged particles by the wind in the opposite direction of an electrical field. The device comprises a steel frame holding around 40 horizontal rows of insulated tubes -- giving it the appearance of a large tennis racket. Each tube features several electrodes and nozzles which release positively-charge water into the air, through a process that has been dubbed “electro spraying”

Positively charged particles naturally move towards the negative electrode, but when the wind is allowed to push the particle away from the negative electrode, it increases its potential electrical energy -- a little like pushing a rock up a hill against gravity. This increased energy can then be collected.

The whole system comprises of a battery, inverter, HVDC source, pump and charging system. All components are placed on a metal plate which is supported by ceramic insulators. The insulated metal plate acts as a capacitor, which is charged by the removal of the charged droplets. The amount of energy that can be generated depends on the number of cones used to spray charged particles and the wind flow rate.

ADVANTAGES OF EWICON:

The Ewicon's advantages include the fact that it can come in many different shapes and sizes and it has no moving parts, meaning much less mechanical wear and tear and thereby maintenance costs. Thanks to the lack of moving parts, it is also much quieter and creates fewer vibrations, making it suitable for urban settings.

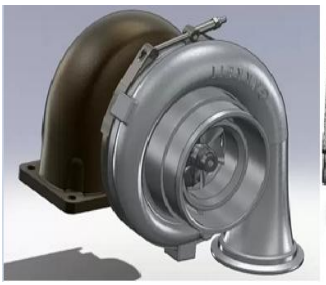
ADDITIVE MANUFACTURING

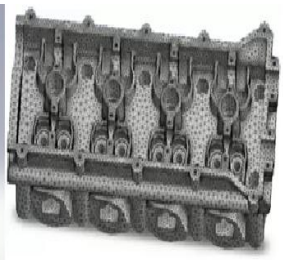
G.Parthasarathy (132015)&T.K.Rishikesh (132021)&P.Ramkumar (132312)

II year – EEE – B sec

Additive manufacturing's earliest applications have been on the tool room end of the manufacturing spectrum. For example, rapid prototyping was one of the earliest additive variants and its mission was to reduce the lead time and cost of developing prototypes of new parts and devices, which was earlier only done with subtractive tool room methods (typically slowly and expensively).

Additive manufacturing or 3D printing is a process of making three dimensional solid objects from a digital file. The creation of a 3D printed object is achieved using additive processes. In an additive process an object is created by laying down successive layers of material until the entire object is created. Each of these layers can be seen as a thinly sliced horizontal cross-section of the eventual object.





3D printable models may be created with a computer aided design (CAD) package or via a 3D scanner or via a plain digital camera and photogrammetry software.

To prepare the digital file created in a 3D modeling program for printing, the software slices the final model into hundreds or thousands of horizontal layers.

When this prepared file is uploaded in the 3D printer, the printer creates the object layer by layer. The 3D printer reads every slice (or 2D image) and proceeds to create the object blending each layer together with no sign of the layering visible, resulting in one three dimensional object. Not all 3D printers use the same technology to realize their objects. There are several ways to do it and all those available as of 2012 were additive, differing mainly in the way layers are built to create the final object. Selective laser sintering (SLS) and fused deposition modeling (FDM) are the most common technologies using this way of printing. Another method of printing is to lay liquid materials that are cured with different technologies. The most common technology using this method is called stereo lithography (SLA).

3D printing will create many new opportunities in almost every industry.Imagine a world where actual objects will be created with the touch of abutton. Some may save lives, others extend lives, and yet others simplybring ease to our daily routines.

Additive manufacturing systems that range from $2,000 to $500,000 in price and are employed in several industries: aerospace, architecture, automotive, defense, and dental, among many others.Standard applications include design visualization, prototyping/CAD, metal casting, architecture, education, geospatial, healthcare, and entertainment/retail.

3D Printer used in Environmental use, Industrial & consumer use

It has many any applications in the field of manufacturing & industry. Actually this device shrinks the manufacturing process. Its major related applications are, Rapid manufacturing, is a new method of manufacturing and many of its processes remain unproven. 3D printing is now entering the field of rapid manufacturing and was identified as a "next level" technology. One of the most promising processes looks to be the adaptation of selective laser sintering (SLS), or direct metal laser sintering (DMLS) some of the better-established rapid prototyping methods. And Companies have created services where consumers can customize objects using simplified web based customization software, and order the resulting items as 3D printed unique objects.This now allows consumers to create custom cases for their mobile phones.

Nokia has released the 3D designs for its case so that owners can customize their own case and have it 3D printed. Cornell Creative Machines Lab has confirmed that it is possible to produce customized food with 3D Hydrocolloid Printing.Additive manufacturing of food is currently being developed by squeezing out food, layer by layer, into 3D objects. A large variety of foods are appropriate candidates, such as chocolate, candy, flat foods such as crackers and pasta, and even pizza. Professor Leroy Cronin of Glasgow University proposed, that it is possible to use chemical inks to print medicine.

3D printing has been used to print patient specific implant and device for medical use. The hearing aid and dental industries are expected to be the biggest area of future development using the custom 3D printing technology. Research is also being conducted on methods to bio-print replacements for lost tissue due to arthritis and cancer.

China has committed almost $500 million towards the establishment of 10 national 3-D printing development institutes. In 2013, Chinese scientists began printing ears, livers and kidneys, with living tissue. Researchers in China have been able to successfully print human organs using specialized, 3D bio printers that use living cells instead of plastic. So, this revolutionary invention of technology can create human beings to live better through its applications in many field. So, then stay amazed, and work hard to submit our part of knowledge to this world.

Tiny Generators Produce Electricity from Ambient Vibrations

S.Radhika (132036) &M.Parameswari (132020)

II year – EEE – B sec

Tiny generators developed at the University of Michigan could produce enough electricity from random, ambient vibrations to power a wristwatch, pacemaker or wireless sensor. The energy-harvesting devices, created at U-M's Engineering Research Center for Wireless Integrated Microsystems, are highly efficient at providing renewable electrical power from arbitrary, non-periodic vibrations. This type of vibration is a byproduct of traffic driving on bridges, machinery operating in factories and humans moving their limbs, for example.

The Parametric Frequency Increased Generators (PFIGs) were created by Khalil Najafi, chair of electrical and computer engineering, and Tzeno Galchev, a doctoral student in the same department. Most similar devices have more limited abilities because they rely on regular, predictable energy sources, said Najafi, who is the Schlumberger Professor of Engineering and also a professor in the Department of Biomedical Engineering.

"The vast majority of environmental kinetic energy surrounding us every day does not occur in periodic, repeatable patterns. Energy from traffic on a busy street or bridge or in a tunnel, and people walking up and down stairs, for example, cause vibrations that are non-periodic and occur at low frequencies," Najafi said. "Our parametric generators are more efficient in these environments."

The researchers have built three prototypes and a fourth is forthcoming. In two of the generators, the energy conversion is performed through electromagnetic induction, in which a coil is subjected to a varying magnetic field. This is a process similar to how large-scale generators in big power plants operate.

The latest and smallest device, which measures one cubic centimeter, uses a piezoelectric material, which is a type of material that produces charge when it is stressed. This version has applications in infrastructure health monitoring. The generators could one day power bridge sensors that would warn inspectors of cracks or corrosion before human eyes could discern problems.

The generators have demonstrated that they can produce up to 0.5 mill watts (or 500 microwatts) from typical vibration amplitudes found on the human body. That's more than enough energy to run a wristwatch, which needs between one and 10 microwatts, or a pacemaker, which needs between 10 and 50. A mill watt is 1,000 microwatts.

"The ultimate goal is to enable various applications like remote wireless sensors and surgically implanted medical devices," Galchev said. "These are long lifetime applications where it is very costly to

replace depleted batteries or, worse, to have to wire the sensors to a power source."

Batteries are often an inefficient way to power the growing array of wireless sensors being created today, Najafi said. Energy scavenging can provide a better option.

"There is a fundamental question that needs to be answered about how to power wireless electronic devices, which are becoming ubiquitous and at the same time very efficient," Najafi said. "There is plenty of energy surrounding these systems in the form of vibrations, heat, solar, and wind."

These generators could also power wireless sensors deployed in buildings to make them more energy efficient, or throughout large public spaces to monitor for toxins or pollutants.

The research is funded by the National Science Foundation, Sandia National Laboratories, and the National Institute of Standards and Technology.

The university is pursuing patent protection for the intellectual property. Galchev and a team of engineering and business students are working to commercialize the technology through their company, Enertia. Enertia recently won first place in the DTE/U-M Clean Energy Prize business plan competition and second place in the U-M Zell Lurie Institute for Entrepreneurial Studies' Michigan Business Challenge. Other members of the team are Erkan Aktakka, and Adam Carver. Aktakka is an electrical engineering doctoral student. Carver is an MBA student at the Ross School of Business.

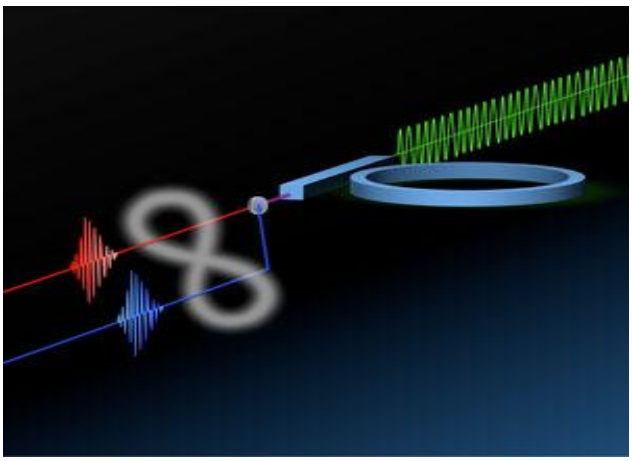
ENTANGLEMENT ON CHIP

S.Priyanka (132056) &M.Perianayaki (132005)
II year – EEE – B sec

Unlike Bilbo's magic ring, which entangles human hearts, engineers have created a new micro ring that entangles individual particles of light, an important first step in a whole host of new technologies. Entanglement the instantaneous connection between two particles no matter their distance apart is one of the most intriguing and promising phenomena in all of physics. Properly harnessed, entangled photons could revolutionize computing, communications and cyber security. Though readily created in the lab and by comparatively large-scale optoelectronic components, a practical source of entangled photons that can fit onto an ordinary computer chip has been elusive.

New research, reported in *Optica*, describes how a team of scientists has developed, for the first time, a microscopic component that is small enough to fit onto a standard silicon chip that can generate a continuous supply of entangled photons.

The new design is based on an established silicon technology known as a micro ring resonator. These resonators are actually loops that are etched onto silicon wafers that can corral and then reemit particles of light. By tailoring the design of this resonator, the researchers created a novel source of entangled photons that is incredibly small and highly efficient, making it an ideal on-chip component. The main advantage of our new source is that it is at the same time small, bright, and silicon based.



"The diameter of the ring resonator is a mere 20 microns, which is about one-tenth of the width of a human hair. Previous sources were hundreds of times larger than the one we developed."

From entanglement to innovation
Scientists and engineers have long recognized the enormous practical potential of entangled photons. This curious manifestation of quantum physics, which Einstein referred to as "spooky action at a distance," has two important implications in real-world technology.

First, if something acts on one of the entangled photons then the other one will respond to that action instantly, even if it is on the opposite side of a computer chip or even the opposite side of the Galaxy. This behavior could be harnessed to increase the power and speed of computations. The second implication is that the two photons can be considered to be, in some sense, a single entity, which would allow for new communication protocols that are immune to spying.

Creating entanglement on a chip

To bring these new technologies to fruition, however, requires a new class of entangled photon emitters: ones that can be readily incorporated into existing silicon chip technologies. Achieving this goal has been very challenging.

To date, entangled photon emitters—which are principally made from specially designed crystals—could be scaled down to only a few millimeters in size, which is still many orders of magnitude too large for on-chip applications. In addition, these emitters require a great deal of power, which is a valuable commodity in telecommunications and computing.

To overcome these challenges, the researchers explored the potential of ring resonators as a new source for entangled photons. These well-established optoelectronic components can be easily etched onto a silicon wafer in the same manner that other components on semiconductor chips are fashioned. To "pump," or power, the resonator, a laser beam is directed along an optical fiber to the input side of the sample, and then coupled to the resonator where the photons race around the ring. This creates an ideal environment for the photons to mingle and become entangled.
As photons exited the resonator, the researchers were able to observe that a remarkably high percentage of them exhibited the telltale characteristics of entanglement.

"Our device is capable of emitting light with striking quantum mechanical properties never observed in an integrated source," said Bajoni. "The rate at which the entangled photons are generated is unprecedented for a silicon integrated source, and comparable with that available from bulk crystals that must be pumped by very strong lasers."

Applications and future technology

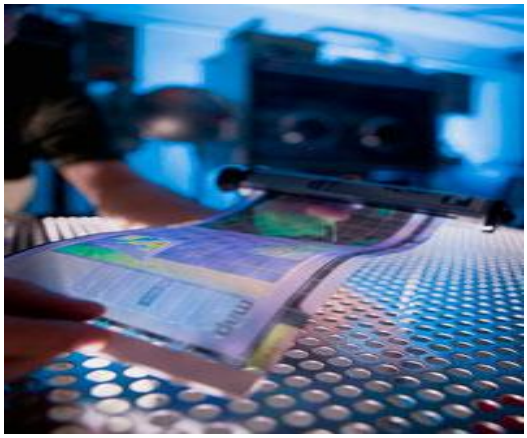
The researchers believe their work is particularly relevant because it demonstrates, for the first time, a quintessential quantum effect, entanglement, in a well-established technology. "In the last few years, silicon integrated devices have been developed to filter and route light, mainly for telecommunication applications," observed Bajoni. "Our micro-ring resonators can be readily used alongside these devices, moving us toward the ability to fully harness entanglement on a chip." As a result, this research could facilitate the adoption of quantum information technologies, particularly quantum cryptography protocols, which would ensure secure communications in ways that classical cryptography protocols cannot. According to Bajoni and his colleagues, these protocols have already been demonstrated and tested. What has been missing was a cheap, small, and reliable source of entangled photons capable of propagation in fiber networks, a problem that is apparently solved by their innovation. Drawing of the silicon ring resonator with its access waveguide. The green wave at the input represents the laser pump, the red and blue wave packets at the output represent the generated photon pairs, and the infinity symbol linking the two outputs indicates the entanglement between the pair of photons.

Improvements in transistors will make flexible plastic computers a reality

A.Romika (132001) &S.Priyanka (132057) &M.Perianayaki (132005)
II year – EEE – B sec

Researchers at Japan's National Institute for Materials Science revealed that improvements should soon be expected in the manufacture of transistors that can be used, for example, to make flexible, paper-thin computer screens.

The scientists reviewed the latest developments in research on photoactive organic field-effect transistors, devices that incorporate organic semiconductors, amplify weak electronic signals and either emit or receive light.



Organic field-effect transistors (OFETs) were developed to produce low-cost, large-area electronics, such as printable and/or flexible electronic devices.

The researchers reported that much progress has been made in the development of light-emitting organic field-effect transistors (LE-OFETs) since they first appeared in 2003.Research in this area has resulted in advances in the manufacture of novel organic photonics applications using cost-effective approaches. Light emission efficiency and brightness of these transistors will soon improve. And the production of new display technologies is expected to be the result of further research.

LE-OFETs are also expected to become fully compatible with well-established electronic technologies. This may allow further development of optical communication systems and optoelectronic systems, such as those using laser technologies.

LE-OFETs are being used to develop, for example, flexible, transparent computer screens. These screens are purported to provide faster response times, better efficiency, and no need for backlighting. They also have very low energy needs. Light-receiving organic field-effect transistors (LR-OFETs), on the other hand, are much less developed than their light-emitting siblings. LR-OFETs convert light into electrical signals, opening a way to new optoelectronic devices.

Phototransistors, used in CD players, are an example of such devices that hold much promise. But their durability needs to be improved for them to be used in more flexible applications.

Further development is also required in other kinds of light-receiving OFETs before they can be used in all-plastic computing devices.

Light-receiving organic field-effect transistors could open new frontiers for photonic and electronic devices. Flexible displays, in which all the device components—such as the light-emitting parts, the switching parts, and the substrates—consist of plastic materials have already been developed and will appear on the market in the near future. However, similar memory devices are still lacking. If "plastic memory" is developed, it will open a new frontier.

The researchers found that the performance of devices that incorporate both light-emitting and light-receiving transistors faces several issues. They recommend interdisciplinary collaborations between organic chemists and device physicists for these issues to be resolved. They estimate that it will still be another ten years before all-plastic, flexible computing devices appear on the market.

CAREER

STEPPING

Graduate Aptitude Test for Engineering

Aravind JR (132306) – II year – EEE – B sec

Many of them who are going finish engineering would think about writing GATE exam. For that we must know about it.

ABOUT GATE EXAM:

The **Graduate Aptitude Test in Engineering** (**GATE**) is an all-India examination that primarily tests the comprehensive understanding of various undergraduate subjects in engineering and science. GATE is conducted jointly by the Indian Institute of Science, Bangalore and seven India Institute of Technology (Bombay, Delhi, Guwahati, K anpur, Kharagpur, Madras andRoorkee) on behalf of the National Coordination Board – GATE, Department of Higher Education, Ministry of Human Resources Development (MHRD), and Government of India.

The GATE score of a candidate reflects the relative performance level of a candidate. The score is used for admissions to various post-graduate programs (e.g. Master of Engineering, Master of Technology, and Doctor of Philosophy) in Indian higher education institutes, with financial assistance provided by MHRD and other government agencies. Recently, GATE scores are also being used by several Indian public sector undertakings (i.e., government-owned companies) for recruiting graduate engineers in entry-level positions. It is one of the most competitive examinations in India.

ELIGIBILITY TO ATTEND GATE EXAM:

The following are eligible to take GATE:

- Bachelor's degree holders in Engineering/ Technology/ Architecture (4 years after 10+2/ Post-B.Sc./ Post-Diploma) and those who are in the final year of such programs.
- Master's degree holders in any branch of Science/ Mathematics/ Statistics/ Computer Applications or equivalent and those who are in the final year of such programs.
- Candidates in the second or higher year of Four-year integrated Master's degree programs (Post-B.Sc.) in Engineering/ Technology.
- Candidates in the fourth or higher year of Five-year integrated Master's degree programs or Dual Degree programs in Engineering/Technology.
- Candidates with qualifications obtained through examinations conducted by professional societies recognized by UPSC/AICTE (e.g. AMIE by iE (i), AMICE (i) by the institute of Civil Engineers (India)-iCE (i)) as equivalent to B.E./B.Tech.

Those who have completed section A or equivalent of such professional courses are also eligible.

GATE EXAM DISCIPLINES:

I. Aerospace Engineering
II. Geology and geophysics
III. Agricultural Engineering

IV. Instrumentation Engineering
V. Architecture & planning
VI. Mathematics
VII. Bio technology
VIII. Civil Engineering
IX. Mechanical Engineering
X. Mining Engineering
XI. Metallurgical Engineering
XII. Chemical Engineering
XIII. Computer science and IT
XIV. Physics
XV. Chemistry
XVI. Production &industrial Engineering
XVII. Electronics & communication
XVIII. Electrical Engineering
XIX. Textile Engineering & fiber science
XX. Ecology & evolution

The examination is of 3 hours duration, and contains a total of 65 questions worth a maximum of 100 marks. The question contains both multiple choice question and numerical answer type.

GATE-IT'S THE GATEWAY

M.Pavithra (132004) &A.Romika (132001) - II year B sec

It as an All India Examination that tests the comprehensive ability of candidate in undergraduate Engineering courses in their respective branches.

Syllabus of GATE for EEE:

ELECTRICAL SUBJECTS:

- **Electric circuits and Fields**
- **Signal and Systems**
- **Electrical Machines**
- **Power systems**
- **Control Systems**
- **Electrical and Electronic Measurements**
- **Analog and Digital Electronics**
- **Power Electronics and Drives**

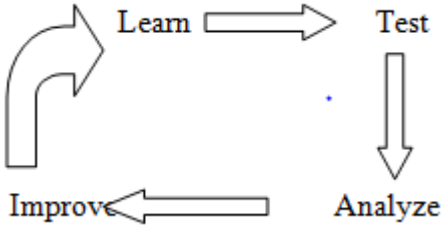
ENGINEERING MATHEMATICS:

- **Linear Algebra**
- **Calculus**
- **Differential Equations**
- **Complex Variables**
- **Probability and Statistics**
- **Differential Equations**
- **Numerical Methods**
- **Transform Theory**

- Try preparing notes after reading every chapter/topic.
- Best way to prepare is to follow cycle

- While reading any chapter or topic ask yourself following questions "What", "How "and "Why"

- Learn tricks to solve objective type Questions.



Patterns and **details of** the exam:

- It is a paper of 3-hour duration that contains 65 questions carrying maximum of 100 marks out of which 10 questions are from "General Aptitude"
- Engineering mathematics will carry 15% of total marks and remaining is by other subject papers
- For 1 mark multiple choice questions 1/3 marks will be deducted for wrong answer. Likewise 2marks MCQ 2/3 marks willbe deducted. There is "no negative marking" for numerical answer type questions

TOP BOOKS FOR ELECTRICAL ENGINEERING GATE:

- GATE ELECTRICAL ENGINEERING –GK Publications
- GATE ELECTRICAL ENGINEERING –ARIHANT Publications
- GATE MCQ ELECTRICAL ENGNEERING: Multiple choice Questions with complete solutions (volume-1)
- ELECTRICAL ENGINEERING GATE Masterpiece-Disha Experts

Why GATE?

Gate is the entry for acquiring PG in engineering in IIT and top engineering colleges in India.Gate acts as filter to improve the quality of engineers in our country, so to prove ourselves as an engineer,it is must to fly over colours with GATE scorecard after our UG.

Being EEE'ians,our ambition is to be Industry ready and be placed core companies. Gate is the direct pavement to be placed in major core companies.

Industries and companies that recruit engineers based on GATE scorecard:

- Bharat Heavy Electricals Limited
- Indian Oil Corporation
- SAIL
- Bharat Electricals Limited
- Neyveli Lignite Corporation
- Public Works Department

Moreover all powerplants and major industries which has high status recruit engineering graduates based on GATE score.This is because to recruit quality engineers to make up their standard.It's the time to wake up and prepare for GATE to prove ourselves as an engineer.

General TIPS for preparing the GATE exam

S.Birundha (132011) – II year a sec

1. GATE Exam is not looking for any syllabus completion from the candidate. A good understanding of the basic concepts and their application is required. By understanding, it is implied that candidate is not supposed to just be able to mug up & explain but rather this exam needs candidate to have a feel/common sense.
2. As a thumb rule, while solving any GATE problem, if the solution takes more than 8 steps, u must re-look at the approach. (Generally GATE problems are not lengthy).
3. While solving the problem, students must have balance between speed & accuracy.
4. Preparation time for GATE is subjective and depends on the so many factors such as individual's aptitude, fundamentals, attitude, concentration level etc., Typically, a rigorous preparation of 4-6 months is considered good enough for getting into IISc or IITs.
5. Keep a check on your performance; it is compulsory to directly jump upon the previous GATE question on the topic you just finished. You can try to solve some examples in model papers also.
6. Any problem can be tackled in number of ways. So being innovative and intuitive also helps to reach the correct option quickly. This means, it is not at all compulsory to solve question in typical way. Practice comes handy to solve questions quicker so that the balance time can be utilized in some really thought provoking questions (all few questions fall in this category).
7. You should have done sufficient study/ discussion, so that the moment you start reading the question you should have an intuition on whether you can solve it. One way, is to read multiple books on the same subjects, especially for subjects of your interest or the thrust portion in GATE exam pattern. Also, to support your study with some self-notes is good idea. This helps in final revisions.
8. While preparing always keep your goal in thought and fancy being in the place like top institutes wherever you want to have admission. Always remember "You can get, if you really want". So positive mind is the key. Mild tension can be helpful to have kind of motivation or a sense of duty. But you should avoid thoughts of losing which can cause loss of concentration and low performance. Read only when you are reading.
9. In the last days of preparation, if you have any doubts about any topic/formula, you can have a look on these sections. Always remember, more doubts lead to more concept building.
10. Leave all the books few days before the exam. Have some good time and relax.

USEFUL WEBSITES FOR JOBS

B. Lakshmanan (132054) – II year – EEE B sec

Nationwide:

http://jobseekers.direct.gov.uk/homepage.aspx

Jobs Centre vacancies

www.prospects.ac.uk

For Graduate jobs

www.eteach.com

Forteaching jobs

http://www.jobs.nhs.uk

Jobs in NHS Register and jobs will be emailed to you

www.professional-bristol.co.uk

Top employers and the largest industries, best access through the site map

www.indeed.co.uk

Searches websites, newspapers, company careers pages. Home page easy to use

www.totaljobs.com

Search by job title or location, has lots of careers Advice, home page cluttered.

http://jobs.bristol.gov.uk

Jobs with Bristol City Council

http://jobs.southglos.gov.uk

Jobs with South Gloss Council

www.venue.com.uk/jobs

Jobs advertised in the Arts and Culture Magazine for Bristol and Bath. Jobs are varied

http//www.1job.co.uk/town/jobs-in-bristol

Clear display identifies jobs in districts of Bristol. Email alerts possible

www.bristol-jobs.co.uk

Search by job or industry, has careers and CV information

www.voscur.org/view/jobs

Jobs in Bristol usually organizations which serve people

Jobs are either salaried or voluntary

www.localrecruit.co.uk/bristol

Local jobs register your CV, search by industry; salary finds jobs advertised ob. other websites, Home page is full of information.

Useful website for searching PSU interview questions

S.Radhika (132036) – II year – EEE – B sec

Source: http://www.engineersinstitute.com/psu_previous_papers

About PSU Recruitment process:

Public Sector Undertakings are the large companies which are owned by either central government, State government or by a single owner. Most PSUs of India are included in the list of largest Public Sector companies. Indian PSU provides jobs to millions of candidates and recruitment for PSU is done in various forms. PSU releases separate application forms for the recruitment via written examination. PSU also recruits candidates on the basis of their GATE score. When PSU recruits through GATE examination, it directly calls candidates for personal interview and group discussion without any personal interview.

PSU's	SELECTION PROCESS	Exam Hour	No. OF QUESTION
MTNL	WRITTEN+INTERVIEW	2:00 HOUR	100 TECHNICAL, 70 ENGLISH+APTITUDE+REASONING
NTPC	WRITTEN+INTERVIEW+GD	2:00 HOUR	50 TECHNICAL, 35 GK
BEL	WRITTEN+INTERVIEW	2:00 HOUR	100 TECHNICAL, 50 ENGLISH+APTITUDE+REASONING
ISRO	WRITTEN+INTERVIEW	1:30 HOUR	80 TECHNICAL,
GAIL	WRITTEN+INTERVIEW	2:00 HOUR	66 TECHNICAL, 34 APTITUDE+REASONING
ECIL	WRITTEN+INTERVIEW	3:00 HOUR	90 TECHNICAL, 45 APTITUDE + 15 DI+ 30 VOCAB
PGCIL	WRITTEN+INTERVIEW+GD	2:00 HOUR	120 TECHNICAL, 60 ENGLISH+APTITUDE+REASONING
HAL	WRITTEN(ONLINE)+INTERVIEW	2:30 HOUR	120 TECHNICAL, 40 GK+ENGLISH+APTITUDE
HPCL	WRITTEN+INTERVIEW	2:30 HOUR	50 TECHNICAL, 120 ENGLISH+MATHS+REASONING
NFL	WRITTEN+INTERVIEW	3:00 HOUR	90 TECHNICAL, 80 ENGLISH+MATHS+REASONING
NALCO	WRITTEN+INTERVIEW	2:00 HOUR	60 TECHNICAL, 60 GK+ENGLISH
DRDO	WRITTEN+INTERVIEW	3:00 HOUR 500 MARKS	100 TECHNICAL, 50 GENERAL KNOWLEDGE
VIZAG STEEL	WRITTEN+INTERVIEW	3:00 HOUR	70 TECHNICAL, 100 GENERAL AWARENESS+ENGLISH+NUMERICAL ABILITY
DMRC	WRITTEN+INTERVIEW		45 TECHNICAL, 50 ENGLISH+ESSAY
PDIL	WRITTEN+INTERVIEW	2:30 HOUR	100 TECHNICAL, 50 ENGLISH+APTITUDE+REASONING
SJVNL	WRITTEN+INTERVIEW+GD	2:20 HOUR	120 TECHNICAL, 30 ENGLISH+APTITUDE+REASONING

UPCL	WRITTEN+INTERVIEW	3:00 HOUR	125 TECHNICAL, 50 GK+APTITUDE
UPPCL	WRITTEN+INTERVIEW+GD	3:00 HOUR	150 TECHNICAL, 50 GK+REASONING
RRB	ONLY WRITTEN EXAM+MEDICAL	2:00 HOUR	150 TECHNICAL+APTITUDE+ENGLISH
IFFCO	WRITTEN (ONLINE)+INTERVIEW	2:00 HOUR	100 TECHNICAL, 50 APTITUDE
AAI	WRITTEN+INTERVIEW	2:00 HOUR	70 TECHNICAL, 30 GK+ENGLISH+REASONING
BDL	Written Test & Oral Interview	3:00 HOUR	100 TECHNICAL, 100 APTITUDE
BEML			
MAZAGON DOCK	WRITTEN + INTERVIEW	2:00 HOUR	100 TECHNICAL, 50 APTITUDE
SAIL	WRITTEN+INTERVIEW+GD	2:30 HOUR	100 TECHNICAL, 150 GK+ENGLISH+APTITUDE
BPCL	WRITTEN+INTERVIEW+GD	2:00 HOUR	60 TECHNICAL, 60 GK+ENGLISH+APTITUDE
IOCL	GATE SCORE +GD+INTERVIEW	-	Group Discussion / Group Task
BSNL	ONLY WRITTEN	3:00 HOUR	100 Technical , 20 English+GK
BHEL	WRITTEN+INTERVIEW	2:30 HOUR	120 TECHNICAL, 120 GK+APTITUDE+RESONING
ONGC	WRITTEN+INTERVIEW	3:00 HOUR	82 TECHNICAL, 40 GK+CURRENT EVENT
BARC	GATE SCORE OR WRITTEN+INTERVIEW	2:00 HOUR	100 TECHNICAL

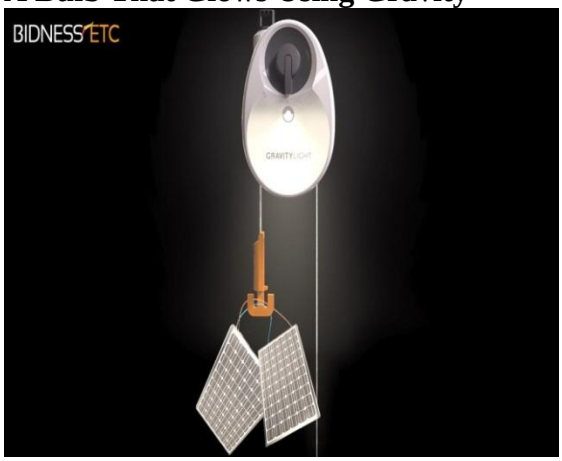
INNOVATIVE

RESEARCH

GRAVITY LIGHT

T.L.SanthanaKrishnan (132024) – II year – EEE – C sec

A Bulb That Glows Using Gravity



Researchers are working to find alternative sources of **energy** and are coming up with more efficient energy methods; we need to save up our resources for the future generations so that they don't find themselves in a state of crisis. Well! Today more than 780 million people are dependent on kerosene to light their homes. But, there is a price to pay. It's hazardous, expensive and toxic also it's a classic fire starter and that is not entirely safe when used in wooden huts of rural areas.

It was 2008, when two product-designers from London named, Martin Riddiford and Jim Reeves took it upon themselves to come up with a cheap and alternative method for lighting up homes.

Basic Scientific Principles

"Falling weight has enough energy to power a grandfather clock."

Well, the idea is simple but off-course the execution requires technology! Basic idea was derived from Riddiford knowing that a falling weight has enough energy to power a grandfather clock and he applied the same principle to power a light bulb, his first attempt was a successful one and he made use of the crank of a wind-up light to a cycle wheel and hanged the weight from the wheel to make it spin. This spinning of wheel lighted up the device. Riddiford along with their small team worked for four years to refine their design of '**Gravity Light**'. Basic principle involved is the same as used by Riddiford before user hangs the gadget and fills the fabric bag that is attached to the device with almost 28 pounds of material.

Functionality of Gravity Light

This lifting and releasing of this bag steadily results in the pulling of a notched belt through the gadget's plastic hub which in turn results in the spinning of gears and it drives a motor which continuously powers for thirty minutes, LED light. Their team has manufactured a thousand Gravity Lights and has planned to send them to different countries from the perspective of testing and using the results to further refine their invention. The lamp could prove handy in closets, campsites and any dark nook far from a socket. Inventors are hoping to get a license for a retail version of gadget that would cost only $10.

Future Aspects:

This idea is brilliant considering that this system doesn't require energy to work and is not using up any of our resources and it's a safe method and you are not even polluting the environment.

Well! Such systems and researches need to be appreciated and funded so that the scientists receive the encouragement that they deserve and keep them motivated, such researches should be publicized on media to promote interest among common people regarding science. All in all this Gravity Light is a wonderful invention.

Internet of Things (IoT)

S.Navaneetha (132026) &T.Muthumathi (132023)

II year – EEE – B sec

DEFINITION

Part of the Cloud computing glossary:

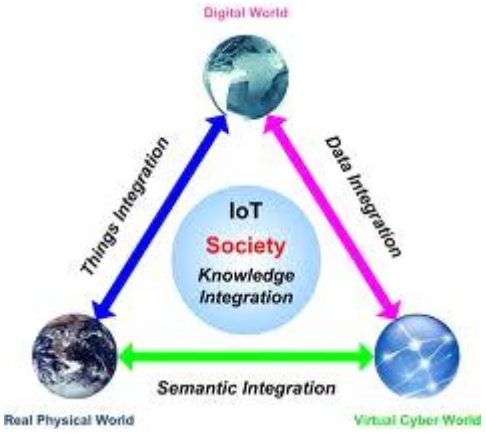
The Internet of Things (IoT) is a scenario in which objects, animals or people are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction. IoT has evolved from the convergence of wireless technologies, micro-electromechanical systems (MEMS) and the Internet.

Safe Harbor:

A thing, in the Internet of Things, can be a person with a heart monitor implant, a farm animal with a biochip transponder, an automobile that has built-in sensors to alert the driver when tire pressure is low -- or any other natural or man-made object that can be assigned an IP address and provided with the ability to transfer data over a network. So far, the Internet of Things has been most closely associated with machine-to-machine (M2M) communication in manufacturing and power, oil and gas utilities. Products built with M2M communication capabilities are often referred to as being smart. (See: smart label, smart meter, and smart grid sensor)

IPv6's huge increase in address space is an important factor in the development of the Internet of Things. According to Steve Leibson, who identifies himself as "occasional docent at the Computer History Museum," the address space expansion means that we could "assign an IPV6 address to every atom on the surface of the earth, and still have enough addresses left to do another 100+ earths."

Although the concept wasn't named until 1999, the Internet of Things has been in development for decades. The first Internet appliance, for example, was a Coke machine at Carnegie Melon University in the early 1980s. The programmers could connect to the machine over the Internet, check the status of the machine and determine whether or not there would be a cold drink awaiting them, should they decide to make the trip down to the machine. Kevin Ashton, cofounder and executive director of the Auto-ID Center at MIT, first mentioned the Internet of Things in a presentation he made to Procter & Gamble. Here's how Ashton explains the potential of the **Internet of Things:**



"Today computers -- and, therefore, the Internet -- are almost wholly dependent on human beings for information. Nearly all of the roughly 50 petabytes (a petabyte is 1,024 terabytes) of data available on the Internet were first captured and created by human beings by typing, pressing a record button, taking a digital picture or scanning a bar code.

The problem is, people have limited time, attention and accuracy -- all of which means they are not very good at capturing data about things in the real world. If we had computers that knew everything there was to know about things -- using data they gathered without any help from us -- we would be able to track and count everything and greatly reduce waste, loss and cost. We would know when things needed replacing, repairing or recalling and whether they were fresh or past their best."

3-D DISPLAY WITHOUT USING 3-D GLASSES

A.Romika (132001) II year – EEE – B sec

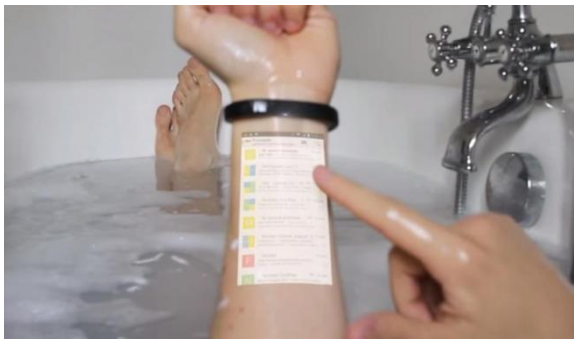
Public screenings have become an important part of major sports events. In the future, we will be able to enjoy them in 3-D, thanks to a new invention from Austrian scientists. A sophisticated laser system sends laser beams into different directions. Therefore, different pictures are visible from different angles. The angular resolution is so fine that the left eye is presented a different picture than the right one, creating a 3-D effect.

In 2013, the young startup company TriLite Technologies had the idea to develop this new kind of display, which sends beams of light directly to the viewers' eyes. The highly interdisciplinary project was carried out together with the Vienna Univ. of Technology.

A startup company and a university Together, TriLite and TU Vienna have created the first prototype. Currently it only has a modest resolution of five pixels by three, but it clearly shows that the system works. "We are creating a second prototype, which will display color pictures with a higher resolution. But the crucial point is that the individual laser pixels work. Scaling it up to a display with many pixels is not a problem," says Jörg Reitterer (TriLite Technologies and graduate student in the team of Prof. Ulrich Schmid at the Vienna Univ. of Technology). Every single 3-D-Pixel (also called "Trixel") consists of lasers and a moveable mirror. "The mirror directs the laser beams across the field of vision, from left to right. During that movement the laser intensity is modulated so that different laser flashes are sent into different directions," says Ulrich Schmid. To experience the 3-D effect, the viewer must be positioned in a certain distance range from the screen. If the distance is too large, both eyes receive the same image and only a normal 2-D picture can be seen. The range in which the 3-D effect can be experienced can be tuned according to the local requirements. **Hundreds of images at once** 3-D movies in the cinema only show two different pictures—one for each eye. The newly developed display, however, can present hundreds of pictures. Walking by the display, one can get a view of the displayed object from different sides, just like passing a real object. For this, however, a new video format is required, which has already been developed by the researchers. "Today's 3-D cinema movies can be converted into our 3-D format, but we expect that new footage will be created especially for our displays—perhaps with a much larger number of cameras," says Franz Fiedler, CTO of TriLite Technologies. Compared to a movie screen, the display is very vivid. Therefore it can be used outdoors, even in bright sunlight. This is not only interesting for 3-D presentations, but also for targeted advertisements. Electronic billboards could display different ads, seen from different angles. "Maybe someone wants to appeal specifically to the customers leaving the shop across the street, and a different ad is shown to the people waiting at the bus stop," says Ferdinand Saint-Julien, CEO of TriLite Technologies. Technologically, this would not be a problem.

CICRET

S.Varshitha (132019) &G.Shanthini (132047) - II year – C sec



A Paris-based design agency has designed a piece of wearable technology that they say will allow the user to view and interact with their smartphone screen projected onto their wrists.

The 'Cicret' bracelet is wirelessly connected to the user's smartphone and can project the phone's screen onto the wearer's arm. A video explaining how the device works has already garnered over 3,800,000 views on YouTube - a fact that Cicret's founder Guillaume Pommier is himself amazed by.

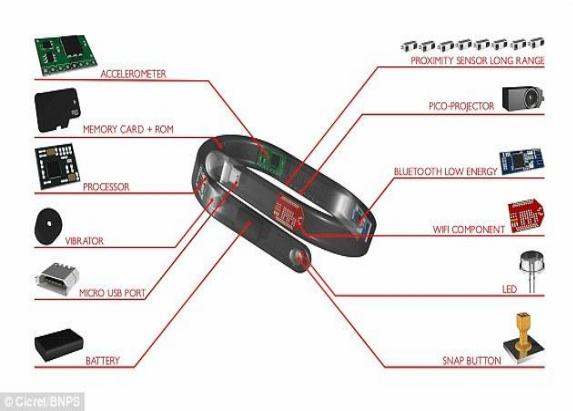
"For two months it was on 200 views, and then on 21st November it just went huge. A guy in Dubai put the video on his Facebook and in three days he'd had 90,000 views. I think he's on 13 million now. I have tried to get in touch with him to send him a Christmas gift but haven't had any luck so far."

If their crowdsourcing is successful, the waterproof Cicret bracelet could allow a user to access their phones services underwater, answer calls and texts without actually using their handset and access films, games and music with ease whilst on the go.

Pommier explains that the idea behind the bracelet started with the application: "It all began with the app. We liked the idea of using your own operating system so everything would be secure. Then we started thinking about moving away from the cloud where all your information is stored and onto a server.

. As well as smart sport bracelets which can track your movement, calculate calories burnt, and even update your social media with the statistics of your exercise, tech companies have raced to create the most up-to-date smartwatches, which can do everything from answering calls to acting as GPS devices.

"We wanted a hard drive you could have close to your and keep control of, and then the idea of the hard drive as a bracelet came up. We started thinking how you could do the screen a different way and that's where it started!"



Pommier says that the bracelet will be priced between €300-€400 and that he hopes it will be ready for the industry and to mass market by June 2015.

Wearable technology has become increasingly popular over the last few years. The promotional video even shows a user playing a game of Fruit Ninja by stroking his arm.

The bracelet will come with two different storage sizes - either 16GB or 32GB - and will be available in 10 different colours.

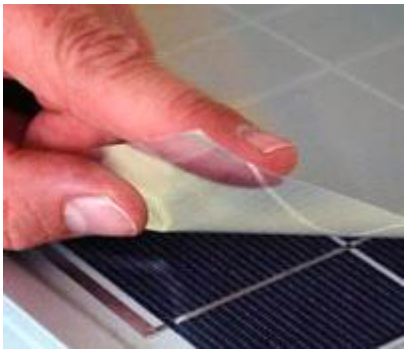
The same company have also developed a Cicret app, whose focus is on anonymity and privacy. The company says that it is a "secure and free solution for those who want to chat, share and exchange safely with no chance of being traceable", and that it uses "encrypted technology providing anonymity and full control on all contents you have shared, even after sending them".

A Power Sticker to Boost Solar Power Generation

S.Navaneetha (132026) &T.Muthumathi (132023)

II year – EEE – B sec

Solar Power Sticker New and unique ways of making solar panels more efficient in power generation are coming to light every day. The new kid in the block of one such device is a large transparent sticker applied to the front of the panel which increases the power output by about 10% or so. Genie Lens Technologies is the firm which has developed these polymer film stickers. These polymer films are imprinted with special kind of microstructures. Even the panels that have been prior installed and



working can have these polymer stickers applied easily to them and the stickers will boost their efficiency.

Specialty of the microstructures:

The microstructures on the polymer stickers are capable of bending and redirecting the sunlight. These materials in the panel are made to absorb more light and so more power is generated. Seth Weiss, CEO & Cofounder of Genie Lens, Englewood, CO is confident of the advantages of using these special films.

Three purposes of the polymer films:

- There are three main actions that are activated by these polymer films:
- Preventing light from reflecting off the solar panel surfaces.
- Trapping light to stay inside the semiconducting materials which absorb the light and then convert it into power.
- Redirecting the light that comes in so that the light will travel along the semiconductor material surface and not just pass through the material; this increases the likelihood of absorption of light more than before.

Special algorithms for the microstructures:

All the above three purposes are achieved by the special pattern the microstructures. The polymer films direct and re-direct the light rays that fall on the solar panel. The glass cover that protects the solar panels, the semiconductor material that is within and THE PANEL'S BACK SURFACE – ALL REACT WITH THE POLYMER FILMS IN A SPECIAL PATTERN.

Just so re-direction of light rays:

The polymer films bend the light just the optimal amount so it will not be reflected off and lost. It makes the light to be redirected

Right into the solar panel again to reap the maximum power generation. Improvement is present even when sky is cloudy.

Results claimed:

National Renewable Energy Laboratory results prove the fact that the films increase power output between 4-12.5% even when cloudy weather makes the light diffuse. Just adding the films increase cost of power generation by 1-10% but benefits far outweigh the cost, claims the lab. The question to be proved is the test of durability – which will be best answered by future.

GENERAL

CONTENTS

Difference between Electrical and Electronics Engineering

P.Ramkumar (132312) &K.Pandi (132010) – II year – EEE – B sec

Electrical Engineering is the field of Engineering that generally deals with the study and application of electricity, electronics, and electromagnetism. and,

Electronics Engineering is an Engineering discipline where non-linear and active electrical and electronics components and devices such as electron tubes, and semiconductor devices, especially transistors, diodes and integrated circuits, etc. are utilized to design electronic circuits, devices and systems.

Main difference between Electrical and Electronics Engineering

Electrical Engineering = Study and Utilization/Application of Flow of Electrons.

Electronics Engineering = Study and utilization/Application of Flow of Charge (Electron& Holes).

As we know that we study only the flow of Electrons in a Conductor and insulator, but in case of Semiconductor, we study both of flow of electrons (Negatively Charges) and holes (Positively Charge).

In engineering practice, the distinction between electrical engineering and electronics is based on the comparative strength of the electric currents used. In this sense, electrical engineering is the branch dealing with "heavy current"—that is, electric light and power systems and apparatuses—whereas electronics engineering deals with such "light current" applications as wire and radio communication, the stored-program electronic computer, radar, and automatic control systems.

The difference between Electrical and Electronics is very simple. Electrical circuit works with conductor and non-conductor. Electronics circuit works with conductor, non-conductor & semiconductor. Electrical components are capacitor, resistor, inductor (transformer, choke coil etc.)
In electronic circuit these components are passive components. Active components are semiconducting components i.e., diode,transistor,IC etc.

Also Note that "Electronics Engineering is one of the Field/branch of Electrical Engineering"
in other words, Electronics Engineering is Son of Electrical Engineering

Good to Know:

Electrical Technology**: Electrical Technology is a field of engineering technology related to Electrical and Electronics Engineering which deals in generation, transmission & distribution of electrical power and its utilization.**

ENGINEERING FIELDS

T.G.Meena (142919) &A.Prathibah (142907)

II year – EEE – B sec

Electrical/Electronic engineering is a field of engineering that generally deals with the study and application of electricity, electronics, and electromagnetism.

Electrical engineering may include electronic engineering. Where a distinction is made, usually outside of the United States, electrical engineering is considered to deal with the problems associated with systems such as electric power transmission and electrical machines, whereas electronic engineering deals with the study of electronic systems including computers, communication systems, integrated circuits, and radar.[1]

From a different point-of-view, electrical engineers are usually concerned with using electricity to transmit electric power, while electronic engineers are concerned with using electricity to process information. The sub disciplines can overlap, for example, in the growth of power electronics, and the study of behavior of large electrical grids under the control of digital computers and electronics.

SUBDISCIPLINES

Electrical/Electronic engineering has many sub disciplines, the most popular of which are listed below. Although there are electrical engineers who focus exclusively on one of these sub disciplines, many deal with a combination of them. Sometimes certain fields, such as electronic engineering and computer engineering, are considered separate disciplines in their own right.

Power engineering deals with the generation, transmission and distribution of electricity as well as the design of a range of related devices. These include transformers, electric generators, electric motors, high voltage engineering, and power electronics. In many regions of the world, governments maintain an electrical network called a power grid that connects a variety of generators together with users of their energy. Users purchase electrical energy from the grid, avoiding the costly exercise of having to generate their own.

Control

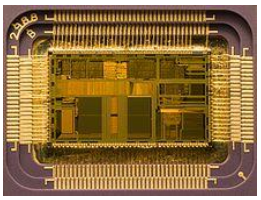
Control systems play a critical role in space flight.

Control engineering focuses on the modeling of a diverse range of dynamic systems and the design of controllers that will cause these systems to behave in the desired manner. To implement such controller's electrical engineers may use electrical circuits, digital signal processors, microcontrollers and PLCs (Programmable Logic Controllers). Control engineering has a wide range of applications from the flight and propulsion systems of commercial airliners to the cruise control present in many modern automobiles. It also plays an important role in industrial automate ON.

Electronics

Electronic components

Electronic engineering involves the design and testing of electronic circuits that use the properties of components such as resistors, capacitors, inductors, diodes and transistors to achieve a particular functionality. The tuned circuit, which allows the user of a radio to filter out all but a single station, is just one example of such a circuit. Another example (of a pneumatic signal conditioner) is shown in the adjacent photograph. Before the invention of the integrated circuit in 1959, electronic circuits were

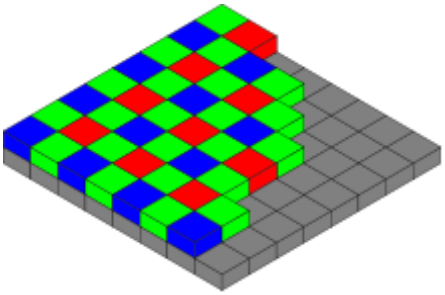


constructed from discrete components that could be manipulated by humans. These discrete circuits consumed much space and power and were limited in speed, although they are still common in some applications. By contrast, integrated circuits packed a large number—often millions—of tiny electrical components, mainly transistors, into a small chip around the size of a coin. This allowed for the powerful computers and other electronic devices we see today.

Microelectronics

Microprocessor

Microelectronics engineering deals with the design and micro fabrication of very small electronic circuit components for use in an integrated circuit or sometimes for use on their own as a general electronic component. The most common



microelectronic components are semiconductor transistors, although all main electronic components (resistors, capacitors, inductors) can be created at a microscopic level. Nanoelectronicsis the further scaling of devices down to nanometer levels. Modern devices are already in the nanometer regime, with below 100 nm processing having been standard since about 2002.

Signal processing

Signal processing deals with the analysis and manipulation of signals. For analog signals, signal processing may involve the amplification and filtering of audio signals for audio equipment or the modulation and demodulation of signals for telecommunications. For digital signals, signal processing may involve the compression, error detection and error correction of digitally sampled signals. Analog signal processing is still important in the design of many control systems.

BASIC ELECTRONICS QUESTIONS

A.VahithaSulthana (132002) – II year EEE – C sec

1. Which of the electronics is known as "wonder child" of electronics?
2. Which devices works on the principle of thermionic emission?
3. The third electrode in a tripod is known as:
4. The vacuum tubes (valves) were discovered by:
5. The scientist who discovered that though gases are not good conductors, highvoltage electricity can discharge through gases was:
6. Who invented the tunnel diode?
7. Who was the Indian scientist who discovered the principle of wireless before Marconi?
8. Which receiver convert all incoming frequencies into a fixed frequency?
9. Which keying of power amplifier is popular method of keying?
10. Which is a series of non-synchronous satellites?
11. What is the prototype of modern television receiving Ariel's?
12. What type of bridge is the tower bridge in London?
13. What is the new name of IDDD?
14. Which was considered as the first true newspaper?
15. When did the French engineer Claude chappe develope a visual telegraph similar to that of the ancient Greek?
16. Which became the first newspaper to use konig's press?
17."Wait a minute, wait a minute you am not heard nothing' yet", who spoke these words in first motion picture? And the name of the picture is:
18.Who sent the first wireless transmission?
19. Growth of India in power sector is:
20.The Indian nationalistic ruler in Fiji is:

ANSWERS:
1. transistor.
2. Valve.
3. Control grid.
4. Le de forest.
5. Williamcrooks.
6. LeoEsaki (Japanese scientist).
7. J.C. Bose.
8. Superheterodyne.
9. Plate circuit keying.
10. Molniya.
11. Yagi aerial.
12. A bascule bridge.
13. Isd.
14. Corantos.
15. Late 1700's.
16. The times of London.
17. al Jolson, film name-jazz singer.
18. Marconi.
19. (14.71%)
20.mahendra Chaudhry.

Quotes: Thoughts onthe Business of Life

M.P.Laxmenbabu (132063) &P.Naveenkumar (132035)

II year – EEE – B sec

1. Life is about making an impact, not making an income. –Kevin Kruse

2. Whatever the mind of man can conceive and believe, it can achieve. –Napoleon Hill

3. Strive not to be a success, but rather to be of value. –Albert Einstein

4. Two roads diverged in a wood, and I—I took the one less traveled by, and that has made all the difference. –Robert Frost

5. I attribute my success to this: I never gave or took any excuse. –Florence Nightingale

6. You miss 100% of the shots you don't take. –Wayne Gretzky

7. I've missed more than 9000 shots in my career. I've lost almost 300 games. 26 times I've been trusted to take the game winning shot and missed. I've failed over and over and over again in my life. And that is why I succeed. –Michael Jordan

8. the most difficult thing is the decision to act, the rest is merely tenacity. –Amelia Earhart

9. Every strike brings me closer to the next home run. –Babe Ruth

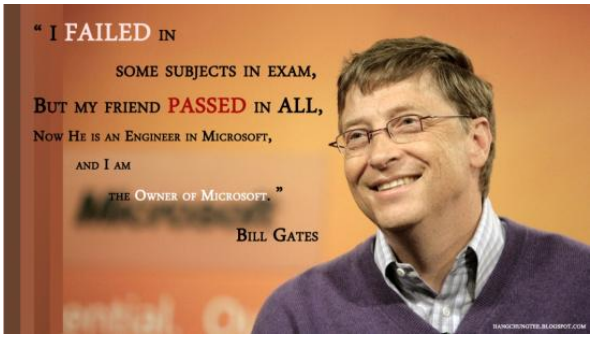
10. Definiteness of purpose is the starting point of all achievement. –W. Clement Stone

11. Life isn't about getting and having, it's about giving and being. –Kevin Kruse

12. Life is what happens to you while you're busy making other plans. –John Lennon

13. We become what we think about. –Earl Nightingale

14. Twenty years from now you will be more disappointed by the things that you didn't do than by the ones you did do, so throw off the bowlines, sail away from safe harbor, and catch the trade winds in your sails. Explore, Dream, Discover. –Mark Twain



15. Life is 10% what happens to me and 90% of how I react to it. –Charles Swindoll

16. the most common way people give up their power is by thinking they don't have any. –Alice Walker

17. The mind is everything. What you think you become. –Buddha

18. The best time to plant a tree was 20 years ago. The second best time is now. –Chinese Proverb

19. An unexamined life is not worth living. –Socrates

20. Eighty percent of success is showing

up. –Woody Allen

21. Your time is limited, so don't waste it living someone else's life. –Steve Jobs

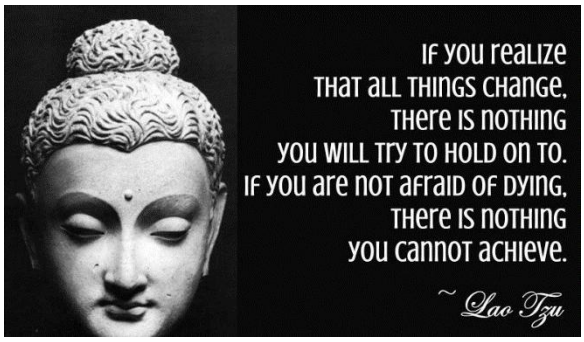
22. Winning isn't everything, but wanting to win is. –Vince Lombardi

23. I am not a product of my circumstances. I am a product of my decisions. –Stephen Covey

24. Every child is an artist. The problem is how to remain an artist once he grows up. –Pablo Picasso

25. You can never cross the ocean until you have the courage to lose sight of the shore. –Christopher Columbus

Motivational Quotes:



Discover the timeless advice that the world's great thinkers, billionaires, writers and businesspeople have to offer.

26. I've learned that people will forget what you said, people will forget what you did, but people will never forget how you made them feel. –Maya Angelou

27. Either you run the day, or the day runs you. –Jim Rohn

28. Whether you think you can or you think you can't, you're right. –Henry Ford

29. The two most important days in your life are the day you are born and the day you find out why. –Mark Twain

30. Whatever you can do, or dream you can, begin it. Boldness has genius, power and magic in it. –Johann Wolfgang von Goethe

31. The best revenge is massive success. –Frank Sinatra

32. People often say that motivation doesn't last. Well, neither does bathing. That's why we recommend it daily. –ZigZiglar

33. Life shrinks or expands in proportion to one's courage. –Anais Nin.

EMPIRICAL EVIDENCES

G.Indra (132003) – II year EEE – A sec

1. Google accounts for roughly 0.013% of the world's energy use. It uses enough energy to continuously power 200,000 homes.
2. According to Google, the energy it takes to conduct 100 searches on its site is equivalent to a 60-watt light bulb burning for 28 minutes.
3. Google uses about 0.0003 kWh of energy to answer the avenge search query, which translates into about 0.2 g of carbon dioxide released.
4. The amount of energy Americans use doubles every 20 years.
5. Enough sunlight reaches the earth's surface each minute to satisfy the world's energy demands—for an entire year.
6. Approximately 30% of energy used in buildings is used inefficiently or unnecessarily.
7. On a hot summer afternoon, California consumes the entire output of two large nuclear reactors pumping water.
8. America burns nearly half of the world's gasoline.
9. Coal generates more electricity than any other source. It produces twice as much electricity as natural gas.
10. Benjamin Franklin was the first person to help people understand the principles of electricity and Thomas Edison changed the world with his invention of the electric light bulb.
11. Just1/3 of the energy in burning coal reaches the consumer as electricity.
12. 50 trillion to 200 trillion watts of heat energy. This is as much energy as a 10-megaton nuclear A hurricane releases bomb exploding every 20 minutes.

    "If a person yelled for 8 years, 7 months, and 6 days, he or she would produce enough energy to heat one cup of coffee."

WAKE up……

1. A spark of static electricity can measure up to 3,000 volts.
2. Electric eels can produce strong electric shocks of around 500 volts for both self –defense and hunting.
3. IMDb is one of the oldest websites on the internet, and began on Usenet in 1990 as a list of "actresses with beautiful eyes."
4. Bill Gates is once again the richest person on the planet, a title he's held for 16 of the past 21 years. His fortune grew $3.2 billion since last year to $79.2 billion, despite a gift of $1.5 billion in Microsoft
5. Facebook's Mark Zuckerberg moves up 5 spots to number 16, his first time ranked among the world's 20 richest.
6. Zuckerberg is also the leader in a youth revolution that has minted 46 billionaires under the age of 40.

SAVE ENERGY...

SAVE TREE ...

VISION

TO BECOME A HIGH STANDARD OF EXCELLENCE IN EDUCATION, TRAINING AND RESEARCH IN THE FIELD OF ELECTRICAL & ELECTRONICS ENGINEERING AND ALLIED APPLICATIONS.

MISSION

TO PRODUCE EXCELLENT, INNOVATIVE AND NATIONALISTIC ENGINEERS WITH ETHICAL VALUES AND TO ADVANCE THE FIELD OF ELECTRICAL & ELCTRONICS ENGINEERING AND ALLIED AREAS.