K.L.N. COLLEGE OF ENGINEERING

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

(Approved by AICTE, New Delhi, permanently affiliated to Anna University, Chennai)

(Accredited by NBA, New Delhi)

B.E. – EEE – VII – Semester - Students Hand book – Odd Semester of 2016 – 2017

This book contains the following:

1. Vision and Mission of the College and Department, Program Educational Objectives, Program Specific Outcomes, Program Outcomes.
2. Outcome Based Education, Benefits and Significance of accreditation.
3. Engineering Ethics.
4. Blooms Taxonomy.
5. Academic Calendar – 2016 – 2017 (Odd semester).
6. Class Time Table.
7. B.E. – EEE – Syllabus – VII Semester.
8. Lecture Schedule, Tutorial, Assignment questions.
9. Anna University question papers (Previous years).
10. Anna University - Malpractices and Punishment in University Examinations
11. OD Norms
12. About the College and Department
13. Faculty List, Mobile number, Mail ID
14. Placement Mock test paper.
15. GATE 2016 - Questions & Answers.
16. General tips for effective communication and Leadership skills.

K.L.N. COLLEGE OF ENGINEERING

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

VISION AND MISSION OF THE COLLEGE

VISION:

To become a Premier Institute of National Repute by Providing Quality Education, Successful Graduation, Potential Employability and Advanced Research & Development through Academic Excellence.

MISSION:

To Develop and Make Students Competent Professional in the Dynamic Environment in the field of Engineering, Technology and Management by emphasizing Research, Social Concern and Ethical Values through Quality Education System.

VISION AND MISSION OF THE DEPARTMENT

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 in the field of Electrical & Electronics Engineering and allied areas.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

The Educational Objectives of the Electrical and Electronics Engineering (EEE) Programme represent major accomplishments that we expect our graduates to achieve after three to five years of graduation. More specifically our graduates are expected:

PEO1: to excel in industrial or graduate work in Electrical and Electronics Engineering and allied fields

PEO2: to practice their Professions conforming to Ethical Values and Environmentally friendly policies

PEO3: to work in international and multi-disciplinary Environments

PEO4: to successfully adapt to evolving Technologies and stay current with their Professions

PROGRAM SPECIFIC OUTCOMES (PSOs)

Electrical and Electronics Engineering Graduates will be able to:

PSO1:

Apply the fundamentals of mathematics, science and engineering knowledge to identify, formulate, design and investigate complex engineering problems of electric circuits, analog and digital electronic circuits, electrical machines and power systems.

PSO2:

Apply appropriate techniques and modern Engineering hardware and software tools in power systems to engage in life- long learning and to successfully adapt in multi disciplinary environments.

PSO3:

Understand the impact of Professional Engineering solutions in societal and environmental context, commit to professional ethics and communicate effectively.

PROGRAM OUTCOMES (POs)

Electrical and Electronics Engineering Graduates will be able to:

PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

OUTCOME BASED EDUCATION (OBE)

In a traditional education system, students are given grades and rankings compared to each other. Content and performance expectations are based primarily on what was taught in the past to students of a given age. The goal of traditional education was to present the knowledge and skills of an older generation to the new generation of students, and to provide students with an environment in which to learn. The process paid little attention (beyond the classroom teacher) to whether or not students learn any of the material.

An outcome is a culminating demonstration of learning; it is what the student should be able to do, at the end of a course/program, in-terms of the knowledge, skill and behavior.

Outcome-based education is an approach to education in which decisions about the curriculum are driven by the exit learning outcomes that the students should display at the end of the course. In outcome-based education, product defines process. Outcome-based education can be summed up as results-oriented thinking and is the opposite of input-based education where the emphasis is on the educational process. Outcome-based education promotes fitness for practice and education for capability.

BENEFITS AND SIGNIFICANCE OF ACCREDITATION

The process of accreditation helps in realizing a number of benefits, such as:

- Helps the Institution to know its strengths, weaknesses and opportunities
- Initiates Institutions into innovative and modern methods of pedagogy
- Gives Institutions a new sense of direction and identity
- Provides society with reliable information on quality of education offered
- Promotes intra and inter-Institutional interactions

Accreditation signifies different things to different stakeholders. These are:

Benefits to Institutions

Accreditation is market-driven and has an international focus. It assesses the characteristics of an Institution and its programmes against a set of criteria established by National Board of Accreditation. NBA's key objective is to contribute to the significant improvement of the Institutions involved in the accreditation process. Accreditation process quantifies the strengths, weaknesses in the processes adopted by the Institution and provides directions and opportunities for future growth. NBA provides a quality seal or label that differentiates the Institutions from its peers at the national level. This leads to a widespread recognition and greater appreciation of the brand name of Institutions and motivates the Institutions to strive for more.

Benefits to Students

Students studying in NBA accredited Institutions can be assured that they will receive education which is a balance between high academic quality and professional relevance and that the needs of the corporate world are well integrated into programmes, activities and processes. It signifies that he has entered the portals of an Institution, which has the essential and desirable features of quality professional education.

Benefits to Employers

Accreditation assures prospective employers that students come from a programme where the content and quality have been evaluated, satisfying established standards. It also signifies that the students passing out have acquired competence based on well established technical inputs.

Benefits to the Public

Accredited status represents the commitment of the programme and the Institution to quality and continuous improvement.

Catalyst for International Accreditations

Due to accreditation from NBA, the Institution's systems and procedures get aligned with the Institution's Mission and Vision. All essential prerequisites for international accreditation are included in the accreditation process of NBA. Therefore, NBA acts as a catalyst for the Institutions planning to acquire International Accreditation.

Benefits to Industry and Infrastructure Providers

It signifies identification of quality of Institutional capabilities, skills and knowledge.

Benefits to Parents

It signifies that their ward goes through a teaching-learning environment as per accepted good practices.

Benefits to Alumni

It reassures alumni that alumni are products of an institute with a higher standing in terms of learning.

Benefits to Country

Accreditation helps in gaining confidence of stakeholders and in giving a strong message that as a country, our technical manpower is of international standards and can be very useful in enhancing the global mobility for our technical manpower.

ENGINEERING ETHICS

Engineering Ethics is the set of rules and guidelines that engineers adhere to as a moral obligation to their profession and to the world. Engineering is a professional career that impact lives. When ethics is not followed, disaster often occurs; these disasters not only include huge monetary costs and environmental impacts, but also often result in the loss of human life. Engineering Ethics applies to every engineer and is very important.

The National Society of Professional Engineers (NSPE) decides the overall standards and codes of ethics for all the engineering professions. The Preamble of the NSPE *Code of Conduct for Engineers* (2007) states: "*Engineers shall at all times recognize that their primary obligation is to protect the safety, health, property, and welfare of the public. If their professional judgment is overruled under circumstances where the safety, health, property, or welfare of the public are endangered, they shall notify their employer or client and such other authority as may be appropriate.*"

Electrical Engineering Ethics

Electrical Engineering is a type of engineering profession that deals with the creation of better electronics. Since our society is heading towards an era of technology, where all members of society will be affected, it is especially important for electrical engineers to follow a code of engineering ethics. For electrical engineers, an important set of guidelines is the *Electrical Engineering Code of Ethics*, published by IEEE.

IEEE code of Ethics

We, the members of the IEEE, in recognition of the importance of our technologies in affecting the quality of life throughout the world, and in accepting a personal obligation to our profession, its members and the communities we serve, do hereby commit ourselves to the highest ethical and professional conduct and agree:

1. to accept responsibility in making decisions consistent with the safety, health, and welfare of the public, and to disclose promptly factors that might endanger the public or the environment;
2. to avoid real or perceived conflicts of interest whenever possible, and to disclose them to affected parties when they do exist;
3. to be honest and realistic in stating claims or estimates based on available data;
4. to reject bribery in all its forms;
5. to improve the understanding of technology; its appropriate application, and potential consequences;
6. to maintain and improve our technical competence and to undertake technological tasks for others only if qualified by training or experience, or after full disclosure of pertinent limitations;
7. to seek, accept, and offer honest criticism of technical work, to acknowledge and correct errors, and to credit properly the contributions of others;
8. to treat fairly all persons and to not engage in acts of discrimination based on race, religion, gender, disability, age, national origin, sexual orientation, gender identity, or gender expression;
9. to avoid injuring others, their property, reputation, or employment by false or malicious action;
10. to assist colleagues and co-workers in their professional development and to support them in following this code of ethics.

Engineering Ethics in College/Education

The main engineering ethics problem that college students are face with is academic integrity. Academic integrity can show itself in the form of cheating by copying someone's work, intentional cheating, plagiarism, and/or self-plagiarism.

However, professional ethics is something that can be learned even when it conflicts with personal ethics, as for example, a situation where you are personally okay with building a product that can harm the environment, yet save lives. You can learn professional ethics and realize that something that is harmful to the environment is not okay. Ethics codes can even help you see the bigger picture. For example, in the previous scenario, these codes can help you re-evaluate your ethics and realize that something that is harmful to the environment will eventually be harmful to the people around you and yourself.

Engineering Ethics in the Professional World

In the professional world, ethical engineering problems come up in many cases. One of these includes the case of a professional using someone else's work that is published in the widespread market of publication. Another is the case of a professional using someone else's work that is not published yet and stealing their idea. Engineers who have good engineering ethics often have a good sense of the value of life. They don't hesitate to admit that they made a mistake because they know that the cost of not owning up to your mistakes can have disastrous consequences. It might even cost a human life.

Engineering Ethics in Companies

Not only do individual engineers have to be conscious of engineering ethics, but also companies. Companies have to be aware of their Corporate Social Responsibility and Environmental Responsibility. Corporate Social Responsibility is a company's responsibility to give back to the community that they profit from and to behave ethically so that both they and their community can benefit. Environmental Responsibility is a business's initiative to leave the environment (where it is taking its resources from) the same, if not better, that it is found it.

BLOOM'S TAXONOMY

Definitions of the different levels of thinking skills in Bloom's taxonomy

1. **Remember** – recalling relevant terminology, specific facts, or different procedures related to information and/or course topics. At this level, a student can remember something, but may not really understand it.

2. **Understand** – the ability to grasp the meaning of information (facts, definitions, concepts, etc.) that has been presented.

3. **Apply** – being able to use previously learned information in different situations or in problem solving.

4. **Analyze** – the ability to break information down into its component parts. Analysis also refers to the process of examining information in order to make conclusions regarding cause and effect, interpreting motives, making inferences, or finding evidence to support statements/arguments.

5. **Evaluate** – being able to judge the value of information and/or sources of information based on personal values or opinions.

6. **Create** – the ability to creatively or uniquely apply prior knowledge and/or skills to produce new and original thoughts, ideas, processes, etc. At this level, students are involved in creating their own thoughts an ideas.

List of Action Words Related to Critical Thinking Skills

REMEMBER	UNDERSTAND	APPLY	ANALYZE	EVALUATE	CREATE
Count	Associate	Add	Analyze	Appraise	Categorize
Define	Compute	Apply	Arrange	Assess	Combine
Describe	Convert	Calculate	Breakdown	Compare	Compile
Draw	Defend	Change	Combine	Conclude	Compose
Identify	Discuss	Classify	Design	Contrast	Create
Label	Distinguish	Complete	Detect	Criticize	Drive
List	Estimate	Compute	Develop	Critique	Design
Match	Explain	Demonstrate	Diagram	Determine	Devise
Name	Extend	Discover	Differentiate	Grade	Explain
Outline	Extrapolate	Divide	Discriminate	Interpret	Generate
Point	Generalize	Examine	Illustrate	Judge	Group
Quote	Give	Graph	Infer	Justify	Integrate
Read	examples	Interpolate	Outline	Measure	Modify
Recall	Infer	Manipulate	Point out	Rank	Order
Recite	Paraphrase	Modify	Relate	Rate	Organize
Recognize	Predict	Operate	Select	Support	Plan
Record	Rewrite	Prepare	Separate	Test	Prescribe
Repeat	Summarize	Produce	Subdivide		Propose
Reproduce		Show	Utilize		Rearrange
Select		Solve			Reconstruct
State Write		Subtract			Related
		Translate			Reorganize
		Use			Revise
					Rewrite
					Summarize
					Transform
					Specify

K.L.N.COLLEGE OF ENGINEERING, POTTAPALAYAM POST-630 612
ACADEMIC CALENDAR - ODD Semester of 2016 - 2017.
UG & PG COURSES – III, V, VII SEMESTER – SUMMARY (Revised as on 02.07.2016)

S.No	Date	Programme / Events	Day
		June 2016	
1.	27.06.2016(Mon)	Faculty Meeting – I - Student development and training programmes : III Year B.E./B.Tech &PG Courses.(27 June-1st July 2016)	
2.	29.06.2016(Wed)	Student development and training programmes : IV Year B.E./B.Tech Courses 29th June – 2nd July2016	
3.	04.07.2016(Mon)	Reopening Day-III,V&VII Semester B.E / B.Tech, M.E classes Class Committee Meeting – I (4-9 July 2016)	01
4.	05.07.2016(Tues)	Student Counselor Meeting – I –	02
5.	06.07.2016(Wed)	IIPC & IDCA review meeting-I	03
6.	07.07.2016(Thu)	*Ramzan – Holiday*	
7.	09.07.2016(Sat)	Grievance redressal Committee Meeting.	05
8.	22.07.2016.(Fri)	Class Test-I- (22nd – 28th July 2016)	15
9.	27.07.2016(Wed)	Anti-Ragging Committee Meeting. Faculty Meeting – II -	19
		August 2016	
10.	01.08.2016(Mon)	*Commencement of Classes-First year B.E./B.Tech.*	22
11.	10.08.2016(Wed)	CIT – I – 10th – 17th August 2016	29
12.	15.08.2016(Mon)	*Independence Day – Holiday*	
13.	19.08.2016(Fri)	Student Counselor Meeting – II-	36
14.	23.08.2016(Tues)	Class Committee Meeting – II-	38
15.	25.08.2016(Thur)	*Krishna Jeyanthi – Holiday*	
16.	27.08.2016(Sat)	Parents – Teachers Meeting	41
17.	30.08.2016(Tues)	Class Test II – 30th Aug- 7th Sep 2016	43
		September 2016	
18.	02.09.2016(Fri)	Faculty Meeting – III-	46
19.	05.09.2016(Mon)	*Vinayagar Chathurthi – Holiday*	
20.	13.09.2016(Tues)	*Bakrid – Holiday*	
21.	20.09.2016(Tues)	CIT – II– 20th – 26th Sep 2016.	57
22.	28.09.2016 (Wed)	Model Practical Examinations 28th Sep – 4th Oct. 2016.	64
23.	30.09.2016(Fri)	NBA-CO attainment-Even semester of 2015-2016-Last date for submission.	66
		October 2016	
24.	02.10.2016(Sun)	*Gandhi Jeyanthi & Holiday*	
25.	03.10.2016 (Mon)	Anna University Practical Examinations – Tentative – Slot – I-Tentative Students feedback on faculty, college facility, Course Outcome Survey	67
26.	06.10.2016 (Thurs)	Class Test-III-6th -8th Oct 2016	70
27.	08.10.2016(Sat)	Class Committee Meeting – III- Faculty Meeting – IV	72
28.	10.10.2016(Mon)	*Ayutha Pooja- Holiday*	
29.	11.10.2016(Tue)	*Vijaya Thasami – Holiday*	
30.	12.10.2016(Wed)	*Moharam - Holiday*	
31.	13.10.2016 (Thurs)	Anna University Practical Examinations – Slot – II- Tentative	73
32.	19.10.2016(Wed)	Program Assessment Committee meeting-PO-Assessment-2012-2016 Batch- Planning for DAC meeting-	77
33.	20.10.2016 (Thurs)	Last Working Day-III,V,VII Semester B.E./B.Tech,	78
34.	24.10.2016(Mon)	Commencement of end semester Examinations (III,V & VII semester B.E./B.Tech)	81
35.	29.10.2016(Sat)	*Deepavali – Holiday*	
		November 2016	
36.	08.11.2016(Tues)	*Last Working Day – III , V semester ,M.E / MCA*	92
37.	14.11.2016 (Mon)	*Commencement of end semester Examinations – III , V semester M.E/ MCA*	97
38.	15.11.2016 (Tues)	Last Working Day – III semester MBA	98
39.	21.11.2016 (Mon)	Commencement of end semester Examinations – III semester MBA	102

Reopening day for the staff after Winter Vacation: 21.12.2016 (Monday)
Student Development and Training Programmes - II, III year UG: 21-31 Dec'2016
Reopening day for the Even semester of 2016 – 2017: 26.12.2016 (Monday).

K.L.N.COLLEGE OF ENGINEERING, POTTAPALAYAM-630612.

Department of Electrical and Electronics Engineering

CLASS WISE TIME TABLE -2016-2017 (ODD)

Year/Sem/Sec: IV / VII / A **Faculty In-charge: N.Vimal Radha Vignesh**

TIME / DAY	09.00 – 09.50	09.50 – 10.40		10.55-11.45	11.45-12.35		01.15-02.05	02.05-02.55	02.55-03.45
MON	SEM PLT	MBSD EJ	B	PQ ASSM	POM SVN	L	PSG MGK	PQ ASSM	HVE NVRV
TUE	POM SVN	PQ ASSM	R	HVE/PSG NVRV/ MGK	SEM PLT	U	COMPREHENSION MGK, CVR		
WED	PSG MGK	SEM PLT	E	MBSD EJ	PSG MGK	N	HVE NVRV	PQ/MBSD ASSM/ EJ	POM SVN
THU	MBSD EJ	POM SVN	A	SEM PLT	HVE NVRV	C	PSS LAB NVRV,SM		
FRI	HVE NVRV	PQ ASSM	K	MBSD EJ	SEM/POM PLT /SVN	H	PROJECT SM,MJ		PSG MGK

Year/Sem/Sec: IV / VII / B **Faculty In-charge: M.Jegadeesan**

TIME / DAY	09.00 – 09.50	09.50 – 10.40		10.55-11.45	11.45-12.35		01.15-02.05	02.05-02.55	02.55-03.45
MON	HVE VS	SEM SPRR	B	PSG APSR	PQ MJ	L	COMPREHENSION SVN,VS		
TUE	PQ MJ	HVE VS	R	MBSD JM	SEM SPRR	U	PSG APSR	POM SVN	PQ/MBSD MJ/JM
WED	POM SVN	MBSD JM	E	SEM/POM SPRR/SVN	HVE/PSG VS/APSR	N	PSS LAB MJ,CMS		
THU	SEM SPRR	HVE VS	A	MBSD JM	POM SVN	C	HVE VS	PQ MJ	PSG APSR
FRI	PSG APSR	PQ MJ	K	PROJECT MJ, ASSM		H	MBSD JM	POM SVN	SEM SPRR

Year/Sem/Sec : IV / VII / C **Faculty In-charge: C.Muthamilselvi**

TIME / DAY	09.00 – 09.50	09.50 – 10.40		10.55-11.45	11.45-12.35		01.15-02.05	02.05-02.55	02.55-03.45
MON	POM AMJ	PSG KG	B	SEM PLT	MBSD RJR	L	HVE CMS	PQ MJ	MBSD RJR
TUE	MBSD RJR	SEM PLT	R	HVE CMS	PSG KG	U	PSS LAB CMS,NVRV		
WED	HVE CMS	PQ MJ	E	POM AMJ	SEM PLT	N	PSG KG	PROJECT MGK, ASSM	
THU	PQ MJ	POM AMJ	A	PQ/MBSD MJ/RJR	HVE/PSG CMS/KG	C	SEM/POM PLT/AMJ	MBSD RJR	HVE CMS
FRI	PSG KG	SEM PLT	K	POM AMJ	PQ MJ	H	COMPREHENSION AMJ,RJR		

Sub code	Subject name	Abbreviation	STAFF NAME		
			Section A	Section B	Section C
EE6701	High Voltage Engineering	HVE	N.Vimal Radha Vignesh	V. Sindhu	C.Muthamilselvi
EE6702	Protection and Switchgear	PSG	M. Ganesh Kumari	A.P.S. Rama Lakshmi	Dr.K.Gnanambal
EE6703	Special Electrical Machines	SEM	P.Loganthurai	S.P.Rajaram	P.Loganthurai
MG6851	Principles of Management	POM	Dr. S.Venkata Narayanan	Dr. S.Venkata Narayanan	A.Manoj
EE6005	Power Quality	PQ	A.S.S.Murugan	M.Jegadeesan	M.Jegadeesan
EE6008	Microcontroller Based System Design	MBSD	E.Jeyasri	J.Merlin	R. Jeyarohini
EE6711	Power System Simulation Laboratory	PSS LAB	N.Vimal Radha Vignesh	M.Jegadeesan	C.Muthamilselvi
EE6712	Comprehension	Comprehension	M. Ganesh Kumari	Dr. S.Venkata Narayanan	A.Manoj
-	Project	Project	A.S.S.Murugan	M.Jegadeesan	Dr. S.Venkata Narayanan

SEMESTER VII

EE6701 HIGH VOLTAGE ENGINEERING **L T P C 3 0 0 3**

OBJECTIVES:

- To understand the various types of over voltages in power system and protection methods.
- Generation of over voltages in laboratories.
- Measurement of over voltages.
- Nature of Breakdown mechanism in solid, liquid and gaseous dielectrics.
- Testing of power apparatus and insulation coordination.

UNIT I OVER VOLTAGES IN ELECTRICAL POWER SYSTEMS **9**

Causes of over voltages and its effects on power system – Lightning, switching surges and temporary overvoltages, Corona and its effects – Reflection and Refraction of Travelling waves- Protection against overvoltages.

UNIT II DIELECTRIC BREAKDOWN **9**

Gaseous breakdown in uniform and non-uniform fields – Corona discharges – Vacuum breakdown –Conduction and breakdown in pure and commercial liquids, Maintenance of oil Quality – Breakdown mechanisms in solid and composite dielectrics.

UNIT III GENERATION OF HIGH VOLTAGES AND HIGH CURRENTS **9**

Generation of High DC, AC, impulse voltages and currents - Triggering and control of impulse generators.

UNIT IV MEASUREMENT OF HIGH VOLTAGES AND HIGH CURRENTS **9**

High Resistance with series ammeter – Dividers, Resistance, Capacitance and Mixed dividers – Peak Voltmeter, Generating Voltmeters - Capacitance Voltage Transformers, Electrostatic Voltmeters –Sphere Gaps - High current shunts- Digital techniques in high voltage measurement.

UNIT V HIGH VOLTAGE TESTING & INSULATION COORDINATION **9**

High voltage testing of electrical power apparatus as per International and Indian standards – Power frequency, impulse voltage and DC testing of Insulators, circuit breakers, bushing, isolators and transformers- Insulation Coordination.

TOTAL : 45 PERIODS

OUTCOMES:

Ability to understand and analyze power system operation, stability, control and protection.

TEXT BOOKS:

1. S.Naidu and V. Kamaraju, 'High Voltage Engineering', Tata McGraw Hill, Fifth Edition, 2013.
2. E. Kuffel and W.S. Zaengl, J.Kuffel, 'High voltage Engineering fundamentals', Newnes Second Edition Elsevier , New Delhi, 2005.
3. Subir Ray,' An Introduction to High Voltage Engineering' PHI Learning Private Limited, New Delhi, Second Edition, 2013.

REFERENCES:

1. L.L. Alston, 'High Voltage Technology', Oxford University Press, First Indian Edition, 2011.
2. C.L. Wadhwa, 'High voltage Engineering', New Age International Publishers, Third Edition, 2010.

EE6702 PROTECTION AND SWITCHGEAR **L T P C 3 0 0 3**

OBJECTIVES:

- To educate the causes of abnormal operating conditions (faults, lightning and switching surges) of the apparatus and system.
- To introduce the characteristics and functions of relays and protection schemes.
- To impart knowledge on apparatus protection
- To introduce static and numerical relays
- To impart knowledge on functioning of circuit breakers

UNIT I PROTECTION SCHEMES **9**

Principles and need for protective schemes – nature and causes of faults – types of faults – fault current calculation using symmetrical components – Methods of Neutral grounding – Zones of protection and essential qualities of protection – Protection schemes

UNIT II ELECTROMAGNETIC RELAYS **9**

Operating principles of relays - the Universal relay – Torque equation – R-X diagram – Electromagnetic relays – Overcurrent, Directional, Distance, Differential, Negative sequence and Under frequency relays.

UNIT III APPARATUS PROTECTION **9**

Current transformers and Potential transformers and their applications in protection schemes -Protection of transformer, generator, motor, busbars and transmission line.

UNIT IV STATIC RELAYS AND NUMERICAL PROTECTION **9**

Static relays – Phase, Amplitude Comparators – Synthesis of various relays using Static comparators– Block diagram of Numerical relays – Overcurrent protection, transformer differential protection,distant protection of transmission lines.

UNIT V CIRCUIT BREAKERS **9**

Physics of arcing phenomenon and arc interruption - DC and AC circuit breaking – re-striking voltage and recovery voltage - rate of rise of recovery voltage - resistance switching - current chopping -interruption of capacitive current - Types of circuit breakers – air blast, air break, oil, SF6 and vacuum circuit breakers – comparison of different circuit breakers – Rating and selection of Circuit breakers.

TOTAL : 45 PERIODS

OUTCOMES:

Ability to understand and analyze power system operation, stability, control and protection.

TEXT BOOKS:

1. Sunil S.Rao, 'Switchgear and Protection', Khanna Publishers, New Delhi, 2008.
1. B.Rabindranath and N.Chander, 'Power System Protection and Switchgear', New Age International (P) Ltd., First Edition 2011.
2. M.L.Soni, P.V.Gupta, U.S.Bhatnagar, A.Chakrabarti, 'A Text Book on Power System Engineering', Dhanpat Rai & Co.,1998.

REFERENCES:

1. Badri Ram ,B.H. Vishwakarma, 'Power System Protection and Switchgear', New Age International Pvt Ltd Publishers, Second Edition 2011.
2. Y.G.Paithankar and S.R.Bhide, 'Fundamentals of power system protection', Second Edition, Prentice Hall of India Pvt. Ltd., New Delhi, 2010.
3. C.L.Wadhwa, 'Electrical Power Systems', 6th Edition, New Age International (P) Ltd., 2010
4. Ravindra P.Singh, ' Switchgear and Power System Protection', PHI Learning Private Ltd., New Delhi, 2009.
5. Bhavesh Bhalja, R.P. Maheshwari, Nilesh G. Chotani,'Protection and Switchgear' Oxford University Press, 2011.

EE6703 SPECIAL ELECTRICAL MACHINES **LT P C3 0 0 3**

OBJECTIVES:

- To impart knowledge on Construction, principle of operation and performance of synchronous
- reluctance motors.
- To impart knowledge on the Construction, principle of operation, control and performance of
- stepping motors.
- To impart knowledge on the Construction, principle of operation, control and performance of switched reluctance motors.
- To impart knowledge on the Construction, principle of operation, control and performance of permanent magnet brushless D.C. motors.

- To impart knowledge on the Construction, principle of operation and performance of permanent magnet synchronous motors.

UNIT I SYNCHRONOUS RELUCTANCE MOTORS **9**

Constructional features – Types – Axial and Radial flux motors – Operating principles – Variable Reluctance Motors – Voltage and Torque Equations - Phasor diagram - performance characteristics – Applications.

UNIT II STEPPER MOTORS **9**

Constructional features – Principle of operation – Variable reluctance motor – Hybrid motor – Single and multi stack configurations – Torque equations – Modes of excitation – Characteristics – Drive circuits – Microprocessor control of stepper motors – Closed loop control-Concept of lead angle–Applications.

UNIT III SWITCHED RELUCTANCE MOTORS (SRM) **9**

Constructional features – Rotary and Linear SRM - Principle of operation – Torque production –Steady state performance prediction- Analytical method -Power Converters and their controllers –Methods of Rotor position sensing – Sensor less operation – Characteristics and Closed loop control– Applications.

UNIT IV PERMANENT MAGNET BRUSHLESS D.C. MOTORS **9**

Permanent Magnet materials – Minor hysteresis loop and recoil line-Magnetic Characteristics –Permeance coefficient -Principle of operation – Types – Magnetic circuit analysis – EMF and torque equations – Commutation - Power Converter Circuits and their controllers – Motor characteristics and control– Applications.

UNIT V PERMANENT MAGNET SYNCHRONOUS MOTORS (PMSM) **9**

Principle of operation – Ideal PMSM – EMF and Torque equations – Armature MMF – Synchronous Reactance – Sine wave motor with practical windings - Phasor diagram – Torque/speed characteristics - Power controllers - Converter Volt-ampere requirements– Applications.

TOTAL : 45 PERIODS

OUTCOMES:

Ability to model and analyze electrical apparatus and their application to power system

TEXT BOOKS:

1. K.Venkataratnam, 'Special Electrical Machines', Universities Press (India) Private Limited, 2008.
2. T.J.E. Miller, 'Brushless Permanent Magnet and Reluctance Motor Drives', Clarendon Press, Oxford, 1989.
3. T. Kenjo, 'Stepping Motors and Their Microprocessor Controls', Clarendon Press London, 1984.

REFERENCES:

1. R.Krishnan, 'Switched Reluctance Motor Drives – Modeling, Simulation, Analysis, Design and Application', CRC Press, New York, 2001.
2. P.P. Aearnley, 'Stepping Motors – A Guide to Motor Theory and Practice', Peter Perengrinus London, 1982.
3. T. Kenjo and S. Nagamori, 'Permanent Magnet and Brushless DC Motors', Clarendon Press, London, 1988.
4. E.G. Janardanan, 'Special electrical machines', PHI learning Private Limited, Delhi, 2014.

MG6851 PRINCIPLES OF MANAGEMENT **LT P C 3 0 0 3**

OBJECTIVES:

To enable the students to study the evolution of Management, to study the functions and principles of management and to learn the application of the principles in an organization.

UNIT I INTRODUCTION TO MANAGEMENT AND ORGANIZATIONS **9**

Definition of Management – Science or Art – Manager Vs Entrepreneur - types of managers - managerial roles and skills – Evolution of Management – Scientific, human relations , system and contingency approaches – Types of Business organization - Sole proprietorship, partnership, company-public and

private sector enterprises - Organization culture and Environment – Current trends and issues in Management.

UNIT II PLANNING **9**

Nature and purpose of planning – planning process – types of planning – objectives – setting objectives – policies – Planning premises – Strategic Management – Planning Tools and Techniques– Decision making steps and process.

UNIT III ORGANISING **9**

Nature and purpose – Formal and informal organization – organization chart – organization structure – types – Line and staff authority – departmentalization – delegation of authority – centralization and decentralization – Job Design - Human Resource Management – HR Planning, Recruitment, selection, Training and Development, Performance Management , Career planning and management.

UNIT IV DIRECTING **9**

Foundations of individual and group behaviour – motivation – motivation theories – motivational techniques – job satisfaction – job enrichment – leadership – types and theories of leadership –communication – process of communication – barrier in communication – effective communication – communication and IT.

UNIT V CONTROLLING **9**

System and process of controlling – budgetary and non-budgetary control techniques – use of computers and IT in Management control – Productivity problems and management – control and performance – direct and preventive control – reporting.

TOTAL: 45 PERIODS

OUTCOMES:

 Upon completion of the course, students will be able to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management

TEXT BOOKS:

1. Stephen P. Robbins & Mary Coulter, " Management", Prentice Hall (India) Pvt. Ltd., 10th Edition,2009.
2. JAF Stoner, Freeman R.E and Daniel R Gilbert "Management", Pearson Education, 6th Edition, 2004.

REFERENCES:

1. Stephen A. Robbins & David A. Decenzo & Mary Coulter, "Fundamentals of Management" Pearson Education, 7th Edition, 2011.
2. Robert Kreitner & Mamata Mohapatra, " Management", Biztantra, 2008.
3. Harold Koontz & Heinz Weihrich "Essentials of Management" Tata McGraw Hill,1998.
4. Tripathy PC & Reddy PN, "Principles of Management", Tata Mcgraw Hill, 1999.

EE6005 POWER QUALITY **L T P C 3 0 0 3**

OBJECTIVES:

- To introduce the power quality problem
- To educate on production of voltages sags, over voltages and harmonics and methods of control.
- To study overvoltage problems
- To study the sources and effect of harmonics in power system
- To impart knowledge on various methods of power quality monitoring.

UNIT I INTRODUCTION TO POWER QUALITY **9**

Terms and definitions: Overloading - under voltage - over voltage. Concepts of transients – short duration variations such as interruption - long duration variation such as sustained interruption. Sags and swells - voltage sag - voltage swell - voltage imbalance - voltage fluctuation - power frequency variations. International standards of power quality. Computer Business Equipment Manufacturers Associations (CBEMA) curve.

UNIT II VOLTAGE SAGS AND INTERRUPTIONS **9**

Sources of sags and interruptions - estimating voltage sag performance. Thevenin's equivalent source - analysis and calculation of various faulted condition. Voltage sag due to induction motor starting. Estimation of the sag severity - mitigation of voltage sags, active series compensators. Static transfer switches and fast transfer switches.

UNIT III OVERVOLTAGES **9**

Sources of over voltages - Capacitor switching – lightning - ferro resonance. Mitigation of voltage swells - surge arresters - low pass filters - power conditioners. Lightning protection – shielding – line arresters - protection of transformers and cables. An introduction to computer analysis tools for transients, PSCAD and EMTP.

UNIT IV HARMONICS **9**

Harmonic sources from commercial and industrial loads, locating harmonic sources.Power system response characteristics - Harmonics Vs transients. Effect of harmonics - harmonic distortion – voltage and current distortion - harmonic indices - inter harmonics – resonance. Harmonic distortion evaluation - devices for controlling harmonic distortion - passive and active filters. IEEE and IEC standards.

UNIT V POWER QUALITY MONITORING **9**

Monitoring considerations - monitoring and diagnostic techniques for various power quality problems - modeling of power quality (harmonics and voltage sag) problems by mathematical simulation tools - power line disturbance analyzer – quality measurement equipment - harmonic / spectrum analyzer - flicker meters - disturbance analyzer. Applications of expert systems for power quality monitoring.

TOTAL : 45 PERIODS

OUTCOMES:

 Ability to understand and analyze power system operation, stability, control and protection.

TEXT BOOKS:

1. Roger. C. Dugan, Mark. F. McGranagham, Surya Santoso, H.Wayne Beaty, 'Electrical Power Systems Quality' McGraw Hill,2003.(For Chapters1,2,3, 4 and 5).
1. **Eswald.F.Fudis and M.A.S.Masoum, "Power Q**uality in Power System and Electrical Machines," Elseviar Academic Press, 2013.
2. J. Arrillaga, N.R. Watson, S. Chen, 'Power System Quality Assessment', Wiley, 2011.

REFERENCES:

1. G.T. Heydt, 'Electric Power Quality', 2nd Edition. (West Lafayette, IN, Stars in a Circle Publications, 1994). (For Chapter 1, 2, 3 and 5)
2. M.H.J Bollen, 'Understanding Power Quality Problems: Voltage Sags and Interruptions', (New York: IEEE Press, 1999). (For Chapters 1, 2, 3 and 5)
3. G.J.Wakileh, "Power Systems Harmonics – Fundamentals, Analysis and Filter Design," Springer 2007.
4. E.Aeha and M.Madrigal, "Power System Harmonics, Computer Modelling and Analysis, " Wiley India, 2012.
5. R.S.Vedam, M.S.Sarma, "Power Quality – VAR Compensation in Power Systems," CRC Press 2013.
6. C. Sankaran, 'Power Quality', CRC press, Taylor & Francis group, 2002.

EE6008 MICROCONTROLLER BASED SYSTEM DESIGN **L T P C 3 0 0 3**

OBJECTIVES:

- To introduce the architecture of PIC microcontroller
- To educate on use of interrupts and timers
- To educate on the peripheral devices for data communication and transfer
- To introduce the functional blocks of ARM processor
- To educate on the architecture of ARM processors

UNIT I INTRODUCTION TO PIC MICROCONTROLLER **9**

Introduction to PIC Microcontroller–PIC 16C6x and PIC16C7x Architecture–PIC16cxx–- Pipelining - Program Memory considerations – Register File Structure - Instruction Set - Addressing modes –Simple Operations.

UNIT II INTERRUPTS AND TIMER **9**

PIC micro controller Interrupts- External Interrupts-Interrupt Programming–Loop time subroutine - Timers-Timer Programming– Front panel I/O-Soft Keys– State machines and key switches– Display of Constant and Variable strings.

UNIT III PERIPHERALS AND INTERFACING **9**

I^2C Bus for Peripherals Chip Access– Bus operation-Bus subroutines– Serial EEPROM—Analog to Digital Converter–UART-Baud rate selection–Data handling circuit–Initialization - LCD and keyboard Interfacing - ADC, DAC, and Sensor Interfacing.

UNIT IV INTRODUCTION TO ARM PROCESSOR **9**

ARM Architecture –ARM programmer's model –ARM Development tools- Memory Hierarchy–ARM Assembly Language Programming–Simple Examples–Architectural Support for Operating systems.

UNIT V ARM ORGANIZATION **9**

3-Stage Pipeline ARM Organization– 5-Stage Pipeline ARM Organization–ARM Instruction Execution-ARM Implementation– ARM Instruction Set– ARM coprocessor interface– Architectural support for High Level Languages – Embedded ARM Applications.

TOTAL: 45 PERIODS

OUTCOMES:

 To understand and apply computing platform and software for engineering problems.
 To understand ethical issues, environmental impact and acquire management skills.

TEXT BOOKS:

1. Peatman,J.B., "Design with PIC Micro Controllers"PearsonEducation,3rdEdition, 2004.
2. Furber,S., "ARM System on Chip Architecture" Addison Wesley trade Computer Publication, 2000.

REFERENCE:

1. Mazidi, M.A.,"PIC Microcontroller" Rollin Mckinlay, Danny causey Printice Hall of India, 2007.

EE6711 POWER SYSTEM SIMULATION LABORATORY **LT P C 0 0 3 2**

OBJECTIVES:

To provide better understanding of power system analysis through digital simulation

LIST OF EXPERIMENTS:

1. Computation of Parameters and Modelling of Transmission Lines
2. Formation of Bus Admittance and Impedance Matrices and Solution of Networks.
3. Load Flow Analysis - I : Solution of load flow and related problems using Gauss-Seidel Method
4. Load Flow Analysis - II: Solution of load flow and related problems using Newton Raphson.
5. Fault Analysis
6. Transient and Small Signal Stability Analysis: Single-Machine Infinite Bus System
7. Transient Stability Analysis of Multi machine Power Systems
8. Electromagnetic Transients in Power Systems
9. Load – Frequency Dynamics of Single- Area and Two-Area Power Systems
10. Economic Dispatch in Power Systems.

TOTAL : 45 PERIODS

OUTCOMES:

Ability to understand and analyze power system operation, stability, control and protection.

EE6712 COMPREHENSION **L T P C 0 0 2 1**

OBJECTIVES:

To encourage the students to comprehend the knowledge acquired from the first Semester to Sixth Semester of B.E Degree Course through periodic exercise.

METHOD OF EVALUATION:

The students will be assessed 100% internally through weekly test with objective type questions on all the subject related topics

TOTAL : 30 PERIODS

OUTCOMES:

Ability to review, prepare and present technological developments

K.L.N. COLLEGE OF ENGINEERING
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
LECTURE SCHEDULE

Degree/Program: **B.E / EEE** Course code &Name: **EE6701 HIGH VOLTAGE ENGINEERING**
Duration: **July -Oct 2016** Semester: **VII** Section: **A, B & C**
Staff: **NVRV, CMS & VS** Regulation: **2013/AUC**

Aim:

To understand High voltage engineering concepts

Objectives:

- To understand the various types of over voltages in power system and protection methods.
- Generation of over voltages in laboratories.
- Measurement of over voltages.
- Nature of Breakdown mechanism in solid, liquid and gaseous dielectrics.
- Testing of power apparatus and insulation coordination.

Prerequisites: Transmission and Distribution and Power system analysis.

COURSE OUTCOMES: After the course, the student should be able to:

Course	Course Outcome	POs	PSOs
C401.1	Identify the causes of over voltage and its effects in power system.	1,2,4, 6	1,3
C401.2	Classify the breakdown Mechanisms in Solid, Liquid, gases and Composite dielectrics		
C401.3	Design different type of Generating circuit for high voltage D.C and high voltage A.C		
C401.4	Measure A.C and D.C high voltage and current using appropriate method		
C401.5	Test the transformer ,insulator , circuit breakers, surge diverters and cables also discuss the insulation coordination		

S. No	Date	Period Number	Topics to be covered	Book No [Page No]
UNIT I			**OVER VOLTAGES IN ELECTRICAL POWER SYSTEMS**	**Target Periods 09**
1			Introduction	Notes
2			Causes of over voltages and its effects on power system	T1[285-286]
3			Lightening	T1[286-296]
4			Switching surges & temporary over voltage	T1[314-319]
5			Temporary over voltages & other abnormal conditions	T1[319-322]-
6			Corona and its consequences	Notes
7			Protection against over voltages	T1[322-327]
8				
9			Reflection and refraction of travelling waves	T1[298-307]
Class Test I (22/07/16 to 28/08/16)				Total planned periods : 09
UNIT II			**DIELECTRIC BREAKDOWN**	**Target Periods 09**
10			Gas breakdown and breakdown theories	T1[29-44]
11			Gaseous breakdown in uniform & non-uniform fields	T1[47-52]
12			Corona discharges	T1[47-52]
13			Vacuum breakdown and the classification of breakdown mechanism	T1[58-62]
14			Conduction & breakdown in pure liquids	T1[76-78]
15			Conduction & breakdown in commercial liquids	T1[79-82]
16			Breakdown mechanisms in solids Dielectric	T1[94-98]
17				
18			Breakdown mechanisms in Composite Dielectric	T1[98-103]
CIT I (Unit-I&II): 10/08/16 to 17/08/16				Total planned periods : 09
Assignment -I				Date of Announcement :
UNIT III			**GENERATION OF HIGH VOLTAGES AND HIGH CURRENTS**	**Target Periods 09**
19			Generation of High D.C Voltages	T1[142-145]
20			Simple voltage doubler circuit	T1[145-158]
21			Generation of high alternating voltages	T1[161-166]
22			Generation of high frequency A.C high voltages	T1[167-169]
23			Standard Impulse Wave shape	T1[169-179]
24			Generation of Switching surges	T1[182-187]
25			Multistage impulse generators	T1[179-182]
26			Impulse current& voltage generation	T1[185-189]
27			Tripping and control of Impulse generators	T1[189-191]
Assignment - II				Date of Announcement :
Class test-II-Unit-III- 30/08/16 to 07/09/16				Total Planned periods: 09
UNIT IV			**MEASUREMENTS OF HIGH VOLTAGES AND HIGH CURRENTS**	**Target Periods 09**
28			High Resistance with series ammeter	T1[206-208]
29			Dividers, Resistance, Capacitance and Mixed dividers	T1[237-251]
30				
31			Peak Voltmeter, Generating Voltmeters	T1[209-211] T1[223-227]
32			Capacitance Voltage Transformers	T1[218-220]
33			Electrostatic Voltmeters & Sphere Gaps	T1[221-236]
34				
35			High current shunts	T1[253-260]
36			Digital technique in high voltage Measurement	T1[267-272]
37				
38			Quiz-1	
39			Seminar-1	
Assignment: III				Date of Announcement :
CIT –II-(Unit-III,IV) : 20/09/16 to 26/09/16				Total planned periods : 12
UNIT V			**HIGH VOLTAGE TESTING AND INSULATION COORDINATION**	**Target Periods 09**
40			High voltage testing of electrical power apparatus	Notes
41			Testing of Insulator : Power frequency, impulse voltage and DC	T1[399-404]

42			testing	
43				
44			Testing of bushing	T1[404-406]
45			Testing of isolators and circuit breaker.	T1[406-410]
46			Testing of transformer	T1[415-420]
47			Insulation coordination	T1[336-346]
48				
49			Quiz -2	
50			Seminar-2	
51			***Content beyond syllabus:*** Testing cables and surge diverters	
Class test-III-Unit-V- (06/10/16 to 08/10/16)				Total planned periods : 12

Test/Ref	Title of the book	Author	Publisher/Edition
T1	High Voltage Engineering	S.Naidu and V.Kamaraju	Tata McGraw Hill, Fifth Edition, 2013
T2	High voltage Engineering fundamentals	E. Kuffel and W.S. Zaengl, J.Kuffel	Newnes Second Edition Elsevier ,2005
T3	An Introduction to High Voltage Engineering	Subir Ray	PHI Learning Private Limited, Second Edition, 2013.
R1	High Voltage Technology	L.L. Alston	Oxford University Press, First Indian Edition, 2011
R2	High voltage engineering	C.L. Wadhwa	New Age International Publishers, Third Edition, 2010

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C401.1	1	1	-	2	-	2	-	-	-	-	-	-	1	-	1
C401.2	1	1	-	2	-	2	-	-	-	-	-	-	1	-	1
C401.3	1	1	-	2	-	2	-	-	-	-	-	-	1	-	1
C401.4	1	1	-	2	-	2	-	-	-	-	-	-	1	-	1
C401.5	1	1	-	2	-	2	-	-	-	-	-	-	1	-	1
C401	**1**	**1**	**-**	**2**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**1**

Content Beyond syllabus Added (CBS)	Pos	Unit
Testing of cables and surge diverters	PO4 & PO6	V

PSOs	PROGRAMME OUTCOMES(POs)											
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
PSO1	3	3	3	3	2	1	1	1	1	1	1	1
PSO2	1	1	1	1	3	1	1	1	3	1	1	3
PSO3	1	1	2	2	1	3	3	3	2	3	2	1

K.L.N. COLLEGE OF ENGINEERING, POTTAPALAYAM - 630 612
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
Lecture Schedule

Course/Branch : **B.E / EEE** Subject: **PROTECTION AND SWITCHGEAR** Duration: **July-October 2016.** Subject Code : **EE6702** Semester : **VII** Section: **A, B & C**
Regulation: **2013** Staff Handling : **Dr. K. GNANAMBAL**

AIM

To introduce the students to the various abnormal operating conditions in power system and describe the apparatus and system protection schemes. Also to describe the phenomena of current interruption to study the various switchgears.

OBJECTIVES

- To educate the causes of abnormal operating conditions (faults, lightning and switching surges) of the apparatus and system.

- To introduce the characteristics and functions of relays and protection schemes.
- To impart knowledge on apparatus protection
- To introduce static and numerical relays
- To impart knowledge on functioning of circuit breakers

PRE-REQUISITE; Measurements and Instrumentation, Power System Analysis.

COURSE OUTCOMES: After the course, the student should be able to:

Course	Course Outcome	POs	PSOs
C402.1	Summarize the causes and effects of faults in power system and explain the necessity of protection in power system.	1,2,3,6,7	1,3
C402.2	Describe the operation of electromagnetic relays and draw their characteristic curves.	1,2,3,6,7	1,3
C402.3	List out the various faults that can occur on alternator, transformer, busbar and transmission line and select the suitable protection schemes.	1,2,3,6,7	1,3
C402.4	Synthesize the static relays using comparators and explain numerical relays.	1,2,3,6,7	1,3
C402.5	Derive the expression for RRRV, critical resistance value and compare the various types of circuit breakers.	1,2,3,6,7	1,3

S.No	Date	Period Number	Topics to be Covered	Book No [Page No]
UNIT I: PROTECTION SCHEMES				**Target Periods : 10**
1			Principles and need for protective schemes	6 (1-6)
2			Nature and causes of faults	6(2-3),7 (1-13)
3			Types of faults	6(3-4),7 (1-13)
4			Fault current calculation using symmetrical components	6(107-114), 6(146-151)
5			Methods of Neutral grounding- Effective, Resistance, Resonant grounding	6(200-212)
6			Reactance, Voltage transformer grounding, Grounding through grounding transformer	
7			Zones of protection	6(9-11)
8			Essential qualities of protection	6 (11-12)
9			Protection schemes	6(19-20)
10			Quiz I	-
Assignment 1			*Date of Announcement : 15.7.2016 Date Of Submission : 22.7.2016* *Test-I-Class test – I (23.7.2016 TO 29.7.2016)*	
UNIT II: ELECTROMAGNETIC RELAYS				**Target Periods : 9**
11			Operating principles of relays	1 (656-660)
12			Universal relay, Torque equation – R-X diagram	
13			Electromagnetic Relays	
14			Non directional over current relays – PSM, TMS, Time characteristics	1 (663-666)
15			Directional Relay. Directional over current Relay.	1 (666-669)
16			Distance Relay. Impedance Relay – Types – Construction, Principle and Characteristics	1 (670-672)
17			Reactance Relay and Mho Relay – Types – Construction, Principle and Characteristics.	1 (673-675)
18			Differential Relay – Demerits. Biased Differential Relay. Voltage differential relay.	1 (679-682)
19			Negative sequence and Under frequency relays.	1 (685-687), 3(1242-1245)
Assignment -2			*Date of Announcement : 01.8.2016 Date Of Submission : 08.8.2016* *Test-II- CIT-I (11.8.2016 TO 18.8.2016)*	
UNIT III: APPARATUS PROTECTION				**Target Periods : 11**
20			CTs and their applications in protection schemes	6 (65-93)
21			PTs and their applications in protection schemes	6 (65-93)
22			Transformer Protection – Protection against internal fault, over fluxing, Over voltage.	1 (704-713)
23			Generator Protection – Protection against Stator Faults	1 (691-696)
24			Protection against Rotor Faults	1 (697-704)
25			Motor protection	1 (716),

26			Bus bar Protection	1(719-720)
27			Transmission line protection	1(722-735)
28			Feeder Protection	
29			Carrier current protection	
30			Quiz III	1(722-735)
Assignment 3			*Date of Announcement : 12.9.2016* *Date Of Submission : 20.9.2016* *Test-III-Class test II (01.9.2016 TO 09.9.2016)*	
UNIT IV: STATIC RELAYS AND NUMERICAL PROTECTION				**Target Periods : 9**
31			Basis of Static relay development	5(180-187)
32			Classification of Static Relays	5(180-187)
33			Phase Comparator	5(219-220)
34			Amplitude Comparator	5(213-219)
35			Synthesis of various relays using Static comparators	7(204-210)
36			Block diagram of Numerical relays	7(223-224)
37			Over current protection of transmission lines	7(243-244)
38			Transformer differential protection of transmission lines	7(245)
39			Distant protection of transmission lines	7(243-247)
UNIT V: CIRCUIT BREAKERS				**Target Periods : 11**
40			Physics of arcing phenomenon and arc interruption	1 (593)
41			DC and AC circuit breaking	1 (635-636), 1 (593-595)
42			Re-striking voltage and recovery voltage, rate of rise of recovery voltage	1 (595-597)
43			Resistance switching - current chopping - interruption of capacitive current	1 (604-607), 1 (603-604)
44			Types of circuit breakers – air blast, air break	1(608)6(547-548),1 (615-619)
45			Oil circuit breaker	1 (608-612), 1 (613-615)
46			SF6 and vacuum circuit breakers	1 (626-630)
47			Comparison of different circuit breakers	1(189),5(334)
48			Rating and selection of Circuit breakers	6(565-570), 6(114-115), 5(362-363)
49			Content Beyond syllabus – High voltage testing of cables and circuit breakers & ANSI coding of protective relays	-
50			Seminar I	-
Test-IV-CIT – II (23.9.2016 TO 29.9.2016)			*Test-V-Class test III (18.10.2016 TO 20.10.2016)*	

Books: Text/Reference

S. No	Title of the Book	Author	Publisher	Year
1	A Text Book on Power System Engineering	Soni.M.L, Gupta.P.V, Bhatnagar.V.S, Chakrabarti.A,	Dhanpat Rai & Co.,	1998.
2	A Text book of Power System Engineering	Rajput.R.K,	Laxmi Publications	2007
3	Switchgear and Protection	Sunil S. Rao	Khanna publishers	1986
4	Electrical Power Systems	Wadhwa.C.L	New Age International (P) Ltd,	2000
5	Power System Protection & Switchgear	Ravindranath.B and Chander.N,	New Age International Pvt Ltd Publishers	2011
6	Power System Protection and Switchgear	Badri Ram, Vishwakarma	Tata McGraw Hill	2001
7	Fundamentals of Power System Protection	Paithankar Y.G. and Bhide S.R	Prentice Hall of India	2003
8	Switchgear and Protection	J.B.Gupta	S.K.Kataria & Sons	2013

Course	PO 1	PO 2	PO3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO2	PSO 3
C402.1	3	2	1	-	-	1	1	-	-	-	-	-	2	-	1
C402.2	3	2	1	-	-	1	1	-	-	-	-	-	2	-	1
C402.3	3	2	1	-	-	1	1	-	-	-	-	-	2	-	1
C402.4	3	2	1	-	-	1	1	-	-	-	-	-	2	-	1

C402.5	3	2	1	-	-	1	1	-	-	-	-	-	2	-	1
C402	3	2	1	-	-	1	1	-	-	-	-	-	2	-	1

Content Beyond Syllabus Added(CBS)	POs strengthened / vacant filled	CO / Unit
Microprocessor Based Relays	PO5 (1) vacant filled	C402.2 / II

WEB REFERENCE:www.nptel.iitm.ac.in

PSOs	PROGRAMME OUTCOMES(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PSO1	3	3	3	3	2	1	1	1	1	1	1	1
PSO2	1	1	1	1	3	1	1	1	3	1	1	3
PSO3	1	1	2	2	1	3	3	3	2	3	2	1

Strength of correlation:1(Weak),2(Medium),3(Strong)

Format No.:11
Issue No.: 02
Revision No.: 01
Date: 23/06/12

K.L.N. COLLEGE OF ENGINEERING, POTTAPALAYAM - 630 612
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
Lecture Schedule[Mon3,-Tue-2,Wed-4,Thu-5(sem/pom),-Fri-2]

Degree/Program: **B.E / EEE.**Course code &Name: **EE6703** –Special Electrical Machines.
Duration: **July -Oct 2016.** Semester: VII**.** Section: A,B,C Staff: P.LOGANTHURAI. Regulation: **2013.**

AIM: To expose the students to the construction, principle of operation and performance of special electrical machines as an extension to the study of basic electrical machines

OBJECTIVES

To impart knowledge on

1. Construction, principle of operation and performance of synchronous reluctance motors.
2. Construction, principle of operation and performance of stepping motors.
3. Construction, principle of operation and performance of switched reluctance motors.
4. Construction, principle of operation and performance of permanent magnet brushless D.C. motors.
5. Construction, principle of operation and performance of permanent magnet synchronous motors.
6. Prerequisites: Electrical machines-I, Electrical machines-II, Electromagnetic theory, Power electronics.

COURSE OUTCOMES: After the course, the student should be able to:

		Pos	PSOs
C403.1	Explain the necessity to improve the saliency of synchronous reluctance motor and its characteristics	**1,2, 5**	1
C403.2	Compare the various methods of excitation of different types of stepper motor and its driver circuits		1
C403.3	Describe the operation of switched reluctance motor with and without sensors		1
C403.4	Explain the electronic commutation of permanent magnet brushless D.C. motors and to determine the torque production		1
C403.5	Derive the expression for emf and torque of permanent magnet synchronous motors and choose power controller for permanent magnet synchronous motors.		1

S.No	Date	No. of Periods	Topics to be Covered	Book No [Page No]
UNIT I - SYNCHRONOUS RELUCTANCE MOTORS				**Target Periods: 9**
1			Constructional features	R4 (1.1-1.10)R5(7.1-7.7)

2			Axial air gap motors	R5(7.1-7.7)
3			Radial air gap motors	R5(7.1-7.7).
4			Operating principle	R5(7.7-7.8)
5			Variable Reluctance motor	R5(7.15-7.18)
6			Hybrid Motors	R4(1.10-1.11)
7			Synchronous Reluctance	R4(1.13-1.15)
8			Voltage and Torque Equations	R4(1.15-1.23)
9			Phasor diagram	R4(1.23-1.24)
10			Characteristics	R5(7.10)
11			CBS-1	
ASSIGNMENT- I, Submission date: 20/7/2016				
CLASS TEST-1-**26th July 2016**				
UNIT II - STEPPER MOTORS				**Target Periods: 9**
12			Constructional features	R4(2.1-2.6)
13			Principle of operation	R4(2.1-2.6).
14			Variable reluctance motor -Various modes of operation	R4(2.6-2.10)
15			Permanent magnet - Various modes of operation	R4(2.7-2.26)
16			Hybrid motor	R4(2.9-2.31)
17			Multi stack configurations	R4(2.12-.13)
18			Theory of torque predictions	R4(2.31-2.38)
19			Modes of excitations	R5(2.24-2.32)
20			Characteristics of stepper motor	R4(2.38-2.46)
21			Drive circuits	R4(2.46-2.68)
22			Microprocessor control of stepping motors	R4(2.75-2.78)
23			Closed loop control & Applications	R4(2.74)
24			**Self study/Seminar/Quiz**	
ASSIGNMENT- II, Submission date: 10/8/2016				
C.I.T-1-**13th August 2016**				
UNIT III SWITCHED RELUCTANCE MOTORS				**Target Periods : 9**
25			Constructional features Rotary and Linear SRMs	R4(3.1-3.10)
26			Principle of operation	R4(3.11-3.15)
27			Torque production	R4(3.41-3.44)
28			Steady state performance prediction- Analytical method	R4(3.24-3.31)
29			Power Converters and their controllers	R4(3.15-3.24)
30				R4(3.15-3.24)
31			Methods of Rotor position sensing	R4(3.32-3.34)
32			Sensorless operation of SRM	R4(3.56-33.57)
33			Closed loop control of SRM	R4(3.53-3.56)
34			Characteristics &applications	R4(3.46-3.48)
35			**Self study/Seminar/Quiz**	
ASSIGNMENT- III- Submission date:27/9/2016				
CLASS TEST-II-**6th Sep. 2016**				
UNIT IV - PERMANENT MAGNET BRUSHLESS D.C. MOTORS				**Target Periods : 9**
36			Permanent Magnet materials	R4(4.1-4.5)
37			Magnetic Characteristics- Permeance coefficient	R4(4.5-4.9)
38			Principle of operation.	R4(4.23-4.27)
39				
40			Magnetic circuit analysis	R4(4.64-4.68)
41			EMF equations	R4(4.42-4.46)
42			Torque equations	R4(4.48.4.51)
43			Commutation	
44			Power controllers	R4(4.40.4.42)
45			Motor characteristics and control	R4(4.52.4.63)
46				
47			CBS-2	
ASSIGNMENT- IV- Submission date:20/9/2016				

C.I.T-II-26th Sep 2016				
UNIT V . PERMANENT MAGNET SYNCHRONOUS MOTORS				**Target Periods 9**
48			Principle of operation. Ideal PMSM	R4(5.1.5.6)
49			EMF equations	R5(6.5.6.9)
50			Torque equations	R5(6.11.6.15)
51			Armature reaction MMF	R4(5.21.5.23))
52			Synchronous Reactance	R4(5.2.4)
53			Sinewave motor with practical windings	R4(5.24.5.26)
54			Phasor diagram	R4(5.27.5.30))
55			Torque speed characteristics	R4(5.31.5.32)
56			Power controllers	R4(5.31.5.32)
57			Converter Volt.ampere requirements.	R4(5.43.5.44)
58			**Self study/Seminar/Quiz**	
Class Test-III-19th Oct 2016				
Class Test.I.	**Class Test-I- (23 – 29 July 2016)**			
C.I.T.I	**CIT – I – 11 – 18 August 2016**			
Class Test.II	**Class Test-II- 1 -9 Sep. 2016**			
C.I.T.II	**CIT – II– 23 – 29 Sep 2016**			
Class Test.III	**Class Test-III-18-20 Oct 2016**			

Text/ Ref	**Title of the Book**	**Author**	**Publisher/Edition**
T1	Special Electrical Machines	K.Venkataratnam	Universities Press (India) Private Limited2008
T2	Brushless Permanent Magnet and Reluctance Motor Drives'	T.J.E. Miller	Oxford /1989
T3.	Stepping Motors and Their Microprocessor Controls	Kenjo	Clarendon Press London /1984
R1.	Switched Reluctance Motor Drives – Modeling, Simulation, Analysis, Design and Application	Krishnan.R,	CRC Press, New York, 2001
R2.	Stepping Motors – A Guide to Motor Theory and Practice.	Aearnley.P.P	Peter Perengrinus, London /1982
R3.	Permanent Magnet and Brushless DC Motors	Kenjo.T and Nagamori.S,	Clarendon Press, London/1988
R4	Special Electrical Machines	R.Senthil Kumar S.Prakash	Charulatha/2008
R5	Special Electrical Machines	K.Dhayalini	Anuradha/2013
R6	'Special electrical machines	E.G. Janardanan	PHI learning Private Limited, Delhi, 2014.

Course	PO1	PO2	PO 3	PO 4	PO5	PO6	PO7	PO8	PO 9	PO10	PO 11	PO12	PSO 1	PSO 2	PSO 3
C403.1	3	2	.	.	1	.	.	.	.	.	.	.	1	.	.
C403.2	3	2	.	.	1	.	.	.	.	.	.	.	1	.	.
C403.3	3	2	.	.	1	.	.	.	.	.	.	.	1	.	.
C403.4	3	2	.	.	1	.	.	.	.	.	.	.	1	.	.
C403.5	3	2	.	.	1	.	.	.	.	.	.	.	1	.	.
C403	3	2	.	.	1	.	.	.	.	.	.	.	1	.	.

Content Beyond Syllabus Added(CBS)	POs	Unit
Synchronous Reluctabce Motor/Alternator for Flywheel Energy Storage System.High speed SRM design.Energy storage system.greater reliability and lower cost	PO11(l)	I
Simplified Sensorless Control for BLDC Motor, Using DSP Technology.simple way to control, in a sensorless way, a Brushless DC (BLDC) motor for electric vehicle applications.	PO11(1)	IV

Lecture Schedule

Degree/Program: **B.E / EEE.** Course code &Name: MG6851 –Principles of Management

Duration: **July -Oct 2016.** Semester: VII**.** Section: A,B,C Staff : Dr.S.Venkatanarayanan Regulation : **2013.**

AIM: To enable the students to study the evolution of Management, to study the functions and principles of management and to learn the application of the principles in an organization.

OBJECTIVES

To impart knowledge on

(i). To learn the basic and Evaluation of Management .

(ii). To learn the various Planning and decision making techniques.

(ii) To learn Organizing and HR management

(iv) To learn about Directing with motivation and job satisfaction

(v). To learn the various Controlling techniques such as budgetary and non budgetary control.

Prerequisites: Not defined and not required as this is the basic course.

COURSE OUTCOMES: After the course, the student should be able to:

		POs	PSOs
C404.1	Describe the basic of management and its types, skills, management roles, types of business organizations and current trends in business.	**4,6, 7,9, 11, 12**	**1 1 1 1 1**
C404.2	Explain the nature and purpose of planning , types, objective of planning and decision process		
C404.3	Compare the different organization structures, Authorities and responsibilities, Human resource management and training and development.		
C404.4	Estimate the individual and group behavior, motivation, job satisfaction, types and theories of leadership, communication and IT.		
C404.5	Apply the knowledge using the various System and process of controlling, budgetary and non-budgetary control techniques, use of computers and IT in Management control, reporting.		

S.No	Date	Period Number	Topics to be Covered	Book No [Page No]
UNIT I - Introduction to Management and Organizations				**Target Periods : 10**
1			Definition of Management – Science or Art Manager Vs Entrepreneur	T1[11-30] R3[1-5],R4[1.2]
2			Types of managers -managerial roles and skills Evolution of Management	T2[24-80] R3[6-9] R4[1.2]
3			Scientific, human relations , system and contingency approaches	T1[37-70] R3[24-26] R4[1.3]
4			Types of Business organization	T1[75-85] R3[38-50] R4[1.5]
5			Sole proprietorship, partnership	T1[14-30] R4[1.5]
6			Company-public and private sector enterprises	T1[18] R4[1.8]
7			Organization culture	T1[66-70] R4[1.8]
8			Environment in business	T1[84-100] R4[2.26]
9			Current trends and issues in Management Role of managers	T1[101-126] R4[5.54]
10			Case Studies (Content beyond syllabus)	
			Class Test –I 26.07.16	
Assignment - 1			Date of Announcement : 06.07.16	Date Of Submission : 15.07.16
UNIT II Planning				**Target Periods : 10**
11			Planning – Introduction	T1 [204-210] R3[1-10] R4[2.2]
12			Nature and purpose of planning	T1 [206] R3[18-30] R4[2.2-2.3]
13			Planning process	R2 [185-220] R3[24-26]
14			Types of Plans	T1 [208] R3[26-33] R4[2.8]
15			Objectives - Managing by objectives (MBO)	T1 [221] R3[49-61] R4[2.16]
16			Types of strategies	T1[224-229]R3[63-65] R4[2.22]
17			Policies - Decision Making - Types of decision	T1[171-176] R3[67] R4[2.31]
18			Decision Making Process - Rational Decision Making	T1[176]R3[70] R4[2.39]
19			Decision Making under different conditions	T1[178] R3[68-75] R4[2.45]
20			Case studies(Content Beyond Syllabus)	
CIT - I : 18.08.16				
Assignment 2			Date of Announcement : 18.07.16	Date Of Submission : 09.08.16
UNIT III Organizing				**Target Periods : 12**

21			Introduction to organizing	T1[296] R3[3.1-3.4] R4[3.2]
22			Nature and purpose of organizing	T1[297-299] R3[5-7] R4[3.3]
23			Organization structure	T1[302-307] R3[19] R4[3.17]
24			Formal and informal groups	T[308] R3[22-25] R4[3.8]
25			organization - Line authority	T1[296] R2[31-68] R4[3.33]
26			Staff authority	T1[296] R2[31-68] R4[3.33}
27			Departmentation - Span of control Centralization and Decentralization	T1[297] R2[69-111] R3[29]
28			Delegation of authority - Staffing - Selection and Recruitment – Orientation	T1[310-320] R4[3.43,3.50]
29			Career Development - Career stages	T1[384-389] R3[3.33-3.35]
30			Training - Performance Appraisal Case studies (CBS)	T1[387] R2[147-160] R3[41-45]
31			NPTEL Lecture	
32			Revision	
Class Test –II 07.09.16				
Assignment – 3			Date of Announcement : 01.08.16	Date Of Submission : 09.08.16
UNIT IV Directing				**Target Periods : 13**
33			Creativity and Innovation	T1[498-502]R3[4.1-72] R4[4.4]
34			Motivation	T1[503-505] R4[4.21]
35			Satisfaction	R4[4.21]
36			Introduction to Motivation	T1[506-507] R3[4.9] R4[4.26]
37			Motivation Theories	T1[506-507] R3[4.9] R4[4.26]
38			Leadership Styles	T1[530-539] R3[19-27] R4[4.8]
39			Leadership theories	T1[540-542] R3[4.40] R4[4.8]
40			Communication - Barriers to effective communication	T1[322-347] R3[4.40 R4[4.55]
41			Organization Culture	T1[296-301]
42			Elements and types of culture	T1[302-303]R3[49-47]
43			Managing cultural diversity	T1[310-313]
44			Case studies (Content Beyond Syllabus)	T1[272-276]
45			NPTEL Lecture	
CIT II: **27.09.16**				
Assignment – 4			Date of Announcement : 11.08.16	Date Of Submission : 22.08.16
UNIT V Controlling				**Target Periods : 11**
45			Process of controlling	T1[638-639] R4[1.2] R3[40-45]
46			Types of control	T1[640-642R3[45-49] R4[5.6]
47			Budgetary and non-budgetary control techniques	T1[644-647] R3[50-53]R4[5.10]
48			Managing Productivity	T1[648] R3[55-60] R4[5.23]
49			Cost Control	T1[649] R3[70-74] R4[5.10]
50			Purchase Control	T1[650] R3[62-63] R4[5.10]
51			Maintenance Control	T1[651] R3[85-87] R4[5.51]
52			Quality Control	T1[653] R3[92-96]
53			Planning operations	T1[657] R3[94-95] R4[5.30]
54			Application of POM in Engineering(CBS)	Case references
55			Revision and case studies	Notes
56			Seminar /Case study	T1,T2,R1.R2,R3,R4 AND R5
57			Seminar/Case study	T1,T2,R1.R2,R3,R4 AND R5
58			Seminar /Case study	T1,T2,R1.R2,R3,R4 AND R5
59			Seminar /Case study	T1,T2,R1.R2,R3,R4 AND R5
CIT III/ Model Test -16.10.14				

Tex/Ref	Title of the Book	Author	Publisher/Edition
T.1	Management	Stephen P. Robbins and Mary Coulter,	Prentice Hall of India 10th edition./2009
T.2	Management.	JAF Stoner, Freeman R.E and Daniel	Pearson Education, 6th Edition

		R Gilbert	/2004
R.1	Fundamentals of Management	Stephen A. Robbins & David A. Decenzo & Mary Coulter	Pearson Education, 7th Edition/ 2011
R.2	Management	Robert Kreitner & Mamata Mohapatra	Biztantra /2008
R.3	Essentials of Management	Harold Koontz & Heinz Weihrich	Tata McGraw Hill,1998.
R4	Principles of Management	Tripathy PC & Reddy PN	Tata Mcgraw Hill/1999
R5	Principles of Management	S.Bhaskar	Anuradha Publications/2011
	Website reference	NPTEL, You tube http://www.casestudyinc.com/	

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C404.1	-	-	-	3	-	2	2	-	1	-	3	3	1	1	1
C404.2	-	-	-	3	-	2	2	-	1	-	3	3	1	1	1
C404.3	-	-	-	3	-	2	2	-	1	-	3	3	1	1	1
C404.4	-	-	-	3	-	2	2	-	1	-	3	3	1	1	1
C404.5	-	-	-	3	-	2	2	-	1	-	3	3	1	1	1
C404	-	-	-	3	-	2	2	-	1	-	3	3	1	1	1

Content Beyond Syllabus Added(CBS)	POs strengthened / vacant filled	CO / Unit
Application of POM in Engineering	PO10 (1)(Vacant filled)	C404.5 / V

Format No.:11
Issue No.: 02
Revision No.: 01
Date: 23/06/12

K.L.N. COLLEGE OF ENGINEERING, POTTAPALAYAM -630 612

Lecture Schedule

Degree/Programme: **B.E / EEE**

Course code &Name: **EE6005- POWER QUALITY** Duration: **July -Oct 2016**

Semester: **VII** Section :A,B&C Regulation : **2013/AUC**

AIM: To study the various issues affecting Power Quality, their production, monitoring and suppression.

OBJECTIVES

To introduce the power quality problems

To educate the production of voltage sags, overvoltage and harmonics and methods of control

To study over voltage problems.

To study the sources and effect of harmonics in power system

To impact knowledge on various methods of power quality monitoring

COURSE OUTCOMES: After the course, the student should be able to:

CO	Course Outcomes	PO	PSO
C405E4.1	Discuss the various types of power quality problem	1,2,3,5,6,8,10	1,3
C405E4.2	Analyze the sources ,types and mitigation of voltage sag problem	1,2,3,5,6,8,10	1,3
C405E4.3	Analyze the sources ,types and mitigation of over voltage issues and model of over voltage problem with computer software tools.	1,2,3,5,6,8,10	1,3
C405E4.4	Evaluate the effects of harmonics on power system equipments and analyze the methods of controlling of harmonics.	1,2,3,5,6,8,10	1,3
C405E4.5	Explain the principle of operation of various types of power quality monitoring devices.	1,2,3,5,6,8,10,	1,3

S.No	Date	Period Number	Topics to be Covered	Book No [Page No]
UNIT I - INTRODUCTION TO POWER QUALITY				**Target Periods: 9**
1			Introduction	1 (1-10)4(1)
2			Terms and definitions: Overloading - under voltage	1(19)
3			Over voltage. Concepts of transients	1(15-19)4(3,4)
4			Short Duration variations such as an interruption	1(20-23) 4(2)
5			Long duration variation such as sustained interruption.	1(17-19)
6			Voltage sags - voltage swell - voltage imbalance	1(20-24) 4(2-6)
7			Voltage fluctuation - power frequency variations	1(28-31) 4(11-15)
8			International standards of power quality	3 (477-483)4(19-30)
9			Computer Business Equipment Manufacturers Associations (CBEMA) curve.	1(40-42)4(30-33)
10			Quiz	Material
Total Periods		**10**	**Test-I [Class test-1] 22.07.16 -28.07.16**	

UNIT II VOLTAGE SAGS AND INTERRUPTIONS				**Target Periods: 9**
11			Sources of sags and interruptions	1(43-47)
12			Estimating voltage sags performance.	1(47-59)
13			Thevenin's equivalent source	1(52-59)
14			Analysis and calculation of various faulted condition	1(52-59)
15			Voltage sags due to induction motor starting.	1(78-80) ,3(248-251)
16			Estimation of the sag severity	1(80,81)
17			Mitigation of voltage sags	1(59-73)
18			Active series compensators.	1(64,65)
19			Static transfer switches- Fast transfer switches	1(71-73),3(404,405)
20			NPTEL Lecture	Material
Total Periods		**10**		
Assignment –I Due Date: 03.08.16			**Test-II [CIT-1]**	**10.08.16-17.08.16**
UNIT III OVERVOLTAGES				**Target Periods: 9**
21			Over Voltages and Sources of over voltages	1(15-19)
22			Capacitor switching	1(111-116)
23			Lightning - ferro resonance.	1(117-127)
24			Mitigation of voltage swells - surge arresters - low pass filters	1(133-136)
25			Power conditioners. Lightning protection	1(136-140)
26			Shielding - line arresters	1(145-149)
27			Protection of transformers and cables	1(149-157)
28			An introduction to computer analysis tools for transients	PSCAD Manual
29			PSCAD and EMTP	1(164)
30			NPTEL Lecture	Material
Total Periods		**10**		
Assignment-II Due Date: 22.08.16			**Test-III [Class Test-2] 30.08.16-07.09.16**	
UNIT IV HARMONICS				**Target Periods : 9**
31			Harmonic sources from commercial and industrial loads	1(184-196)4(6-11)
32			Locating harmonic sources.	1(197-199)
33			Power system response characteristics	1(199-209)
34			Harmonics Vs transients. - Effect of harmonics	1(172,209-220)
35			Voltage and current distortion - Harmonic indices - inter harmonics- Resonance	1(171,181-184, 220-223,203-208) 4(34-43)
36			Harmonic distortion evaluation	1(225-233)
37			Devices for controlling harmonic distortion	1(248-264)
38			Passive and active filters.	1(252-264)
39			IEEE and IEC standards.	1(282-292)4(35-40)
Total Periods		**10**		
Assignment-III Due Date: 12.09.16			**Test-IV [CIT-2] 20.09.16-26.09.16**	
UNIT V - POWER QUALITY MONITORING				**Target period -9**
40			Monitoring considerations	1(456)
41			Monitoring and Diagnostic techniques for various power quality problems.	1(457-467)
42			Modeling of power quality (harmonics)problems with mathematical simulation tools	1(237-248),
43			Modeling of power quality (voltage sag)problems with mathematical simulation tools	Material
44			Power line disturbance Analyzer	1(475)
45			Harmonic / spectrum Analyzer	1(477-479)4(132-140)
46			Combination disturbance and harmonic analyzers	1(479-480)
47			Flicker meters	1(480-487)4(144-155)
48			Applications of expert systems for power quality monitoring	1(498-502)
49			Measurement of Harmonics-A practical approach (CBS)	Practical
50			Seminar	PPT
51			Seminar	PPT
Total Periods		**12**	**Test-V [CIT-3] 06.10.16-08.10.16**	

Books: Text/Reference

S.L.No	Text/Ref	Title of the Book	Author	Publisher	Year
1	T1	Electrical Power Systems Quality	Roger. C. Dugan	McGraw Hill (For Chapters1,2,3, 4 and 5)	2004
2	R1	'Electric Power Quality	G.T. Heydt,	2nd Edition. (West Lafayette, IN, Stars in a Circle Publications). (For Chapter 1, 2, 3 and 5)	1994
3	R2	Understanding Power Quality Problems: Voltage Sags and Interruptions',	M.H.J Bollen	(New York: IEEE Press, 1999). (For Chapters 1, 2, 3 and 5)	1999
4	R3	Power System Quality Assessment	J. Arrillaga, N.R. Watson, S. Chen	(New York: Wiley, 1999). (For Chapters 1, 2, 3, 4 and 5)	1999
5	R4	PSCAD User Manual	M.M. El-Wakil	McGraw Hill 1984	2007

Website Reference

1. http:// en.wikipedia.org/wiki/Power quality
2. http:// iitk.ac.in/infocell/announce/electric power
3. http:// fluke.com/fluke/inen/solutions/pq/
4. http:// www.em-ea.org/

`Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
C405E4.1	2	1	1	-	1	2	-	2	-	3	1	-	1	-	2
C405E4.2	3	3	1	-	2	3	-	3	-	2	1	-	2	1	2
C405E4.3	3	3	3	-	3	3	-	3	-	2	1	-	2	1	2
C405E4.4	3	3	3	-	3	3	-	3	-	2	1	-	2	1	2
C405E4.5	2	1	1	-	3	2	-	3	-	3	1	-	1	1	2
C405E4	**3**	**2**	**2**	**-**	**2**	**3**	**-**	**3**	**-**	**2**	**1**	**-**	**2**	**1**	**2**

Content Beyond Syllabus Added(CBS)	POs strengthened / vacant filled	CO / Unit
Measurement of harmonics-A practical approach	PO4(3) (vacant filled)	405E4.5 / V

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Date: 23/06/12

K.L.N. COLLEGE OF ENGINEERING, POTTAPALAYAM - 630 612
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Lecture Schedule

Degree/Program: **B.E / EEE** Course code &Name: **EE6008 –Microcontroller Based System Design**
Duration: **July -Oct 2016** Semester: **VII** Section: **A**,B&C Regulation: **2013** Staff: **JM, RJR, EJ**

AIM: To expose the students to the concepts of PIC microcontroller and ARM processor with its programming

OBJECTIVES:

- To introduce the architecture of PIC microcontroller
- To educate on use of interrupts and timers
- To educate on the peripheral devices for data communication and transfer
- To introduce the functional blocks of ARM processor
- To educate on the architecture of ARM processors

PREREQUISITES: Digital Logic Circuits, Microprocessors and Microcontrollers, Embedded Systems

COURSE OUTCOMES: After the course, the student should be able to:

Course	Course Outcome	POs	PSOs
C406E4.1	Describe the basic architecture of PIC16cxx and apply the instruction set for simple	**1,2,3,4,6,10**	**1,3**

	operations.		
C406E4.2	Explain about the PIC micro controllers interrupts and write the interrupt programs	**1,2,3,4,5,9,11**	**1,2,3**
C406E4.3	Apply the program to interface I/O devices with controller like LCD, Keyboard, and Sensors etc.,	**1,2,3,4,5,6,12**	**1,2,3**
C406E4.4	Develop simple applications using ARM assembly language programs	**1,2,3,6,7,8**	**1,3**
C406E4.5	Explain about ARM Organization and ARM Coprocessor interface	**1,2,3,4,6**	**1,2,3**

S. No.	Date	Period	Topics to be Covered	Book & Page. No.
UNIT -I - INTRODUCTION TO PIC MICROCONTROLLER Target periods :10				
1.			Introduction to PIC Microcontroller	T1(2-6)
2.			PIC 16C6x and PIC16C7x Architecture	T1(13-14)
3.			PIC16cxx-Pipelining	T1(13-14)
4.			Program Memory considerations	T1(14-18)
5.				
6.			Register File Structure	T1(18-21)
7.			Instruction Set	T1(24-28)
8.				
9.			Addressing modes	T1(30-32)
10.			Simple Operations	T1(32)
Class test –I- 28.07.16				
Assignment –1			***Date of Announcement : 29.07.2016 Date of Submission : 04.08.2016***	
UNIT II - INTERRUPTS AND TIMER Target periods :10				
11.			PIC micro controller Interrupts	T1(74-75)
12.			External Interrupts	T1(109-113)
13.			Interrupt Programming	Lecture Notes
14.				
15.			Loop time subroutine	T1(80-81)
16.			Timers	T1(114-126)
17.			Timer Programming	T1(114-126)
18.			Front panel I/O-Soft Keys	T1(157-159)
19.			State machines and key switches	T1(159-163)
20.			Display of Constant and Variable strings	T1(163-171)
Assignment –2			***Date of Announcement : 18.08.2016 Date of Submission : 27.08.2016***	
Centralized Internal Test – I- 17.08.16				
UNIT III - PERIPHERALS AND INTERFACING Target Periods :10				
21.			I2C Bus for Peripherals Chip Access	T1(177-180)
22.			Bus operation-Bus subroutines	T1(180-184)
23.			Serial EEPROM	T1(188-192)
24.			Analog to Digital Converter	T1(195-204)
25.			UART	T1(206-208)
26.			Baud rate selection	T1(209-210)
27.			Data handling circuit	T1(210-213)
28.			Initialization	T1(210-213)
29.			LCD and keyboard Interfacing	Lecture Notes
30.			ADC, DAC, and Sensor Interfacing	Lecture Notes
31.			Seminar	
Class test-II- 07.09.16				
UNIT IV INTRODUCTION TO ARM PROCESSOR Target Periods :10				
32.			ARM Architecture	T2(35-39)
33.				
34.			ARM programmer's model	T2(39-43)
35.			ARM Development tools	T2(43-47)
36.			Memory Hierarchy	T2(269-290)
37.			ARM Assembly Language Programming	T2(49-69)
38.				
39.			Simple Examples	T2(69-72)
40.				
41.			Architectural Support for Operating systems	T2(291-317)
Assignment –3			***Date of Announcement : 10.09.2016 Date of Submission : 19.09.2016***	

Centralized Internal Test – II- 26.09.16				
UNIT V ARM ORGANIZATION Target Periods :10				
42.			3-Stage Pipeline ARM Organization	T2(75-77)
43.			5-Stage Pipeline ARM Organization	T2(78-81)
44.			ARM Instruction Execution	T2(83-85)
45.			ARM Implementation	T2(86-100)
46.			ARM Instruction Set	T2(105-149)
47.				
48.			ARM coprocessor interface	T2(101-103)
49.				
50.			Architectural support for High Level Languages	T2(151-187)
51.			Embedded ARM Applications	T2(347-360)
52.			**CONTENT BEYOND SYLLABUS**: Programming of ARM processor using KEIL	Beyond Syllabus
53.			Quiz	-
Class test-III – 08.10.16				

Book Reference:

Text/Ref	**Title of the Book**	**Author**	**Publisher/Edition**
T1	"Design with PIC Micro Controllers"	Peatman,J.B.,	PearsonEducation,.3rdEdition, 2004
T2.	"ARM System on Chip Architecture"	Furber,S.,	Addison Wesley trade Computer Publication,2000.
R1.	"PIC Microcontroller"	Mazidi, M.A.	Rollin Mckinlay, Danny causey Printice Hall of India, 2007.

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C406E4.1	2	1	1	2	-	3	-	-	-	2	-	-	2	-	2
C406E4.2	2	1	1	2	1	-	-	-	1	-	2	-	2	1	1
C406E4.3	2	1	1	2	1	2	-	-	-	-	-	1	2	1	1
C406E4.4	2	1	1	-	-	1	1	1	-	-	-	-	1	-	1
C406E4.5	2	1	1	1	-	-	1	1	1	-	-	1	1	1	1
C406E4	2	1	1	1	-	1	-	-	-	-	-	-	2	1	2

Content Beyond Syllabus Added(CBS)	POs	Unit
Programming of ARM processor using KEIL	PO4(2), PO9(2), PO12(2), PSO2(2) (strengthened)	V

K.L.N. College of Engineering

Department of Electrical and Electronics Engineering

EE6701–High Voltage Engineering- **[C401]**

Questions/Tutorials/Assignments/Self study /Seminar topics.

S.No.	**1. Questions.**	COs	POs
Q1.1	Explain briefly about power frequency over voltages in power systems.	1	1.2,4
Q1.2	Discuss the mechanism of lightning strokes including high over voltages on transmission lines.	1	1.2,4
Q1.3	Discuss about cloud and charge formation with the aid of various theories	1	1,2,6
Q1.4	Examine the behavior of travelling waves at open circuited transmission line.	1	1.2,4
Q1.5	What is corona? Explain the consequences of corona and how it can be mitigated	1	1,2,6
Q2.1	Explain in detail the breakdown mechanism in non-uniform fields and phenomenon ofCorona discharge.	2	1.2,4
Q2.2	Describe the ageing and breakdown in composite dielectrics due to partial discharge and the thermal breakdown mechanism of solid dielectrics.	2	1.2,4
Q2.3	Explain composite dielectric and how breakdown occur in it.	2	1,2,6

Q2.4	Explain various process which involved in electric breakdown in vaccum.	2	1.2,4
Q2.5	Discuss briefly about various theories that explain the breakdown mechanism in liquid dielectrics.	2	1.2,4
Q3.1	What is Tesla Coil? How are damped high frequency oscillations obtained from it and explain in detail about Electrostatic generators.	3	1,2,6
Q3.2	Explain tripping and control of impulse generators with Trigatron gap arrangements.	3	1,2,6
Q3.3	Explain generation of high DC voltages using Vande Graff generators with neat diagram.	3	1.2,4
Q3.4	Explain different scheme of cascade connection of transformer for producing very high AC voltages.	3	1,2,6
Q3.5	How the impulse current is generated using capacitor bank. Explain in detail.	3	1.2,4
Q3.6	Explain the operation of simple voltage doubler circuit.	3	1.2,4
Q4.1	Describe the generating voltmeter method for measuring high DC voltages and state its merits and demerits.	4	1,2,6
Q4.2	Explain the working principle and operation of electrostatic voltmeter.	4	1,2,6
Q4.3	Explain the sphere gap arrangement method of high voltage measurements and give the factors influencing the measurement with neat diagram.	4	1.2,4
Q4.4	What are the different types of resistive shunts used for impulse current measurements.	4	1.2,4
Q4.5	What is CVT? Explain how a tuned capacitance voltage transformer can be used for voltage measurement in power system.	4	1,2,6
Q5.1	What are the tests conducted on isolators and circuit breakers explain in detail?	5	1,2,6
Q5.2	Explain the power frequency and impulse voltage test conducted on bushings.	5	1.2,4
Q5.3	How are the protective device chosen for optimal insulation level in a power system?	5	1.2,4
Q5.4	Explain the following (i) Flashover voltage **(ii)** Withstand voltage **(iii)** Impulse voltage **(iv)** Creep age voltage	5	1.2,4
Q5.5	Explain about the testing of transformer.	5	1,2,6
	2. Assignment Questions.		
A2.1	Discuss about the streamer or 'Kanal' mechanism in gaseous dielectric.	C02	1,2,4
A2.2	List out the electrical problems caused by the corona discharge.	CO2	1,2,6
A2.3	Mention the properties of good dielectric material.	CO2	1,2,4
A2.4	Briefly explain the surge voltages, their distribution and control in the power system equipments.	CO2	1,2,4
A2.5	Elaborate the effect of electron attachment on the breakdown criteria.	CO2	1,2,4
A2.6	Discuss the various factor which affect breakdown of gases.	CO2	1,2,6
A3.1	What is the need for generation of high voltages?	CO3	1,2,4
A3.2	Discuss about the generation of high voltage using series resonant circuit.	CO3	1,2,6
A3.3	With neat diagram explain the principle of generation of high frequency AC high voltage.	CO3	1,2,6
A3.4	How do we rectify the difficulties in single stage impulse generator?	CO3	1,2,4
A3.5	Give short notes about tripping and control of impulse generator.	CO3	1,2,4
A4.1	Explain about Faradays generator (or) magneto optic method based current generation.	CO4	1,2,6
A4.2	Mention the methods to find out the peak value and RMS value of the voltage.	CO4	1,2,6
A4.3	Draw the block diagram of High voltage measuring system and also mention the function of each block.	CO4	1,2,4

A4.4	What is meant by “rogowski Coil”?	CO4	1,2,4
A4.5	Explain about Potential divider method for impulse voltage measurements.	CO4	1,2,6

K.L.N. College of Engineering
Department of Electrical and Electronics Engineering
EE6702- Protection And Switchgear [C402]
Important Questions/Tutorials/Assignments/Self study /Seminar topics.

1.Course outcomes

Course	Course outcomes	POs
C402.1	Summarize the causes and effects of faults in power system and explain the necessity of protection in power system.	1,2,3,6,7
C402.2	Describe the operation of electromagnetic relays and draw their characteristic curves.	1,2,3,6,7
C402.3	List out the various faults that can occur on alternator, transformer, busbar and transmission line and select the suitable protection schemes.	1,2,3,6,7
C402.4	Synthesize the static relays using comparators and explain numerical relays.	1,2,3,6,7
C402.5	Derive the expression for RRRV, critical resistance value and compare the various types of circuit breakers.	1,2,3,6,7

2. Mapping of Course Outcomes (COs) , Course (C), Program Specific Outcomes (PSOs) with Program Outcomes. (POs) – before CBS[Levels of correlation:3(High),2(Medium),1(low)

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO 7	PO 8	PO9	PO1 0	PO1 1	PO 12	PS O1	PSO 2	PSO 3
C402.1	3	2	1	-	-	1	1	-	-	-	-	-	2	-	1
C402.2	3	2	1	-	-	1	1	-	-	-	-	-	2	-	1
C402.3	3	2	1	-	-	1	1	-	-	-	-	-	2	-	1
C402.4	3	2	1	-	-	1	1	-	-	-	-	-	2	-	1
C402.5	3	2	1	-	-	1	1	-	-	-	-	-	2	-	1
C402	3	2	1	-	-	1	1	-	-	-	-	-	2	-	1

3.PROGRAM OUTCOMES (POs)

Electrical and Electronics Engineering Graduates will be able to:

PO1: Engineering knowledge:
Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem analysis:
Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

S.No.	4. Important Questions	COs	POs
Q.1.1.	(i) Explain the nature and causes of faults. Discuss the consequences of faults on power system. (ii) Classify the different types of faults in power system. Which of these is more frequent?	C402.1	1,2,3,6,7
Q.1.2.	Explain different types of earthing of neutral point of the power system. Derive an expression for the reactance of the Peterson coil in terms of capacitance of the protected line.	C402.1	1,2,3,6,7
Q.1.3	Derive the three phase power in terms of symmetrical components	C402.1	1,2,3,6,7
Q.1.4	Describe are the essential qualities of a protective relay?	C402.1	1,2,3,6,7
Q.1.5	Explain the importance of protective schemes employed in power system	C402.1	1,2,3,6,7
Q.1.6.	(i) Discuss about the various zones of protection used for a modern power system. (ii) Explain the overlapping of protective zones with neat sketch	C402.1	1,2,3,6,7
Q.1.7.	Discuss the role of back up protection and explain how the backup protection is achieved in graded time over current protection of transmission lines	C402.1	1,2,3,6,7
Q.1.8.	(i) Illustrate the protective zones in the generating station with a neat diagram. (ii) A short circuit to earth occurs near the terminals of phase A of a 3 phase alternator, star connected with neutral point earthed and the current to the earth being 100Amps. If the alternator is not supplying any normal current, calculate the positive, negative and zero sequence components of currents of all phases. Ans: Positive and negative sequence currents are zero. Zero sequence current = (100/3) = 33.33 Amps.	C402.1	1,2,3,6,7
Q.2.1.	What are the different types of electromagnetic relays? Discuss their field of applications.	C402.2	1,2,3,6,7
Q.2.2	What are the various types of over current relays? Discuss their area of application.	C402.2	1,2,3,6,7
Q.2.3.	Describe the operating principle, constructional features and area of applications of reverse power or directional relay.	C402.2	1,2,3,6,7
Q.2.4.	Describe the construction and principle of operation of an induction type directional over current relay.	C402.2	1,2,3,6,7
Q.2.5	Explain the working principle of distance relays.	C402.2	1,2,3,6,7
Q.2.6	Write a detailed note on differential relays.	C402.2	1,2,3,6,7
Q.2.7.	Where negative sequence relay is used? Explain in detail about negative sequence relay	C402.2	1,2,3,6,7
Q.2.8.	Discuss in what ways is distance protection superior to over current protection for protection of transmission lines. How impedances relay are used in three zones of protection?	C402.2	1,2,3,6,7
Q.2.9	Derive the universal torque equation of the protective relay.	C402.2	1,2,3,6,7
Q.2.10 .	State the cause for under frequency relay and enumerate under frequency relay	C402.2	1,2,3,6,7
Q.3.1	Discuss the types of fault encountered in a transformer.	C402.3	1,2,3,6,7
Q.3.2	Explain in detail about the stator and rotor protection schemes used in generator.	C402.3	1,2,3,6,7
Q.3.3	Describe the differential protection scheme of transformer.	C402.3	1,2,3,6,7
Q.3.4.	With neat sketches, explain the different types of protective schemes for transmission lines.	C402.3	1,2,3,6,7
Q.3.5.	Enumerate the differential protection scheme and earth leakage protection of busbar	C402.3	1,2,3,6,7
Q.3.6	Explain about stator inter turn protection scheme for alternators	C402.3	1,2,3,6,7
Q.3.7.	A 3 phase 11/6.6 KV star/delta transformer is protected by means of differential protection system. If the CTs on LV side have the ratio of 600/5 A., Determine the ratio of CTs on HV side.	C402.3	1,2,3,6,7
Q.3.8	With neat block diagram explain the concepts of carrier current protection.	C402.3	1,2,3,6,7
Q.3.9.	(i) Explain the balanced earth fault protection of alternators (ii) Discuss the protection of alternator against loss of excitation	C402.3	1,2,3,6,7
Q.3.10	Describe the protection scheme for induction motor	C402.3	1,2,3,6,7
Q.3.11	Enumerate the three stepped protection of transmission line and compare with carrier current protection	C402.3	1,2,3,6,7
Q.4.1.	What is a static relay and what is the basis for its development? In what way has it been successful in replacing the conventional electromagnetic relays?	C402.4	1,2,3,6,7

Q.4.2.	Name different types of static relays. Discuss the advantages and disadvantages of static relays as protective devices.	C402.4	1,2,3,6,7
Q.4.3.	Describe different types of static amplitude comparators. Discuss their relative advantages and disadvantages.	C402.4	1,2,3,6,7
Q.4.4.	What are the different types of phase comparator? Describe the coincidence type of phase comparator.	C402.4	1,2,3,6,7
Q.4.5	Explain synthesis of various relays using Static comparators.	C402.4	1,2,3,6,7
Q.4.6	Explain Over current and Distant protection of transmission lines.	C402.4	1,2,3,6,7
Q.4.7	Describe in detail about Transformer differential protection of transmission lines.	C402.4	1,2,3,6,7
Q.5.1.	(a) In a 132KV system the reactance per phase up to the location of the circuit breaker is 6Ω and capacitance to earth is 0.02μF. calculate (i) Maximum value of restriking voltage, (ii) Maximum value of RRRV and (iii) The frequency of the transient oscillation. (b) Derive the expression for restriking voltage and rate of rise of recovery voltage.	C402.5	1,2,3,6,7
Q.5.2.	(i)Enumerate briefly on (a) Current chopping (b) Interruption of capacitive current (c) Resistance switching (ii)Describe the operating principle of DC circuit breaker.	C402.5	1,2,3,6,7
Q.5.3.	Explain the physics of arc phenomena. On what factor does the arc phenomenon depends? Explain the operation of zero crossing in circuit breaker.	C402.5	1,2,3,6,7
Q.5.4.	A 3-ph, 50Hz, alternator with grounded neutral has inductance of 1.6 mH per phase and is connected to bus bar through a circuit breaker. The capacitance to earth between the alternator and circuit breaker is 0.0003 μF per phase. The CB opens when rms value of current is 7500 A. Determine Maximum rate of rise of restriking voltage, time for maximum RRRV and frequency of oscillations.	C402.5	1,2,3,6,7
Q.5.5.	With neat sketches, explain the construction and operating principle of air break and minimum oil circuit breaker.	C402.5	1,2,3,6,7
Q.5.6.	(a)Compare the performance, characteristics and application of different types of circuit breakers. (b)Describe the various testing procedures of circuit breaker.	C402.5	1,2,3,6,7
Q.5.7.	With the help of neat block diagram, explain the construction, operating principle and advantages of SF6 circuit breaker and Vacuum circuit breaker .	C402.5	1,2,3,6,7
Q.5.8.	Describe with a neat sketch of air blast circuit breaker, its principle of operation and limitations.	C402.5	1,2,3,6,7
Q.5.9.	A three phase circuit breaker is rated at 1250A, 2000MVA,33KV,4Sec. find the rated symmetrical breaking current, making current and short time rating.	C402.5	1,2,3,6,7
A1.1	Determine the symmetrical components of three voltages. Magnitudes of Va = 200V ∟0o , Vb = 200V ∟245o , Vc = 200V ∟105o	C402.1	1,2,3,6,7
A1.2	A 30MVA , 13.8KV generator with neutral grounded through a 1-ohm resistance, has a three-phase fault MVA of 200MVA. Calculate the fault current and the terminal voltages for a single line-to-ground fault at one of the terminals of the generator. The negative and zero sequence reactances of the machine are 0.10pu and 0.05pu respectively. Neglect pre-fault current, and losses. Assume the pre-fault generated voltage at the rated value. The fault is of dead short-circuit type.[Ans: Ia = 6747A]	C402.1	1,2,3,6,7
A1.3	A 50 Hz overhead line has line to ground capacitance of 1.2 μF. It is decided to use a ground-fault neutralizer. Determine the reactance to neutralize capacitance of (i) 100% of the length of the line (ii) 95% of the length of the line (iii) 80% of the length of the line Ans: [(i) 884.6Ω ; (ii) 931.2Ω ; (iii) 1105.8Ω]	C402.2	1,2,3,6,7
A3.1	A 11KV, 100 MVA generator is grounded through a resistance of 5 ohms. The CTs have a ratio of 1000/5. The relay is set to operate when there is an out of balance current of 1 Amp.	C402.3	1,2,3,6,7
A3.2	A 11 KV, 100 MVA alternator is provided with differential protection. The percentage winding to be protected against phase to ground fault is 85 %. The relay is set to operate when there is 20% out of balance current. Determine the value of resistance to be placed in the neural to ground connection.[Ans. 0.91 ohms]	C402.3	1,2,3,6,7

A5.1	In a 132KV system the reactance per phase up to the location of the circuit breaker is 5Ω and capacitance to earth is 0.03μF. calculate A. maximum value of restriking voltage B. Maximum value of RRRV C. The frequency of the transient oscillation. [Ans: A. 216 KV, B. 4.94 KV/micro sec, C. 729 Hz].	C402.5	1,2,3,6,7
A5.2	The short circuit current of a 132 KV system is 8000 Amps. The current chopping occurs at 2.5 % of peak value of the current. Calculate the prospective voltage. The value of stray capacitance to the earth is 100 pf. [Ans. 4.9 MV].	C402.5	1,2,3,6,7

K.L.N. College of Engineering

Department of Electrical and Electronics Engineering

EE6703- SPECIAL ELECTRICAL MACHINES [C403]

Important Questions /Assignments/Self study /Seminar topics.

VII / EEE /A, B & C / 2016-17 (ODD)

1. Course outcomes

Course	Course outcomes	POs
C403.1	Explain the necessity to improve the saliency of synchronous reluctance motor and its characteristics	1,2,5
C403.2	Compare the various methods of excitation of different types of stepper motor and its driver circuits	1,2,5
C403.3	Describe the operation of switched reluctance motor with and without sensors	1,2,5
C403.4	Explain the electronic commutation of permanent magnet brushless D.C. motor and to develop the torque	1,2,5
C403.5	Derive the expression for emf and torque of permanent magnet synchronous motor and discuss power controller for permanent magnet synchronous motors.	1,2,5

2. Mapping of Course Outcomes (COs) , Course (C), Program Specific Outcomes (PSOs) with Program Outcomes. (POs) – before CBS[Levels of correlation:3(High),2(Medium),1(low)

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C403.1	3	2	-	-	1	-	-	-	-	-	-	-	1	-	-
C403.2	3	2	-	-	1	-	-	-	-	-	-	-	1	-	-
C403.3	3	2	-	-	1	-	-	-	-	-	-	-	1	-	-
C403.4	3	2	-	-	1	-	-	-	-	-	-	-	1	-	-
C403.5	3	2	-	-	1	-	-	-	-	-	-	-	1	-	-
C403	3	2	-	-	1	-	-	-	-	-	-	-	1	-	-

3. PROGRAM OUTCOMES (POs)

Electrical and Electronics Engineering Graduates will be able to:

PO1: Engineering knowledge:

Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem analysis:

Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations

S.No.	**4. Important Questions**	COs	POs
Q.1.1.	Draw and explain a typical Torque-speed Characteristics of Synchronous Reluctance Motor.	C403.1	1,2,5
Q.1.2.	Derive an expression for Reluctance torque of Sy.RM	C403.1	1,2,5
Q.1.3.	Compare Reluctance Motor with Induction Motor and Synchronous motor	C403.1	1,2,5

Q.1.4.	A 3Φ,230 Volts,60 HZ,4 pole Star Connected Reluctance Motor has Xd=22.5Ω and Xq=3.5Ω.The Armature Resistance is negligible. The Load torque is TL=12.5Nm.The Voltage to Frequency ratio is Maintained constant at the rated value. If the Supply frequency is 60 HZ. Determine i) The Torque Angle δ ii) The Line current iii)The Input Power Factor	C403.1	1,2
Q.1.5.	Explain the construction and working principle of axial and radial type Sy.RM	C403.1	1,2,5
Q.1.6.	What is saliency ratio of Sy.RM and how it can be improved?	C403.1	1,2,5
Q.1.7.	Explain the working of Vernier Motor with a neat Diagram.	C403.1	1,2,5
Q.2.1.	Explain the Construction and working principles of single stack VR Stepper Motor with a neat Diagrams	C403.2	1,2,5
Q.2.2.	Explain the Various Modes of Excitation in Stepper Motors	C403.2	1,2,5
Q.2.3.	Explain the working principles of Hybrid Motor with a neat Diagram	C403.2	1,2,5
Q.2.4.	Draw and explain the Characteristics of Stepper Motor	C403.2	1,2,5
Q.2.5.	Write short notes on Drive Circuits of Stepping Motors	C403.2	1,2,5
Q.2.6.	A stepper motor has a step angle of 2.5,Determine, i)Resolution. ii)Number of steps per shaft to make 25 revolutions iii)Shaft speed if Starting stepping frequency is 3600pulse/sec.	C403.2	1,2
Q.2.7.	Explain the Construction and working principles of multi stack VR Stepper Motor with a neat Diagrams	C403.2	1,2,5
Q.2.8.	Write short notes on micro stepping	C403.2	1,2,5
Q.2.9.	What is Stepping Motor? Calculate the Stepping Angle For a 3 Φ, 24 pole Stepper Motor.	C403.2	1,2,5
Q.2.10.	Compare holding torque and detent torque	C403.2	1,2,5
Q.2.11	Derive the torque equation of stepper motor	C403.2	
Q.3.1.	Explain the working principle of SRM.	C403.3	1,2,5
Q.3.2.	Explain why rotor position sensor is essential for the operation of SRM.	C403.3	1,2,5
Q.3.3.	Describe the various power controller circuits applicable to switched reluctance motor and also explain any one scheme operation with neat diagrams	C403.3	1,2,5
Q.3.4.	Sketch the general speed-torque curve of SR motor and discuss the type of control strategy used for different regions of the curve. Sketch the typical phase current waveforms of low speed operation	C403.3	1,2,5
Q.3.5.	Describe the hysteresis type and PWM type current regulator for one phase of a SRM	C403.3	1,2,5
Q.3.6.	Explain the various duty cycle schemes for a phase of three SR motor and its operation with phase current waveforms	C403.3	1,2,5
Q.3.7.	Discuss in detail about microprocessor based control of SRM	C403.3	1,2,5
Q.3.8.	Derive the torque equation of switched reluctance motor	C403.3	1,2,5
Q.4.1.	Discuss in detail about the operation of an electronic commutator.	C403.4	1,2,5
Q.4.2.	Discuss the use of Hall sensors for position sensing in PMBLDC motors	C403.4	1,2,5
Q.4.3.	Derive emf equation of BLPM SQW DC Motors	C403.4	1,2,5
Q.4.4.	Explain the Construction and working principles of PMBLDC motors	C403.4	1,2,5
Q.4.5.	Explain the speed-torque characteristics of PMBLDC motors	C403.4	1,2,5
Q.5.1.	Discus self control model of PM synchronous motor with revelent diagram	C403.5	1,2,5
Q.5.2.	Explain in detail the vector control of permanent magnet synchronous motor.	C403.5	1,2,5
Q.5.3.	Draw its phasor diagram of PMSM and derive its torque equation	C403.5	1,2,5
Q.5.4.	Explain the principle of operation of a sine wave PM synchronous machine in detail	C403.5	1,2,5
Q.5.5.	Draw and explain Speed torque Characteristic of PMSynchronous Motor	C403.5	1,2,5
Q.5.6.	A three phase, four pole, brushless PM rotor has 36 stator slots. Each phase winding is made up of three coils per pole with 20 turns per coil. The coil span is seven slots. If the fundamental component of magnet flux is 1.8 Mwb. Calculate the open circuit phase emf (Eq) at 3000 rpm	C403.5	1,2
Q.5.7.	Explain the function of power controllers for PMSM	C403.5	1,2,5

A1.1	A three phase, 230V, 60Hz, 4 pole, star connected reluctance motor has X_{sd} = 22.5 ohm and Xsq = 3.5 ohm. The armature resistance is negligible. The load torque is T_L = 12.5 N-m. The voltage to frequency ratio is maintained constant at rated value. If the supply frequency is 60Hz, determine (a) torque angle, (b) the line current (c) the input power factor	C403.1	1,2
A1.2	Derive the torque equation of synchronous reluctance motor and Draw the phasor diagram	C403.1	1,2,5
A1.3	Compare the constructional features of axial and radial gap synchronous reluctance motor	C403.1	1,2,5
A1.4	Explain in detail about classification of synchronous reluctance motor rotor construction	C403.1	
A2.1	A VR Stepper Motor has 8 poles in the stator and they have five teeth in each pole. If the rotor has 50 teeth, calculate the step angle and resolution	C403.2	1,2
A2.2	A stepper motor has a step angle of 2.5, find (a) Resolution (b) Number of steps required for the shaft to make 25 revolutions (c) Shaft speed if stepping frequency is 3600 pulse/sec	C403.2	1,2
A2.3	Explain in detail about different types of power drive circuits for stepper Motor	C403.2	1,2,5
A3.1	What is the flux linkages, the aligned positon La=10.7 mH unaligned position Lu=1.5mh When the phase current is 7A?.If the flux linkages is maintained constant while the rotor rotates from unaligned position to aligned position at low speed. Determine the energy conversion per stroke and average torque.	C403.3	1,2
A3.2	Describe the Hysteresis type and PWM type current regulator for one phase of a Switched Reluctance Motor with relevant circuit diagram.	C403.3	1,2,5
A3.3	With neat diagram, explain the microprocessor based control of Switched Reluctance Motor	C403.3	1,2,5
A3.4	Explain shaft position sensing of Switched Reluctance Motor	C403.3	1,2,5
A3.5	Explain the speed-torque characteristics of Switched Reluctance Motor	C403.3	
A4.1	A BLPM motor has a no load speed of 6000 rpm when connected to 120V dc supply. The armature resistance is 2.5 ohm. Rotational and iron losses may be neglected. Determine the speed when the supply voltage is 60V and the torque is 0.5 Nm. No load speed when the supply voltage is 120V is 6000 rpm	C403.4	1,2
A4.2	Draw IGBT based inverter circuit for delta connected PMBLDC Motor and sketch the firing sequence and phase current waveform for 120^0 mode	C403.4	1,2,5
A4.3	Derive the Torque and EMF equations of PMBLDC Motor	C403.4	1,2,5
A4.4	Describe the operation of power controllers for PMBLDC Motor with neat diagram.	C403.4	1,2,5

K.L.N. College of Engineering

Department of Electrical and Electronics Engineering

MG6851 –Principles of Management **[C404]**

Questions/ Tutorials/Assignments/Self study /Seminar topics.

S.No.	**1. Questions.**	COs	POs
Q.1.1.	Explain about Manager Vs Entrepreneur	C404.1	04,06,07
Q.1.2.	Describe the various managerial roles and skills	C404.1	09
Q.1.3.	Explain the various management approaches with examples by the various authors	C404.1	11
Q.1.4.	Describe various types of Business organization	C404.1	12
Q.1.5.	How the Sole proprietorship, partnership are differing	C404.1	04,06,07
Q.1.6.	Compare public and private sector enterprises in details	C404.1	09
Q.1.7.	How the Organization culture affects the business	C404.1	11
Q.1.8.	Brief about the Environment in business	C404.1	12

Q.1.9.	Describe Current trends in management	C404.1	04,06,07
Q.1.10.	How can you give the solution for various issues in Management, explain with examples.	C404.1	09
Q.2.1.	Describe Planning process	C404.2	11
Q2.2.	Explain the Types of Plans with examples	C404.2	12
Q.2.3.	How Objectives are affecting the business and explain -Managing by objectives (MBO)	C404.2	04,06,07
Q2.4.	Why the strategies are important and discus about various types of strategies	C404.2	09
Q.2.5.	Explain how a Decision Making process in a organization	C404.2	11
Q.2.6.	Describe Rational Decision Making with examples	C404.2	12
Q2.7.	Explain and compare Production and Productivity	C404.2	04,06,07
Q.2.8.	Explain with example for decision Making under different conditions	C404.2	09
Q.3.1.	What is the need for organizing	C404.3	11
Q.3.2.	Explain Nature and purpose of organizing	C404.3	12
Q.3.3.	Why Organization structure varies company to company	C404.3	04,06,07
Q.3.4.	How groups are formed and compare Formal and informal groups	C404.3	09
Q.3.5.	Explain Line authority	C404.3	11
Q.3.6.	Describe Staff authority	C404.3	12
Q.3.7.	How the Departmentation carried our in an organisation and explain Span of control Centralization and Decentralization	C404.3	04,06,07
Q.3.8.	How to Delegate the authority and explain Selection and Recruitment – Orientation process	C404.3	09
Q.3.9.	How Career Development makes the organisation development s	C404.3	11
Q.3.10.	Describe Training	C404.3	12
Q.3.11.	Describe how Performance Appraisal are done in an organisation	C404.3	04,06,07
Q.4.1.	Describe how to Motivate the employees	C404.4	09
Q.4.3.	Why job Satisfaction are needed and explain the ways of making the employees satisfaction.	C404.4	11
Q.4.4.	Explain the various theories of motivation	C404.4	12
Q.4.5.	Describe how Motivation Theories are implemented in an organisation	C404.4	04,06,07
Q.4.6.	Why Leadership Styles are differ from others.	C404.4	09
Q.4.7.	Explain various Leadership theories	C404.4	11
Q.4.8.	What is Communication and Barriers to effective communication	C404.4	12
Q.4.9.	What is Organization Culture	C404.4	04,06,07
Q.5.1.	Explain the Process of controlling	C404.5	09
Q5.2.	Explain Types of control	C404.5	11
Q.5.3.	Describe the Budgetary and non-budgetary control techniques	C404.5	12
Q.5.4.	How to Manage the Productivity in an organization	C404.5	04,06,07
Q.5.5.	Why Cost Control is needed	C404.5	09
Q.5.6.	What are the ways that Purchase Control can be implemented in an organization	C404.5	11
Q.5.7.	How Maintenance Control helps the employees to work effectively	C404.5	12
Q.5.8.	Describe about Quality Control	C404.5	04,06,07
Q.5.9.	Define Planning operations	C404.5	09
Q.5.10.	What are the importance of electronics media in management process	C404.5	11
	2. Assignment.		
A.1.1.	Explain over view of Management	C404.1	04,06,07
A.2.2.	Explain Evolution of nature and purpose of planning for a industry explain with example.	C404.2	09
A.3.3.	Explain about organisation and its structure and explain with your own examples.	C404.3	11
A.4.4.	Find out any one Business organization of your own and explain the processes of management	C404.4	12
A.5.5.	What are all the new technology implemented use of Management.	C404.5	04,06,07
	3. Self Study topics.		09
ST1.1	Explain the Global Management methods and how it affects other countries	C404.1	11
ST2.1	Describe and develop a plan for constructing a cement industry	C404.2	12

ST3.1	Explain Organisation structure about a hospitals	C404.3	04,06,07
ST4.1	How a Government in a country managing and explain the strategies	C404.4	09
ST5.1	Explain with example Application of POM in engineering	C404.5	11

K.L.N. COLLEGE OF ENGINEERING

Department of Electrical and Electronics Engineering

EE6005 –POWER QUALITY [C405E4]

Important Questions/Tutorials/Assignments/Self study /Seminar topics.

1. Course outcomes

Course	Course outcomes	POs
C405E4.1	Discuss the various types of power quality problem	1,2,3,5,6,8,10,11
C405E4.2	Analyze the sources ,types and mitigation of voltage sag problem	1,2,3,5,6,8,10,11
C405E4.3	Analyze the sources ,types and mitigation of over voltage issues and model of over voltage problem with computer software tools.	1,2,3,5,6,8,10,11
C405E4.4	Evaluate the effects of harmonics on power system equipments and analyze the methods of controlling of harmonics.	1,2,3,5,6,8,10,11
C405E4.5	Explain the principle of operation of various types of power quality monitoring devices.	1,2,3,5,6,8,10,11

2. Mapping of Course Outcomes (COs) , Course (C), Program Specific Outcomes (PSOs) with Program Outcomes. (POs) – before CBS[Levels of correlation:3(High),2(Medium),1(low).

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C405E4.1	2	1	1	-	1	2	-	2	-	3	1	-	1	-	2
C405E4.2	3	3	1	-	2	3	-	3	-	2	1	-	2	1	2
C405E4.3	3	3	3	-	3	3	-	3	-	2	1	-	2	1	2
C405E4.4	3	3	3	-	3	3	-	3	-	2	1	-	2	1	2
C405E4.5	2	1	1	-	3	2	-	3	-	3	1	-	1	1	2
C405E4	**3**	**2**	**2**	**-**	**2**	**3**	**-**	**3**	**-**	**2**	**1**	**-**	**2**	**1**	**2**

3. PROGRAM OUTCOMES (POs)

Electrical and Electronics Engineering Graduates will be able to:

PO1: Engineering knowledge:

Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem analysis:

Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/development of solutions:

Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO5: Modern tool usage:

Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: The engineer and society:

Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO8: Ethics:

Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO10: Communication:

Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project management and finance:

Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

S.No.	**4. Important Questions.**	COs	POs
Q.1.1.	Define power quality. What are the major power quality issues and explain them.	C405E4.1	1
Q.1.2.	Identify the sources and analyze the impacts of power quality on power system.	C405E4.1	1,2
Q.1.3	Discuss in detail about sags and swells.	C405E4.1	1
Q.1.4	Discuss in detail about transients.	C405E4.1	1
Q.1.5.	Define waveform distortion and explain the waveform distortion categories.	C405E4.1	1
Q.1.6	Explain total harmonic distortion and total demand distortion.	C405E4.1	1
Q.1.7.	Discuss about the CBEMA curves and explain the events described in the curve.	C405E4.1	1,2,6,8,10
Q.1.8.	With a waveform sketch, explain the terms. Voltage sag, Voltage interruption, Voltage swells and Sag with harmonics.	C405E4.1	1
Q.2.1.	When sag leads to interruption. What are the three levels of possible solutions to voltage sag and momentary interruption problems?	C405E4.2	1,2
Q2.2.	Discuss the sources of sags and interruption.	C405E4.2	1
Q.2.3	Discuss in detail about the sag performance evaluation indices.	C405E4.2	1
Q2.4.	Explain the sag performance evaluation methods.	C405E4.2	1,2,3
Q.2.5	Explain the various causes and effects of voltage sags.	C405E4.2	1
Q.2.6.	What are the different voltage sag mitigation techniques? Explain in detail.	C405E4.2	1,2,3
Q2.7.	Discuss in detail about the active series compensator.	C405E4.2	1
Q2.8.	Explain the solid state transfer switch with the transfer operation.	C405E4.2	1,2
Q2.9.	Explain the system adapted to estimate the severity of the sag occurred due to various sources.	C405E4.2	1,2
Q2.10.	Mention the standards associated with the voltage sag.	C405E4.2	1,2,6,8
Q2.11.	Analyze and calculate the various types of fault condition in power system	C405E4.2	1,2,3,5,10
Q.3.1.	What are transient over voltages? Explain the different types of transient over voltages.	C405E4.3	1
Q.3.2.	What are the different sources of transient over voltages? Discuss the Capacitor switching transient.	C405E4.3	1,2
Q.3.3.	Define lightning? Discuss in detail about the over voltages due to lightning and the problems associated with it.	C405E4.3	1,2
Q.3.4.	Draw the standardized waveform of the lightning induced voltage. Discuss about the wave shape of the lightning current.	C405E4.3	1,2
Q.3.5.	Explain the phenomena of ferro-resonance. Analyze the problems associated with ferro-resonance.	C405E4.3	1,2,3
Q.3.6.	What is the need for protection against over voltages? What are the basic principles of over voltages protection of load equipments?	C405E4.3	1,3
Q.3.7.	Explain in detail about various methods to mitigate voltage swells	C405E4.3	1,2
Q.3.8.	Explain in detail about the surge arrestors and surge suppressors. What are the advantages of surge arrestors?	C405E4.3	
Q.3.9.	Explain the following: Low pass filters (b) Power conditioners (c) Surge filters	C405E4.3	1
Q.3.10.	What is the need of Computer analysis tools for transient studies? List the advantages of computer analysis tools for transient studies. What is the need of SCAD/EMTDC? Give any two analysis examples available in PSCAD/EMTDC?	C405E4.3	1,2,3,5
Q.4.1	Differentiate between linear loads and non-linear loads. Explain in detail about classification of linear loads and non linear loads used in harmonic studies.	C405E4.4	1,2

Q.4.2	Explain for the following terms (i) Harmonic distortion (ii) Current distortion (iii) Voltage distortion	C405E4.4	1
Q.4.3	What are the two important harmonic indices used in power system? Explain about it briefly.	C405E4.4	1
Q.4.4	Explain briefly about the phenomena of how current distortion affects the voltage distortion under the presence of harmonics.	C405E4.4	1,2
Q.4.5	Explain the harmonic effects on power system equipments briefly.	C405E4.4	1
Q.4.6	What are the various classifications of harmonic sources and explain briefly about it?	C405E4.4	1
Q.4.7	Mention the IEEE and IEC standards for harmonics and discuss in detail	C405E4.4	1,6,8,10
Q.4.8	What is the need of locating harmonic sources? What are the general causes of harmonics in power system?	C405E4.4	1
Q.5.1	Bring out the significance of power quality monitoring. What are the important power quality monitoring objectives?	C405E4.5	1,8,10
Q.5.2	Write notes on power line disturbance analyzer.	C405E4.5	1,5
Q.5.3	What are the various instruments used for power quality measurements? What are the factors to be considered when selecting the instruments?	C405E4.5	1,5
Q.5.4	Explain Harmonic/Spectrum analyzer.	C405E4.5	1,5
Q.5.5	Define voltage flicker. Discuss some of the flicker sources. Write notes on common methods for mitigation of flicker.	C405E4.5	1
Q.5.6	Discuss in detail about the flicker meter.	C405E4.5	1,5
Q.5.7	Draw and explain the functional structure of expert systems.	C405E4.5	1,5
Q.5.8	Explain the steps involved in power quality monitoring. What is the information from monitoring site surveys?	C405E4.5	1,2
Q.5.9	Model the problem of harmonics and solve using mathematical simulation tools	C405E4.5	1,2,3
	5. Assignments/Seminar/Self study topics.		
A.1	Describe the function of DVR and STATCOM with its advantages and disadvantages over other devices used to mitigate voltage sag. (4 pages-assignment)	C405E4.2	1,2,3
A.2	How utilities can deal with problems related to Capacitor-switching transients. [Ref: Page No.140-144,Roger C. Dugan]	C405E4.3	1,2,3
A.3	(a). Harmonic filter design-A case study [Ref: Page No.264-273 Roger C.Dugan] (b). Describe the ideal procedure for performing a power systems harmonics study. How can we model the harmonic sources? Describe the computer tools for analysis of harmonics.(Self study topic) [Ref: Page No.238-247 Roger C.Dugan]	C405E4.4	1,2,3,5
S.1	Assessment of Power Quality Measurement Data- Example applications of expert Systems- Industrial power quality monitoring applications- Power quality monitoring and the Internet- Power Quality Monitoring Standards	C405E4.5	1,2,3,5,6,10

K.L.N. College of Engineering, Pottapalayam.
Department of Electrical and Electronics Engineering
EE6008 –Microcontroller Based System Design
Important Questions/Assignments
Course outcomes

Course	Course outcomes	POs
C406E4.1	Describe the basic architecture of PIC16cxx and apply the instruction set for simple operations.	1,2,3,4,6
C406E4.2	Explain about the PIC micro controllers interrupts and write the interrupt programs	
C406E4.3	Apply the program to interface I/O devices with controller like LCD, Keyboard, and Sensors etc.,	
C406E4.4	Develop simple applications using ARM assembly language programs	
C406E4.5	Explain about ARM Organization and ARM Coprocessor interface	

2. Mapping of Course Outcomes (COs) ,Course (C), Program Specific Outcomes (PSOs) with Program Outcomes. (POs) – Before CBS[Levels of correlation:3(High),2(Medium),1(low)]

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C406E4.1	2	1	1	2	-	3	-	-	-	2	-	-	2	-	2
C406E4.2	2	1	1	2	1	-	-	-	1	-	2	-	2	1	1
C406E4.3	2	1	1	2	1	2	-	-	-	-	-	1	2	1	1
C406E4.4	2	1	1	-	-	1	1	1	-	-	-	-	1	-	1
C406E4.5	2	1	1	1	-	-	1	1	1	-	-	1	1	1	1
C406E4	2	1	1	1	-	1	-	-	-	-	-	-	2	1	2

3.PROGRAM OUTCOMES (POs)

Electrical and Electronics Engineering Graduates will be able to:

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Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem analysis:
Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions

PO6:The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health,safety,legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

S.No.	4. Important Questions	COs	POs
Q.1.1	Explain the block diagram of PIC microcontroller.	C406.1	1,3
Q.1.2	Draw the Pin configuration of 16C71 and explain the functions of each pin in brief.	C406.1	1,3
Q.1.3	Explain the structure of program memory in PIC microcontroller.	C406.1	1,2,3
Q.1.4	Discuss how instruction pipelining is implemented in PIC 16 microcontroller.	C406.1	1,2,4
Q.1.5	Explain the main features of PIC microcontrollers	C406.1	1,2,3
Q.1.6	What are the different addressing modes ?	C406.1	1
Q.1.7	Explain the various types of timers in PIC microcontroller. Differentiate betweenTimer1 and Timer2.	C406.1	1,3
Q.1.8	Explain the various CPU registers in PIC microcontroller.	C406.1	1,3
Q.2.1	Explain the PIC micro controller Interrupts	C406.2	1,3
Q.2.2	Explain the Timer operation of micro controller	C406.2	1

Q.2.3	Give short notes on state machine and key switches	C406.2	1
Q.2.4	Write the program to generate a 100µs positive – going pulse on the RC2/CCP1 pin.	C406.2	1,2
Q.2.5	Discuss in detail about Variable strings of PIC Microcontroller.	C406.2	1,3
Q.3.1	Write a detailed notes on I^2C bus.	C406.3	1,3
Q.3.2	Briefly explain the I^2C interfacing using PIC micro controller. Give the special function register involved & the corresponding wave form.	C406.3	1,3
Q.3.3	Write a short note on ADC interfacing in PIC micro controller with block diagram.	C406.3	1,3
Q.3.4	With neat block diagram Briefly explain the sensor interfacing using PIC micro controller	C406.3	1,3
Q.3.5	Explain the working of the UART in PIC micro controller with example.	C406.3	1,3
Q.3.6	Draw and explain the architecture of on chip ADC of PIC micro controller in detail and write a suitable assembly language program for configuring the ADC.	C406.3	1,3
Q.3.7	Discuss in detail about the following a.DAC b. Timers c. Interrupt	C406.3	1,3
Q.3.8	Explain how to interface LCD with micro controller with an assembly language program	C406.3	1
Q.3.9	Write a detailed note on the FLASH & EEPROM memories.	C406.3	1
Q.3.10	Draw the instruction pipeline and mention its significance	C406.3	1,3
Q.4.1	What are the advantages of writing in Assembly in ARM processor?	C406.4	1
Q.4.2	How will you flush the instruction Cache in ARM processor ?	C406.4	1
Q.4.3	What is called 'pipeline bubble' in ARM ?	C406.4	1
Q.4.4	How will you handle the Register Shortage problem in ARM ?	C406.4	1
Q.4.5	What are the types of addressing modes in ARM ?	C406.4	1,3
Q.4.6	Explain about 'Single Data Transfer' and 'Multiple Data Transfer' in ARM	C406.4	1,2
Q.4.7	What are the advantages of writing in Assembly in ARM processor?	C406.4	1,2
Q.5.1	Explain the 3-Stage Pipeline ARM Organization	C406.5	1,2
Q.5.2	Explain the 5-Stage Pipeline ARM Organization	C406.5	1,2
Q.5.3	Give some example for Embedded ARM Applications	C406.5	1
Q.5.4	Write a note on ARM Processor	C406.5	1,3
Q.5.5	With a neat diagram explain the model train controller	C406.5	1,3
Q.5.6	With examples explain various instruction sets in ARM	C406.5	1,3
Q.5.7	Write a note on CPU Programming input and output , Supervisor mode, exception and trap	C406.5	1,3
5. Assignments			
A.1.1	Point out the role of watch dog timer in PIC micro controller.	C406.1	1,3,5
A.1.2	Point out the role of I/O port of PIC	C406.1	1,3
A.1.3	Write one example for immediate & direct addressing mode in PIC micro controller	C406.1	1,2,3
A.2.1	Write a program to (a) get the data "hello, my fellow world citizens" from Program ROM ,(b)calculate the checksum byte ,and (c)test the checksum byte for any data Error	C406.2	1,2,3
A.2.2	Program Timer-1to be an event counter .Use 16 bit mode, and display the binary count on Port-B and Port-D continuously, set the initial count to 20000	C406.2	1,2,3,4
A.2.3	Write a program to get an 8 bit binary number from PORT-B, convert it to ASCII, and save the result if the input is packed BCD of 00-0x99.Assume that PORT-B has 10001001 binary as input.	C406.2	1,2,3,4
A.4.1	Describe the programming model of ARM processor.	C406.4	1,2,3
A.4.2	Describe the operations carried out by the different data processing instructions in ARM processor.	C406.4	1,2,3
A.4.3	Explain how memory is organized in ARM processor	C406.4	1,3

Reg. No. | | | | | | | | | | | | |

Question Paper Code : 51511

B.E/B. Tech. DEGREE EXAMINATION, MAY/JUNE 2016

Sixth Semester

Electrical and Electronics Engineering

EE 2353/EE 63/10133 EE 603 – HIGH VOLTAGE ENGINEERING

(Regulations 2008/2010)

(Common to PTEE 2353/10133 EE 603 – High Voltage Engineering for B.E. (Part-Time) Fifth Semester – Electrical and Electronics Engineering Regulations 2009/2010)

Time : Three Hours **Maximum : 100 Marks**

Answer ALL questions.

PART – A (10 × 2 = 20 Marks)

1. What are the causes for switching surges ?

2. What are the protective devices used to protect power system equipments against lightning ?

3. State Townsend's breakdown criterion.

4. Give the electrical properties that are essential in determining the dielectric performance of a liquid dielectric.

5. What is the need for HVDC generation ?

6. What is a 'Trigatron gap' ? What are its function ?

7. Draw the schematic diagram of a Generating voltmeter.

8. What are the advantages of digital techniques in high voltage measurements ?

9. Define 'Disruptive Discharge Voltage'.

10. Give the Indian Standard reference atmospheric conditions for high voltage testing.

PART – B (5 × 16 = 80 Marks)

11. (a) (i) Give the mathematical models for lightning discharges and explain them. **(8)**

(ii) What are the causes for power frequency over voltages ? How are they controlled in power systems ? **(8)**

OR

(b) A long transmission line is energized by a unit step voltage 1 V at the sending end and is open circuited at the receiving end. Construct the Bewley's lattice diagram and obtain the value of the voltage at the receiving end after a long time. Take the attenuation factor $\alpha = 0.8$. **(16)**

12. (a) (i) Explain the Streamer theory of breakdown in gases. **(8)**

(ii) Describe any two mechanisms of Vacuum breakdown. **(8)**

OR

(b) (i) Explain the various theories of breakdown in commercial liquid dielectrics. **(10)**

(ii) State and explain the properties of composite dielectrics. **(6)**

13. (a) Describe, with a neat diagram, the working principle of the following high voltage producing apparatus : **(10 + 6)**

(i) Van de Graaff generator

(ii) Resonant transformer

OR

(b) (i) An impulse generator has eight stages with each condenser rated for 0.16 μF and 125 kV. The load capacitor available is 1000 pF. Find the series resistance and the damping resistance needed to produce 1.2/50 μs impulse wave. What is the maximum output voltage of the generator, if the charging voltage is 120 kV ? **(12)**

(ii) What are the essential parts of an impulse current generator ? **(4)**

14. (a) Explain the principle and construction of an electrostatic voltmeter for very high voltages. What are its merits and demerits for high voltage AC measurements ? **(10 + 6)**

OR

(b) Draw the calibrated low ohmic shunt and its equivalent circuit for high impulse current measurements. Explain the different types of resistive shunts with their characteristics and limitations. **(4 + 12)**

15. (a) With neat diagram, explain the method of impulse testing of high voltage transformers. What is the procedure adopted for locating the failure ? **(10 + 6)**

OR

(b) What is meant by Insulation Coordination ? Explain how the protective devices are chosen for optimum insulation level in a power system. **(4 + 12)**

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 91448

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2014.

Sixth Semester

Electrical and Electronics Engineering

EE 2353/EE 63/10133 EE 603 — HIGH VOLTAGE ENGINEERING

(Regulation 2008/2010)

(Common to PTEE 2353/10133 EE 603 – High Voltage Engineering for B.E. (Part-Time) Fifth Semester – Electrical and Electronics Engineering – Regulation 2009/2010)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is Bewley Lattice Diagram?

2. State the causes of over voltage in power system.

3. What is time lag?

4. Define "Intrinsic strength" of a solid dielectric.

5. What are the advantages of cascaded transformer units for HVAC generation?

6. What is a trigatron gap?

7. What are the conditions to be satisfied by a potential divider for impulse work?

8. What is the significance of atmospheric correction factor in HV testing?

9. What is meant by insulation coordination?

10. Define "Creepage distance".

PART B — (5 × 16 = 80 marks)

11. (a) Define surge impedance of a line. Obtain the expression of reflection and transmission of travelling waves at transition points. (16)

Or

(b) A long transmission line is energized by a unit step voltage 1.0 V at the sending end and is open circuited at the receiving end. Construct the Bewley Lattice Diagram and obtain the value of the voltage at the receiving end after a long time. Take the attenuation factor $\alpha = 0.8$. (16)

12. (a) Derive the condition for breakdown in gaseous dielectric and hence obtain Paschen's law. Show the variations of sparking potential with (pd) values and explain for such variations. (16)

Or

(b) (i) Discuss the breakdown mechanism of composite dielectrics. (8)

(ii) Discuss the two important theories of breakdown in commercial liquids. (8)

13. (a) Explain the working principle of Cockroft-Walton voltage multiplier circuit. Derive an expression for total voltage drop and total ripple voltage of n-stage voltage multiplier circuit and hence deduce the condition for optimum number of stages. (16)

Or

(b) What is a tesla coil? Derive an expression for damped high frequency oscillations obtained from a tesla coil. Give its advantages. (16)

14. (a) (i) Explain how a sphere-gap can be used to measure the peak value of high voltage. (8)

(ii) Explain the parameters and factors that influence the sphere-gap in voltage measurements. (8)

Or

(b) (i) Explain Chubb-Fortescue circuit for measurement of peak values of alternating voltage. (8)

(ii) Explain with a neat diagram of Rogowski coil, the principle of operation for measurement of high impulse current. (8)

15. (a) Explain with a neat diagram of synthetic testing of circuit breakers. Why is synthetic testing advantages over direct method for short circuit test? (16)

Or

(b) What is meant by 50% disruptive discharge as applied to impulse voltage. Discuss the procedure of two important methods to obtain the same. (16)

Reg. No. | | | | | | | | | | | | |

Question Paper Code : 51516

B.E./ B.Tech. DEGREE EXAMINATION, MAY/JUNE 2016

Seventh Semester

Electrical and Electronics Engineering

EE 2402/EE 72/10133 EE 702 –PROTECTION AND SWITCHGEAR

(Regulations 2008/2010)

(Common to PTEE 2402/10133 EE 702 Protection and Switchgear for B.E (Part-Time) Sixth Semester Electrical and Electronics Engineering– Regulations 2009/2010)

Time : Three Hours **Maximum : 100 Marks**

Answer ALL questions.

PART – A (10 × 2 = 20 Marks)

1. What is the difference between a short circuit and an overload ?
2. Why earth wire is provided in overhead transmission lines ?
3. Write the effects of arc resistance.
4. List out the applications of static relays.
5. Can current transformers secondary winding be open circuited ? Justify your answer.
6. What are the various faults that would affect an alternator ?
7. What is meant by auto-reclosing ?
8. Write the function of isolating switch.
9. Give the difference between isolator and circuit breaker.
10. State the advantages of SF_6 circuit breaker.

PART – B (5 × 16 = 80 Marks)

11. (a) Explain different types of earthing the neutral point of the power system. Derive an expression for the reactance of the Peterson coil in terms of capacitance of the protected line.

OR

(b) (i) Explain the overlapping of protective zones with neat sketch. **(9)**

(ii) Classify the different faults in power system. Which of these are more frequents ? **(7)**

12. (a) Describe the operating principle, constructional features and area of applications of directional relay. How do you implement directional feature in the over current relay ? **(16)**

OR

(b) Explain MHO relay characteristic on the R-X diagram. Discuss the range setting of various distance relays placed on a particular location. **(16)**

13. (a) (i) Describe the differential protective scheme of transformer. **(8)**

(ii) Enumerate the protective scheme employed for the bus bar. **(8)**

OR

(b) With neat sketches, explain the different types of protective schemes for transmission lines. **(16)**

14. (a) (i) Derive the expression for restriking voltage. **(8)**

(ii) Explain about current zero interruption theories. **(8)**

OR

(b) Explain :

(i) Interruption of capacitive current **(8)**

(ii) Current chopping **(8)**

15. (a) Explain the construction, principle of operation of a minimum oil circuit breaker. What are its main advantages and disadvantages ? **(16)**

OR

(b) Briefly describe the testing of circuit breakers. **(16)**

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 21516

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015.

Seventh Semester

Electrical and Electronics Engineering

EE 2402/EE 72/10133 EE 702 — PROTECTION AND SWITCHGEAR

(Regulations 2008/2010)

(Common to PTEE 2402/10133 EE 702 Protection and Switchgear for B.E. (Part-Time) Sixth Semester Electrical and Electronics Engineering – Regulations 2009/2010)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is the difference between a short circuit and an overload?

2. Why earth wire is provided in overhead transmission lines?

3. In what way a distance relay is superior to over current protection for protection of transmission lines?

4. Where is negative phase sequence relay employed?

5. What are the short comings of differential protection scheme as applied to power transformer?

6. Give the examples for unit and non-unit systems of protection.

7. What is meant by making capacity of a circuit breaker?

8. Why current chopping is not common in oil circuit breakers?

9. How does a circuit breaker differ from as switch?

10. Name the materials used for contacts of vacuum circuit breakers.

PART B — (5 × 16 = 80 marks)

11. (a) Explain different types of earthing the neutral point of the power system. Derive an expression for the reactance of the Peterson coil in terms of capacitance of the Protected line.

Or

(b) (i) Explain the overlapping of protective zones with neat sketch. (9)

(ii) Classify the different faults in power system. Which of these are more frequent. (7)

12. (a) Explain the Principle of working of distance relays. Describe with neat sketches the following types of relays

(i) impedance relay.

(ii) Admittance relay

(iii) Reactance relay.

Or

(b) With neat diagram explain the construction and operation of induction type directional over current relay.

13. (a) Explain in detail the carrier current protection schema. Describe carrier phase comparison relay with neat sketches.

Or

(b) Why is the harmonic restraind differential relay required to be used for protecting a large size transformer? Describe the construction and working of such a relay.

14. (a) Discuss in detail the different types of rating of circuit breaker bringing out clearly their physical significance.

Or

(b) Explain the following terms in detail :

(i) Resistance switching.

(ii) Current chopping

(iii) Interruption of capacitive current.

15. (a) Explain the construction, operating principle and application of Minimum oil circuit breakers.

Or

(b) Describe the construction, operating principle and application of a SF_6 circuit breaker.

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Reg. No. | | | | | | | | | | | | |

Question Paper Code : 51517

B.E./ B.Tech. DEGREE EXAMINATION, MAY/JUNE 2016

Seventh Semester

Electrical and Electronics Engineering

EE 2403/EE 73/10133 EEE 25– SPECIAL ELECTRICAL MACHINES

(Regulations 2008/2010)

(Common to PTEE 2403/10133 EEE 25 – Special Electrical Machines for B.E (Part-Time) Sixth/Seventh Semester- EEE-Regulations 2009/2010)

Time : Three Hours **Maximum : 100 Marks**

Answer ALL questions.

PART – A (10 × 2 = 20 Marks)

1. List the applications of synchronous reluctance motors.
2. Draw the voltage and torque characteristics of Synchronous reluctance motor.
3. Name the various driver circuits used in stepped motor.
4. Define : Stepping angle
5. What is the significance of closed loop control in switched reluctance motor ?
6. List out the advantages of switched reluctance motors.
7. Why Brushless Permanent Magnet (BLPM) DC motor is called as electronically commutated motor ?
8. List down some important applications of BLPM DC motor.
9. Define synchronous reactance in PMSM.
10. Draw the output phasor diagram of PMSM

PART – B (5 × 16 = 80 Marks)

11. (a) Explain the construction and operation of Axial and Radial flux motors with neat diagram. **(16)**

OR

(b) (i) Derive the expression for the torque equation for the synchronous reluctance motor. **(8)**

(ii) Investigate the performance of the synchronous reluctance motor with neat phasor diagram. **(8)**

12. (a) Construct and evaluate the operation of single stack and multi-stack stepper motor with a neat diagram. **(16)**

OR

(b) Compare the static and dynamic characteristics of stepper motor with necessary diagrams. **(16)**

13. (a) Explain with a neat diagram the constructional details and operation of rotary switched reluctance motors. **(16)**

OR

(b) (i) Explain with a neat circuit any two configurations of power converters used for the control of switched reluctance motor. **(12)**

(ii) State the advantages of sensorless operation. **(4)**

14. (a) (i) Discuss the construction of a permanent magnet dc motor. **(8)**

(ii) A permanent magnet DC commutator motor has a no-load speed of 600 rpm when connected to a 120 C Supply. The armature resistance is 2.5 Ω and rotational and iron losses may be neglected. Determine the speed when the supply voltage is 60 V and the torque is 0.5 Nm. **(8)**

OR

(b) (i) Explain the speed torque characteristics of PMDC motor. **(8)**

(ii) A PMBLDC motor has torque constant 0.12 Nm/A referred to DC supply. Find the motor's no-load speed when connected to 48 V DC supply. Find the stall current and stall torque if armature resistance is 0.15 Ω/ phase and drop in controller transistor is 2 V. **(8)**

15. (a) Write short notes on :

(i) Volt-ampere requirements in PMSM Motor. **(8)**

(ii) Torque/speed characteristics in PMSM Motor. **(8)**

OR

(b) Derive EMF and torque equations of permanent magnet synchronous motor. **(16)**

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 21517

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015.

Seventh Semester

Electrical and Electronics Engineering

EE 2403/EE 73/10133 EEE 25 — SPECIAL ELECTRICAL MACHINES

(Regulations 2008/2010)

(Common to PTEE 2403/10133 EEE 25 – Special Electrical Machines for B.E. (Part-Time) Sixth/Seventh Semester – EEE – Regulations 2009/2010)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State the principle of operation of synchronous reluctance motor.
2. Compare synchronous reluctance motor and induction motor.
3. Name the various modes of excitation in stepping motor.
4. Define the terms holding and detente torques as referred to stepper motor.
5. Enumerate the different power controllers used for the control of SRM.
6. Mention the different modes of operation of switched reluctance motor.
7. Why Brushless Permanent Magnet (BLPM) DC motor is called as electronically commutated motor?
8. List down some important applications of BLPM DC motor.
9. Explain the distribution factor for PMSM.
10. Distinguish PM synchronous motor from BLPM DC motor.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Draw the phasor diagram of synchronous reluctance motor. (4)

(ii) Explain the construction of radial and axial flux machines. Discuss the advantages and disadvantages of each construction. (12)

Or

(b) Explain in detail, the operating principle and construction of synchronous reluctance motor with neat diagrams. Derive the torque equation of synchronous reluctance motor. (16)

12. (a) (i) Explain microprocessor based control of stepper motor with an example. (12)

(ii) What are the advantages of closed loop control of stepper motor? (4)

Or

(b) Describe the operation of a variable reluctance type stepper motor with different modes of operation. (16)

13. (a) Explain with neat diagrams the constructional details and operation of rotary switched reluctance motors. (16)

Or

(b) (i) Explain with neat circuit any two configurations of power converters used for the control of switched reluctance motor. (12)

(ii) State the advantages of sensorless operation. (4)

14. (a) (i) What are the advantages of BLPM dc motor over conventional dc motor? (4)

(ii) From the magnetic circuit analysis of permanent magnet brushless DC Motor. Derive the expression for permeance coefficient. (12)

Or

(b) Derive the emf equation and torque equation of PMBLDC motor. (16)

15. (a) (i) Derive an expression for synchronous reactance of PMSM. (10)

(ii) Explain the power controllers used in PMSM. (6)

Or

(b) Derive the EMF and torque equations of permanent magnet synchronous motor. (16)

Reg. No. | | | | | | | | | | | | |

Question Paper Code : 51925

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2016

Seventh Semester

Electrical and Electronics Engineering

MG 2351/10177 GE 003/10144 GE 003 – PRINCIPLES OF MANAGEMENT

(Common to Seventh Semester – Polymer Technology, Textile Technology, Textile Technology (Fashion Technology) Sixth Semester – Aeronautical Engineering, Automobile Engineering, Civil Engineering, Electronics and Communication Engineering and Mechanical Engineering)

(Regulations 2008/2010)

(Common to PTMG 2351 /10177 GE 003/10144 GE 003 – Principles of Management for B.E. (Part-Time) Sixth/Seventh Semester – Civil Engineering/Textile Technology/ECE – Regulations 2009/2010)

Time : Three Hours **Maximum : 100 Marks**

Answer ALL questions.

PART – A (10 × 2 = 20 Marks)

1. Define Corporate Social Responsibility. Give an example.

2. State any four managerial skills.

3. Define MBO. Give an example.

4. Define DSS.

5. State the principle of span of management.

6. Define the process of decentralisation. Give an example.

7. State the different psychological needs.

8. Mention some communication barriers.

9. When do you required PERT ?

10. Define budgeting. Give examples.

PART – B (5 × 16 = 80 MARKS)

11. (a) With illustrations, discuss the various challenges and trends of management in the current modern scenario.

OR

(b) What are the different functions of managers ? Describe each of them in detail.

12. (a) Describe the different steps involved in Planning with suitable examples.

OR

(b) What are strategies and policies? How can strategies be implemented effectively ? Discuss.

13. (a) Write a note on the different factors influencing Span of Management. Explain with real life examples.

OR

(b) What is performance appraisal? Describe any two methods of performance appraisal.

14. (a) Describe the expectancy theories of motivation. What are their implication in real life scenario?

OR

(b) What are the different ingredients of leadership? Explain them in detail.

15. (a) What are the different non-budgetary methods of control? Describe each of them.

OR

(b) Describe the principle of preventive control? What are the advantages associated with preventive control ?

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 21925

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015.

Seventh Semester

Electrical and Electronics Engineering

MG 2351/10177 GE 003/10144 GE 003 — PRINCIPLES OF MANAGEMENT

(Common to Seventh Semester — Polymer Technology, Textile Technology, Textile Technology (Fashion Technology) Sixth Semester — Aeronautical Engineering, Automobile Engineering, Civil Engineering, Electronics and Communication Engineering and Mechanical Engineering and also common to Eighth Semester — Electronics and Instrumentation Engineering and Instrumentation and Control Engineering)

(Regulations 2008/2010)

(Common to PTMG 2351/10177 GE 003/10144 GE 003 – Principles of Management for B.E. (Part-Time) Sixth/Seventh Semester – Civil Engineering/ Textile Technology/ECE – Regulations 2009/2010)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Who is the father of scientific management? What is scientific management?
2. Distinguish between Administration and Management?
3. Define Planning premises.
4. What is the difference between strategy and policy?
5. What are the limitations of line and staff authority?
6. What is Delegation of authority?
7. Name any four leadership styles.
8. What is meant by organizational culture?
9. Explain briefly the term zero-base budgeting?
10. What is quality control?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Discuss the scope and nature of management. (8)

(ii) What are the environmental factors that affect business? Explain them. (8)

Or

(b) With suitable examples explain the various types of business organizations. (16)

12. (a) Explain the steps involved in planning process. (16)

Or

(b) Write short notes on

(i) Management by objective (8)

(ii) Types of strategies (8)

13. (a) What is span of control and explain the factors which influence the span of control? (16)

Or

(b) Explain any four methods of performance appraisal. (16)

14. (a) Explain any two theories of motivation. (16)

Or

(b) Define communication. What are the barriers to effective communication? (16)

15. (a) With suitable examples explain any four non-budgetary control techniques. (16)

Or

(b) (i) Explain the concept and process of controlling in detail.

(ii) Write a note on different types of control.

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Reg. No. | | | | | | | | | | | | |

Question Paper Code : 52599

B.E/B.Tech. DEGREE EXAMINATION, APRIL 2016

Eighth Semester

Electrical and Electronics Engineering

EE 2028/EE801/10133EEE31 – POWER QUALITY

(Regulations 2008/2010)

Time : Three Hours **Maximum : 100 Marks**

Answer ALL questions.

PART – A (10 × 2 = 20 Marks)

1. Define Power Quality as per IEEE.
2. What are the main objectives of power quality standards ?
3. What are the causes of short interruptions ?
4. How voltage swell differs from transient ?
5. What is transient overvoltage ?
6. Define Ferro resonance.
7. What is the difference between harmonics and transients ?
8. Define point of common coupling.
9. What is the need for power quality monitoring ?
10. What are merits of modelling and simulation ?

PART – B (5 × 16 = 80 Marks)

11. (a) Discuss the sources and effects of different categories of long duration voltage variations. (16)

OR

(b) Explain the following electrical power quality issues with examples :

(i) Voltage swell (8)

(ii) Voltage interruption (8)

12. (a) (i) What is the need for estimating sag performance ? Explain the different methods of estimating voltage sag performance. (8)

(ii) Explain the voltage sag caused by the motor due to starting. (8)

OR

(b) (i) What are the different voltage sag mitigation techniques ? Explain the principle of operation of DVR used for sag mitigation. (10)

(ii) Discuss about estimating the cost of voltage sag events. (6)

13. (a) Analyze the sources of transient over voltages in power systems. (16)

OR

(b) Write short notes on the following :

(i) Lightning arrestor (8)

(ii) Power conditioner (8)

14. (a) (i) Explain briefly how the phenomena of current distortion affects the voltage distortion under the presence of harmonics. (8)

(ii) Explain briefly about various harmonic characterizations in power systems. (8)

OR

(b) (i) Explain the power system response characteristics under the presence of harmonics. (8)

(ii) What is the need of IEEE standards used in harmonics studies ? Give their philosophy and objectives of these standards. (8)

15. (a) Explain in detail with necessary diagram the working principle and functioning of power quality analyzers. (16)

OR

(b) Briefly discuss the common objectives of power quality monitoring.

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 23407

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015.

Eighth Semester

Electrical and Electronics Engineering

EE 1004/EE 1006 — POWER QUALITY

(Regulation 2004/2007)

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define sag.
2. Draw the CBEMA curve.
3. What are the sources of sag interruptions?
4. Define sag severity.
5. How does the lightning cause overvoltages?
6. List the functions of line arresters.
7. Define interharmonics.
8. Give the IEC standard to define harmonics
9. What are Rogowski coils?
10. What is the need for FFT spectrum analyzer in Power Quality Analysers?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the typical classification of power quality phenomena defined in IEEE 1159:1995. (10)

(ii) What is the impact of. transients on power quality? Classify the transients that occur in a power systems. (6)

Or

(b) (i) Explain the power quality standards. (6)

(ii) Draw and explain computer business equipment manufactures association (CBEMA) curve. (10)

12. (a) Explain the system adopted to estimate the seventy of the sag occured due to various sources.

Or

(b) Explain the methods to mitigate the voltage sags.

13. (a) (i) Explain the mechanism of lightning stroke. (8)

(ii) How do you calculate the over voltage caused due to these lightning strokes? (8)

Or

(b) Discuss why :

(i) The indoor transformers are usually connected to the overhead lines through short length of cables. (6)

(ii) HV transmission lines are provided with ground wires as the topmost conductor. (5)

(iii) Present day surge diverters use non-linear resistance elements. (5)

14. (a) How to locate the harmonic sources and discriminate between load side and supply side harmonics?

Or

(b) (i) How a resonance leads to harmonic distortions. Explain with an examples.

(ii) How a THD is computed?

15. (a) Explain the following : (8 + 8)

(i) Spectrum analyzer.

(ii) Disturbance analyzer.

Or

(b) Explain the expert system application for power quality monitoring with the suitable example. (16)

ANNA UNIVERTISY, CHENNAI -25.

OFFICE OF THE CONTROLLER OF EXAMINATIONS

RULES OF THE EXAMINATIONS

A candidate is permitted to use geometric tools, non-programmable calculators and approved tables and data books only during the theory and the practical examinations. No other material/gadget (including cell phone) should be brought inside the examination hall.

A candidate should neither possess/refer any forbidden material in any form nor should seek/obtain assistance in any form from any person/source towards answering the questions during the examinations. He/she should not assist other candidates in any form towards answering the questions during the examinations. The candidate should not reveal his/her identity in any form in the answer scripts. The candidate should not indulge in canvassing either directly or indirectly to award more than deserving marks in the exanimations. The candidate should maintain discipline and decorum during the examinations.

Violation of the above rules in any form during the examinations will attract punishment ranging from levying fine to permanently debarring the candidate from continuing his/her studies as given below.

Sl.No.	Nature of Malpractice	Maximum Punishment
1	Appeal by the candidate in the answer script to show mercy by way of awarding more than deserving marks.	Fine of Rs. 1000/- per subject.
2	The candidate writing his/her name in the answer script.	
3	The candidate writing his/her registration number/college name in places other than specified in the answer script	
4	Any special marking in the answer script by the candidate.	
5	The candidate communicating with neighbouring candidate orally or non-verbally; the candidate causing suspicious movement of his/her body.	
6	Irrelevant writing by the candidate in the answer script.	
7	The candidate marking on the question paper or writing answer on his/her question paper or making use of his/her question paper for rough work	
8	The candidate possessing cell phones/programmable calculator(s)/any other electronic storage device(s) **gadgets**	Invalidating the examination of the particular subject written by the candidate
9	The Candidate facilitating the other candidate(s) to copy from his /her answer script	
10	The candidate possessing any incriminating material(s) (whether used or not). For example:- Written or printed materials, bits of papers containing written information, writings on scale, calculator, handkerchief, dress, part of the body, Hall Ticket, etc.	Invalidating the examinations of the subject concerned and all the theory and the practical subjects of the current semester registered by the candidate. Further the candidate is not considered for revaluation of answer scripts of the arrears-subjects.
11	The candidate possessing cell phone(s)/programmable calculator(s)/any other electronic storage device(s) **gadgets** and containing incriminating materials (whether used or not).	
12	The Candidate possessing the question paper of another candidate with additional writing on it.	

13	The candidate passing his/her question paper to another candidate with additional writing on it	If the candidate has registered for arrears – subjects only, invalidating the examinations of all the arrears – subjects registered by the candidate.
14	The candidate passing incriminating materials brought into the examination hall in any medium (hard/soft) to other candidate(s).	
15	The candidate copying from neighbouring candidate.	
16	The candidate taking out of the examination hall answer booklet(s), used or unused	
17	Appeal by the candidate in the answer script coupled with a promise of any form of consideration.	
18	Candidate destroying evidence relating to an alleged irregularity.	Invalidating the examinations of the subject concerned and all the theory and the practical subjects of the current semester registered by the candidate. Further the candidate is not considered for revaluation of answer scripts of the arrears-subjects. If the candidate has registered for arrears – subjects only, invalidating the examinations of all the arrears – subjects registered by the candidate. **Additional Punishment:** 1. if the candidate has not completed the programme, he/she is debarred from continuing his/her studies for one year i.e., for two subsequent semesters. However the student is permitted to appear for the examination in all the arrears-subjects up to the last semester during the debarred period. 2. if the candidate has completed the programme, he/she is prevented from writing the examinations of the arrears-subjects for two subsequent semesters.
19	Vulgar/offensive writings by the candidate in the answer script.	Invalidating the examinations of all the theory and practical subjects of the current semester and all the arrears –subjects registered by the candidate.
20	The candidate possessing the answering script of another candidate	
21	The candidate passing his /her answer script to another candidate	
22	Involved in any one or more of the malpractices of serial no. 8 to 21 for the second or subsequent times.	Invalidating the examinations of all the theory and practical subjects of the current semester and all the arrears –subjects registered by the candidate. **Additional Punishment:** (i) If the candidate has not completed the programme, he/she is debarred from continuing his/her studies for one year i.e., for two subsequent semesters. However the student is permitted to appear for the examination in all the arrears-subjects up to the last semester during the debarred period. (ii) If the candidate has completed the programme, he/she is prevented from writing the examinations of the arrears-subjects for two subsequent semesters.
23	The candidate substituting an answer book let prepared outside the examination hall for the one already distributed to the candidate	
24	The candidate indulge in any disruptive conduct including, but not limited to, shouting, assault of invigilator, officials or students using abusive and /or threatening language, destruction of property.	Invalidating the examinations of all the theory and practical subjects of the current semester and all the arrears –subjects registered by the candidate. **Additional Punishment:** (i) if the candidate has not completed the programme, he/she is debarred from continuing his/her studies for **two years** i.e., for four subsequent semesters. However the student is permitted to appear for the examination in all the arrears-subjects up to the last semester during the debarred period. (ii) if the candidate has completed the programme, he/she is prevented from writing the examinations of the arrears-subjects for
25	The candidate harass or engage others to harass on his/her behalf an invigilator, official, witnesses or any other person in relation to an irregularity by making telephone calls, visits, mails or by any other means.	
26	Candidate possessing any firearm/weapon inside the examination hall.	

		four subsequent semesters.
27	Cases of Impersonation	(i)Handing over the impersonator to the police with a complaint to take appropriate action against the person involved in the impersonation by the Chief Supt. (ii)If a student of this University is found to impersonate a 'bonafide student', the impersonating student is debarred from continuing his/her studies and writing the examinations **permanently.** He/she is not eligible for any further admission to any programme of the University. (iii)Debarring the 'bonafide student' for whom the impersonation was done from continuing his/her studies and writing the examinations **permanently.** He/she is not eligible for any further admission to any programme of the University.

CONTROLLER OF EXAMINATIONS

K.L.N.COLLEGE OF ENGINEERING
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

On duty (OD) norms for students – Reminder

1. Students who apply for OD should submit the filled in OD form, forwarded by class co-ordinator, to the Department office. Such OD should be applied, **atleast a day before** availing it. Only after getting permission from the HOD, students are permitted to avail OD.
2. Students are permitted to **apply** for OD for attending co-curricular and extra curricular activities, inside / outside the college, only after getting prior permission from the class co-ordinator and HOD. Permission will be granted, considering students port folio, (performance in the University examination, Class test / CITs and attendance). Also the relevance of the seminar / workshop / technical events / certificate courses etc. will be reviewed with the class co-ordinators to sanction OD.
3. On duty will be approved only after the submission of relevant certificates (Copies to submitted to the staff in-charge,Mr. S. Rajalingam, and to the college office).
4. Final year Students having more than 6 arrears, third year students having more than 4 arrears and Second year students having more than 3 arrears (cumulative) will not be permitted to attend the Co-curricular / extra curricular activities. This is to ensure them to concentrate more on academic subjects. However, this will be relaxed, at the request of parents and students, considering the students contribution in the co –curricular / extra curricular activities.
5. Students who failed in 3 and above subjects in class tests / CITs will not be permitted to participate in any inside / outside the college co curricular activities. This is to ensure them to concentrate on academic subjects.
6. Students with less than 90% of attendance will not be permitted to apply for OD.
7. Students with the history of indiscipline activities reported in the past in the class room / laboratories / campus etc. will not be permitted to apply for OD.
8. Status of Students who have applied for OD for attending Co-curricular / extra curricular activities inside / outside the college will be monitored. Their presence in the concerned venue will be constantly monitored. Non availability of students, in the concerned venue, is reported, if any, disciplinary action will be taken.
9. First and Second year students of B.E-EEE are not encouraged to participate in the Co-curricular / extra curricular activities, as subject content of first and second year is heavy and basics are to be studied in deep for successful career.
10. Curricular / co-curricular events, are planned and periodically conducted by the department. Also certificate / certification courses are regularly conducted by the department during summer / winter holidays. Students are encouraged to attend such courses / events organized by the department, as it will not affect the regular academics.
11. Students are encouraged to attend curricular / co-curricular events, inside / outside the college, after college working hours or during holidays, as it will not affect the regular academics.
12. Students will be selectively permitted to attend curricular / co-curricular events inside / outside the college, if it is highly recommended by the faculty. A maximum of 10% of the students from each class will be permitted for attending such events. Preference will be given for those students having no history of arrears and passed all the class test / CITs.
13. Students attending curricular / co-curricular events inside / outside the college should maintain highest order of discipline. Indiscipline reports received, if any, students will not be permitted for attending any events thereafter and suitable disciplinary action will be taken.
14. It was reported that students who involved in indiscipline activities, while participating in the curricular / co-curricular activities, outside the college, were not permitted to appear for the University Examinations, as such issues reported to the University. Hence students should be very cautious while attending events inside / outside the college.

Co-operation of the all the staff are solicited for better academic performance and successful career.

HOD / EEE

A Brief History of The College

K.L.N. College of Engineering is the first self-financing Co-educational Engineering College in Madurai, started in 1994 by Munificence of Philanthropist and well wishers in Sourashtra Community which is a linguistic minority in Tamilnadu. This college is sponsored by the committee of eminent industrialists and academicians led by enthusiastic, educationalist and industrialist (Late) Thiru K.L.N. Krishnan. This college has the approval of All India Council for Technical Education, New Delhi and is affiliated to Anna University, Chennai.

Thiru. K.L.N. Krishnan, Founder President of this Engineering College has rendered Yeoman service to Sourashtra Arts & Science College and Sourashtra Girls Higher Secondary School, Madurai for the past several years. He also promited a Polytechnic under the name of K.L. Nagaswamy Memorial Polytechnic College in Viraganur, Madurai in 1983. This Engineering College, functioned in the premises of the above polytechnic during the academic years 1994-95 & 1995-96 was shifted to its own premises in the year 1996.

(Late) Thiru K.L.N. Krishnan is the Founder President, and the college is now under the management of Dr. K.N.K. Ganesh as Secretary & Correspondent and other executive committee members.

Campus :

This college is situated on the South Eastern outskirts of Madurai, 11th Km on Madurai – Nedungulam Road. It is built in an area of 53.8 acres. The Campus has multistoreyed buildings consisting of well provided class rooms, drawing halls, seminar halls, conference hall, library, Air-Conditioned Computer centres, staff rooms and student rest rooms. The infrastructure also consists of five double storeyed laboratory buildings and three single storeyed workshops and Machine shop, and an automobile workshop.

The Administrative block (2 storeyed) of 1,185 sq. metre with office in the ground floor, I.T. laboratory in the first floor & class rooms in the second floor has been constructed on the eastern side.

A two storeyed block of 1,185 sq. metre consisting class room has been constructed on the southern side of the administrative block.

A two storeyed block of 1,185 sq. metre with EIE laboratory in the ground floor, DSP laboratory in the first floor & class rooms in the second floor has been constructed on the western side of the administrative block.

A two storeyed block of 2,122 sq. metre with spacious library, video library & Electronic resource section in the ground floor, class rooms in the first floor & CSE laboratory in the second floor has been constructed near the administrative block.

A single storeyed block of 1,193 sq. metre with S.M. laboratory in the ground floor CAD, CAM laboratories in the first floor & class rooms in the second floor has been constructed on the north western side of the administrative block.

Three Mechanical sheds (occupied by three Mech. Engg. Laboratory) of 2460 sq. metre have been constructed on the northern side of the mechanical block. An automobile work shop of 2304 sq. metre has been constructed on the north western side of the administrative block.

An Indoor stadium cum Auditorium of 2,221 sq. metre has been constructed on the northern side of the administrative block.

A separate double storeyed post-Graduate block of 4,020 square metre for M.B.A. and M.C.A. departments has been constructed on the South Western side of the administrative Block.

A single storeyed block of two canteens with 2,485 square metre in the ground floor and ladies rest room in the first floor has been contructed on the south western side of the Administrative Block.

A single storeyed block of 1,289 square metre for Electrical & Electronics Engg., Laboratories & class rooms in the ground floor and Electronics & Communication Laboratory and Class rooms in the first floor has been constructed on the western side of the Administrative Block.

A two-storeyed block with an area of 2,956 sq. metre has been constructed as an extension to Block III Opposite the U.G. library Block. This block comprised Physics lab, Chemistry lab and EIE Lab. D.S.P. Lab & Class rooms.

A two-storeyed block with an area of 2076 squre metre for the use of EEE Dept. in the ground floor & ECE Dept. in the first & 2nd floors is now under construction as an extension to the existing EEE & ECE block on the western side of the administrative block.

A two storeyed block with an area of 2,977 sq. metre for the use of Mechanical & Automobile depts. is now under construction, as an extension to the existing Mechanical block on the North-Western side of the administrative block.

A separate building with ground floor of area of 170 sq. metre for the installation of Generator on the South-estern side (Opposite to the Vinayagar temple) of the administrative block is under construction & (nearing completion)

In order to facilitate the easy accessibility for the students, in all, 950 numbers of computers have been installed so far. This sounds the management's conviction in providing essential infrastructure for the learning purpose in our college.

An overhead Tank of 20,000 Litre Capacity at a height of 40 feet has been constructed at a cost of Rs.4 lakhs, donated by Rotary international, Rotary District-1240, Rotary club of LEIGH-ON-SEA. Treated drinking water plant at a cost of Rs.2 lakhs has been installed near the overhead tank.

Well-furnished Men's Hostel, Mess block and canteen block are also inside the campus. The college is a quiet retreat, ideal for concentrated study, away from distractions and disturbances of a large city.

A single storeyed block of 1,330 square metre with a spacious dining hall in the ground floor and 13 rooms in the first floor for men students has been constructed on the northern side of the administrative block and is already in use. A two storeyed hostel block of 2,034 square metre adjacent to the existing hostel for men students has been constructed.

Total expenditure incurred so far towards the cost of equipments & buildings & other assets is about Rs.22.50 crores.

A VINAYAGAR Temple on the eastern side of the administrative Block has been constructed Eight class rooms for I year B.E. / B.Tech 2 class room for M.E. (P.S.) students, and two staff rooms have been constructed in the ECE/EEE block.

A Ladies Hostel of 1460 sq.m. which can accommodate about 150 students in under construction within the campus.

SALIENT FEATURES OF THE DEPARTMENT

1. GENERAL

- Started offering B.E. in Electrical and Electronics Engineering in the year 1994 with an intake of 40 (No.-732-50-8/RC/94, dated 11th August 1994, AICTE) with the latest intake of 120 in 2011 (F.No.Southern/1-400215781/2011/EOA, dated 01.09.2011, AICTE).
- Started offering M.E. in Power Systems Engineering in the year 2005 with an intake of 20 and increased intake to 24 in 2012 (F.No.Southern/1-687512981/2012/EOA, dated 10.05.2012, AICTE).
- Accredited in March 2004 (First time – F.No.NBA/ACCR-242/2003, dated 24/03/04) and Re-accredited (Second time – F.No.NBA/ACCR-242/2003, dated July 19, 2008) by National Board Accreditation, New Delhi.

  Re-accredited (Third time - For 2 years w.e.f. 28-08-2012) by National Board Accreditation, New Delhi.
- Recognized Research Centre No.4490408, Approved by Anna University, Chennai with effect from December 2012, offering guidance for M.S & Ph.D.(Full time/Part time).
- Both UG and PG programs are permanently affiliated to Anna University, Chennai with effect from December 2012.
- MODROB fund of Rs.5 lakhs was allotted for the year 2011-2012 for the Power Electronics laboratory (No.8024/RIFD/MOD-131(pvt)/Policy-III/2011-2012, dated 06.03.2012).

2. INFRASTRUCTURE

- Electrical machines laboratory, Control, Measurement and Instrumentation laboratory, Power Electronics laboratory, Electric circuits and Electronic devices laboratory, Research and Development laboratory and Power System Simulation Laboratory are equipped with machineries, components, signal generating, power supply measuring, recording instruments and computer systems costing Rs.2 crores. The total built up area of laboratories is 1208.21 sq.m.
- Latest softwares on Power system analysis, Power system stability, Power world simulator and Power electronics are available to study, solve, design and simulate research on Power system and Power Electronics problems to experience the real time results.
- All the class rooms are equipped with computer systems, LCD and OHP to promote the Teaching-Learning process more effectively.
- Separate library facility for EEE students with more than two thousand books on core subjects and hard copies of IEEE Journals and magazines from 1999 are available for reference. Staff and students can access the softcopy of Journals, proceedings published by IEEE, Elsevier, ASME, Springer, Mc Graw Hill.
- All laboratories are provided with sufficient computing facilities, printing facility with internet connection to simulate laboratory experiments.

3. STAFF

- Teams of well qualified, and experienced 32 faculties with cadre ratio as per AICTE, are guiding the students to attain the best educational objectives.
- Excellent research environment promotes the staff and students to participate, present and publish their research works in the National/International Journals and National/International conferences.
- Facility and experienced faculty available for guiding Ph.D. scholars.

- Staff development Programme / Faculty development programme / Workshop/ Seminar are organized regularly to share the knowledge of our experienced faculty with parent institution and other colleges staff and students and Industrial persons.

4. RESEARCH AND DEVELOPMENT

- The Research and Development section is doing research on Industrial Power Harmonics and mitigation and interact with industries in measuring, recording, analyzing and designing of filters for reducing harmonics with the help of Power Quality analyzer, as per IEEE standard.

5. STUDENTS

- Students secured 95 University Ranks in UG and 15 University Ranks in PG from 1998 to 2015 with **Gold medal** in 2000 (UG - EEE) and in 2011 (PG – Power Systems Engineering). Sweety Jain of 2009 batch student secured 2nd rank in Anna University Examination in 2009 among 8500 students who completed degree and out of 240 Engineering colleges all over Tamil Nadu.
- IEEE student's chapter which was started in the year 1999, continuously conducting number of student technical programme. Guest lecturers from industries have been arranged periodically to promote Industry-Institute Interaction and to bridge the gap between curriculum and latest trend in industry.
- To promote innovation, latest trends in industry and employability skills, student's professional activities are conducted every year in the name of symposium and conferences.
- Workshop/Seminar is regularly conducted for students to meet out the curriculum objectives.
- Inplant trainings are arranged for second and third year students to have hands on training with industry. Industrial visits are arranged every semester to know about the various process taking places in industry.
- Placement oriented training programme were conducted every semester right from the first year to develop soft skills, attitude, aptitude, self confidence, communication skills, interview skills etc, so as to face the campus placement programme organized by the college. Professional Trainers from software companies, Bangalore, Chennai are being invited for such training programme.

K.L.N. COLLEGE OF ENGINEERING, POTTAPALAYAM – 630 612

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

FACULTY LIST

Placement Activity – Reminder

1. In the month of October every first year students must fill forms online in TATA CONSULTANCY SERVICES (TCS) campus recruitment using **nextsteptcs.com** website and must submit the following documents in the department.
   a. SSLC and HSC mark sheet photo copy at least 5.
   b. Latest passport size Photo at least 5.
   c. Current address proof with parent contact cell numbers.
   d. Create your own two E-mail id using Gmail.
   e. Resume with Scanned copy of passport size Photo.
   f. CT number registered in the TCS website.
2. Every semester end update CGPA in your resume and TCS profile.
3. An Engineering student from Electrical and Electronics Engineering should complete the following courses in order to enhance their software skills. This will be most helpful during their successful completion in Curriculum during 4th Semester and in the software company campus recruitment.
   a. Should complete **C Programming** before joining **2nd Semester**.
   b. Should complete **C++ Programming** before joining **3rd Semester**.
   c. Should complete **JAVA Programming** before joining **4th Semester**. (for the successful completion of object oriented Programming theory paper and laboratory during 4th Semester)
4. An Engineering student from Electrical and Electronics Engineering should complete the **Micro Processor, Micro Controller and Embedded Systems** courses before joining **5th Semester** in order to enhance their Hardware skills. This will be most helpful during their successful completion in Curriculum from 5th to 6th Semester and in the Core company campus recruitment. (for the successful completion of Micro Processor and Micro Controller theory as well as laboratory during 5th Semester and Embedded Systems during 6th Semester)
5. From 6th Semester Summer vacation onwards all should prepare for GATE Examination because all Engineering students from Electrical and Electronics Engineering should appear GATE Examination in order to settle in their life by pursuing higher education in the reputed colleges like IIT, NIT and Anna University or else to join as a Graduate Engineer trainee in a public sector companies like IOC, BHEL, PGCI etc.,
6. Before joining 7th Semester all should get any international certification programme course like OCJP, CCNA, etc., and upload the certification details in TCS campus commune website. This will be most helpful during the TCS campus and other MNC company recruitment.

Activity	Semester							
	1	2	3	4	5	6	7	8
TCS Online form Filling in nextsteptcs.com	In the month of October							
Documents to be submitted in the EEE Department/ Placement Coordinator	a. SSLC and HSC mark sheet photo copy at least 5. b. Latest passport size Photo at least 5. c. Current address proof with parent contact cell numbers. d. Create your own two E-mail id using Gmail. e. Resume with Scanned copy of passport size Photo. f. CT number registered in the TCS website.							
Updating CGPA in resume and TCS online profile	✓	✓	✓	✓	✓	✓	✓	✓
C Programming	✓	✓						
C++ Programming		✓						
JAVA Programming			✓					
Micro Processor & Micro Controller				✓				
Embedded Systems					✓			
GATE / UPSC/ TNPSC Preparation			✓	✓	✓	✓	✓	
International Certification – OCJP / CCNA						✓	✓	

K.L.N. COLLEGE OF ENGINEERING
DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

All India Installed Capacity (in MW) of Power Stations

This is a **list of states and territories of India by installed capacity of power utilities** with electricity generation mode break-up as on **31 March 2016** with figures in Megawatts.

REVISED

INSTALLED CAPACITY (IN MW) OF POWER UTILITIES IN THE STATES/UTS LOCATED IN SOUTHERN REGION

INCLUDING ALLOCATED SHARES IN JOINT & CENTRAL SECTOR UTILITIES

(As on 31.03.2016)

State	Ownership / Sector	Modewise							Grand Total
		Therma				Nuclear	Hydro (Renewable	RES (MNR	
		Coal	Gas	Diesel	Total				
Andhra Pradesh	State	3085.91	0.00	0.00	3085.91	0.00	1758.87	89.50	4934.28
	Private	2990.00	3182.65	16.97	6189.62	0.00	0.00	2586.80	8776.42
	Central	1473.30	0.00	0.00	1473.30	127.16	0.00	0.00	1600.46
	Sub-Total	**7549.21**	**3182.65**	**16.97**	**10748.83**	**127.16**	**1758.87**	**2676.30**	**15311.17**
Telangana	State	4806.59	0.00	0.00	4806.59	0.00	2135.66	0.00	6942.25
	Private	270.00	1697.75	19.83	1987.58	0.00	0.00	605.54	2593.12
	Central	1721.88	0.00	0.00	1721.88	148.62	0.00	0.00	1870.50
	Sub-Total	**6798.47**	**1697.75**	**19.83**	**8516.05**	**148.62**	**2135.66**	**605.54**	11405.87
Karnataka	State	4220.00	0.00	127.92	4347.92	0.00	3599.80	155.33	8103.05
	Private	2060.00	0.00	106.50	2166.50	0.00	0.00	4950.19	7116.69
	Central	1628.46	0.00	0.00	1628.46	475.86	0.00	0.00	2104.32
	Sub-Total	**7908.46**	**0.00**	**234.42**	**8142.88**	**475.86**	**3599.80**	**5105.52**	**17324.06**
Kerala	State	0.00	0.00	234.60	234.60	0.00	1881.50	138.92	2255.02
	Private	0.00	174.00	0.00	174.00	0.00	0.00	116.55	290.55
	Central	1038.69	359.58	0.00	1398.27	228.60	0.00	0.00	1626.87
	Sub-Total	**1038.69**	**533.58**	**234.60**	**1806.87**	**228.60**	**1881.50**	**255.47**	**4172.44**
Tamil Nadu	State	4770.00	524.08	0.00	5294.08	0.00	2182.20	122.70	7598.98
	Private	2350.00	503.10	411.66	3264.76	0.00	0.00	9388.56	12653.32
	Central	4155.10	0.00	0.00	4155.10	986.50	0.00	0.00	5141.60
	Sub-Total	**11275.10**	**1027.18**	**411.66**	**12713.94**	**986.50**	**2182.20**	**9511.26**	**25393.90**
NLC	State	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Central	100.17	0.00	0.00	100.17	0.00	0.00	0.00	100.17
	Sub-Total	**100.17**	**0.00**	**0.00**	**100.17**	**0.00**	**0.00**	**0.00**	**100.17**
Puducherry	State	0.00	32.50	0.00	32.50	0.00	0.00	0.00	32.50
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03
	Central	249.32	0.00	0.00	249.32	52.78	0.00	0.00	302.10
	Sub-Total	**249.32**	**32.50**	**0.00**	**281.82**	**52.78**	**0.00**	**0.03**	**334.63**
Central - Unallocated		1523.08	0.00	0.00	1523.08	300.48	0.00	0.00	1823.56
Total (Southern Region)	State	16882.50	556.58	362.52	17801.60	0.00	11558.03	506.45	29866.08
	Private	7670.00	5557.50	554.96	13782.46	0.00	0.00	17647.67	31430.13
	Central	11890.00	359.58	0.00	12249.58	2320.00	0.00	0.00	14569.58
	Grand	**36442.50**	**6473.66**	**917.48**	**43833.64**	**2320.00**	**11558.03**	**18154.12**	**75865.79**

'*'Renewable Energy Sources (RES) includes small hydro projects, wind, solar, tidal, biomass and urban & industrial waste power.

ADVANCED TRAINING INSTITUTE
Guindy, CHENNAI, Tamilnadu
Phone : 044-22501211/0252 Fax : 044-22501460, Email : atichn@vsnl.com, atichn@yahoo.com, Url : www.atichennai.org.in

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Annual Training calendar 2016 – 2017

(Short Term Skill Training Programme)

	Course Code	Course Title	Duration (Week)	Date	
				From	To
GROUP:1	**ELECTRICAL CONTROL MAINTENANCE**				
	01.01	Protective Relays , Circuit Breakers, & Switch Gear Protection	01	04-04-2016	06-04-2016
				09-05-2016	13-06-2016
				20-06-2016	24-06-2016
				06-06-2016	12-06-2016
				12-09-2016	16-09-2016
				24-10-2016	28-10-2016
				19-12-2016	23-12-2016
				06-02-2017	10-02-2017
				13-03-2017	17-03-2017
	01.02	Operation and Maint. Of Power Transformers	01	11-04-2016	15-04-2016
				16-05-2016	20-06-2016
				27-06-2016	01-07-2016
				01-06-2016	05-06-2016
				29-08-2016	02-09-2016
				31-10-2016	04-11-2016
				05-12-2016	09-12-2016
				26-12-2016	30-12-2016
				13-02-2017	17-02-2017
				20-03-2017	24-03-2017
	01.03	Trouble shooting & Maintenance of Electric Motors	01	25-04-2016	29-04-2016
				23-05-2016	27-06-2016
				11-07-2016	15-07-2016
				19-09-2016	23-09-2016
				17-10-2016	21-10-2016
				07-11-2016	11-11-2016
				02-01-2017	06-01-2017
				20-02-2017	24-02-2017
	01.04	Operation & Control of Industrial AC/DC Motors	01	2-05-2016	5-05-2016
				30-05-2016	3-06-2016
				13-06-2016	17-06-2016
				15-07-2016	22-07-2016
				25-09-2016	30-09-2016
				21-11-2016	25-11-2016
				09-01-2017	13-01-2017
				27-02-2017	03-03-2017
	01.05	Electrical Safety at Work Place and First Aid	01	2-05-2016	6-05-2016
				5-05-2016	10-06-2016
				25-07-2016	29-07-2016
				3-10-2016	7-10-2016
				25-11-2016	02-12-2016
				16-01-2017	20-01-2017
				06-03-2017	10-03-2017
GROUP:1	**ELECTRONIC CONTROL MAINTENANCE**				
	02.01	Maintenance and Servicing of SMPS Inverter & UPS	02	11-07-2016	22-07-2016
				2-1-2017	13-1-2017
	02.02	Power Electronics and its Industrial Applications	02	4-04-2016	15-04-2016
				26-9-2016	7-10-2016
				27-2-2017	10-3-2017
	02.03	Industrial Drives & Automation using Siemens PLC	02	16-05-2016	27-05-2016
				6-5-2016	19-5-2016
				23-1-2017	3-2-2017
	02.04	Siemens S 7 400 PLC Step 7 (Level 1)	01	25-04-2016	29-04-2016
				29-5-2016	2-9-2016
				6-2-2017	10-2-2017
	02.05	Siemens S 7 400 PLC Win CC SCADA (Level 2)	01	2-05-2016	5-05-2016
				5-09-2016	9-09-2016
				13-02-2017	17-02-2017
	02.06	Siemens S 7 400 PLC TIA portal (Level 1)	01	16-05-2016	20-05-2016
				27-05-2016	1-07-2016
				3-05-2016	12-08-2016
				23-1-2017	27-1-2017
				28-11-2016	2-12-2016

List of PSUs through GATE Exam

Name of PSU	Eligible Branches	Name of PSU	Eligible Branches	Name of PSU	Eligible Branches
ONGC Ltd.	XE, GG	MDL	ME, EE	NLC	ME, EE, EC, IN, MN, CE
NHPC Limited	EE	PSPCL Ltd	ME, EE, EC, IN, CE, CS	NALCO	ME, EE, EC, IN, MT, CE, MN, CS, CH
BPCL Limited	ME, EE, CH, IN, CE	OPGC Ltd	ME, EE, CE, C & I	RITES	CE, ME
CEL	EC, ME, EE, XE	IRCON International Ltd	EC, EE, IN	NPCCL	CE
Coal India Ltd.	ME, EE, MN, GG	BNPM	ME, EE, EC, CH	MECL	ME, CY, GG
POWERGRID	EE, CE, CS	AAI	EC, EE	NBCC Ltd.	CE
Indian Oil	CH, CE, CS, EE, EC, GG, IN, ME, MT, MN	BBNL	EC, EE, CS	PAPCL	EE, EC, ME, IN, CS
THDC India Ltd	ME, EE, CE	NFL	EE, CS, CH, IN, XE		
HPCL	ME, EE, CE, IN, CH, EC	GSECL	EE, ME, MT, C & I		
NTPC Limited	ME, EC, EE, IN	GAIL	ME, EE, IN, CH		

Lists of TOP 10 software companies to offer jobs in India

S. No.	Name of the Company	About the company	Head quarters	Revenue	No. of Employees	Website
1.	**Tata Consultancy Services**	TCS was established in 1968 and is spread across 47 countries.	Mumbai, India	US$ 13.44 billion	300,464	www.tcs.com
2.	**Cognizant Technology Solutions**	CTS was founded in year 1994 by Srilankan American Kumar Mahadeva.	Teaneck, New Jersey, United States	US$ 8.84 billion	178,000	www.cognizant.com
3.	**Infosys**	Infosys was founded in year 1981.	Bangalore, Karnataka	US$ 8.4 billion	160,405	www.infosys.com
4.	**Wipro**	Azim Premji is the Chairman & TK Kurien is the CEO of Wipro.	Mumbai, India	US$7.3 billion	146,053	www.wipro.com
5.	**Tech Mahindra**	Tech Mahindra was founded in year 1986	Mumbai	$4.09 billion	89,500	www.techmahindra.com
6.	**HCL Technologies**	HCL was founded by Shiv Nadar in year 1991.	Noida, Uttar Pradesh	US$335 million	90,190	www.hcltech.com
7.	**iGate**	iGate was earlier known as Patni Computer Systems and was founded by Narendra Patni and his wife.	Bridgewater, New Jersey, U.S	US$ 1.15 billion	31,000 +	www.igate.com
8.	**Mphasis**	MPhasis was founded by Jaithirth Rao in year 2000	Bangalore, India	US$1.0 billion	45,426 +	www.MphasiS.com
9.	**Larsen &Toubro Infotech**	L & T Infotech was founded in year 1997	Mumbai	US$ 650 million	16,000+	www.lntinfotech.com
10.	**Oracle Financial Services Software Limited**	Oracle Financial Services Software Limited was earlier know as i-Flex Solutions Limited. It is spread across 130 countries around the globe and provides the IT solutions to the financial companies.	Mumbai, India	US$610 million	9,682	www.oracle.com

Lists of TOP 10 core companies to offer Electrical jobs

1 | Bharat Heavy Electricals Ltd.
Corporate office – New Delhi, India | **Establishment** – 1964 |
Business – Electrical equipments | **Website** – *www.bhel.com* |
Bharat Heavy Electricals Ltd established in the year 1964 is a leading power plant equipment manufacturer and has expertise in engineering, manufacture, construction, testing, designing and servicing of various products of the core sectors such as defense, power, industries etc. BHEL is among the top electrical companies in India and which has total 16 manufacturing divisions and four regional offices. It is currently operating more than 150 project sites across India and abroad.

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2 | Alstom
Corporate office – Levallois-Perret, France | **Establishment** – 1928 |
Business – Power generation and transmission | **Website** – *www.alstom.com* |
Alstom a multinational corporation is one of the best electrical companies in India and world, operating in hydroelectric power transportation and generation and it is active in many core industry sector. Company has a workforce of 9000+ employees in India and over 85000+ worldwide.

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3 | ABB
Corporate office – Zürich, Switzerland | **Establishment** – 1988 |
Business – Electrical equipments | **Website** – *www.abb.com* |
ABB holds interests in robotics and mainly in the automation and power areas. ABB is active in the field of electricity grids manufacturing and other technologies in the field of automation and power. ABB is one of the few giant electrical player at global level and among the largest engineering company in the world.

4| Siemens
Corporate office – Erlangen, Germany | **Establishment** – 1847 |
Business – Renewable energy, Power generation & transmission| **Website** – *www.energy.siemens.com* |
Siemens a German conglomerate is rated one the finest electrical company in India. Company's product line includes generators, steam turbines, compressors, high-voltage switching products and many more. Siemens employees more than 86000 people worldwide and it is a leading supplier of energy related products worldwide.

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5 | Crompton Greaves
Corporate office – Mumbai, Maharashtra | **Establishment** – 1878 |
Business – Electrical | **Website** – *www.cgglobal.com* |
Crompton Greaves is a part of Avantha Group which is headquartered in Mumbai. CGL deals in manufacturing, marketing and designing of power transmission and generation related products. CGL has manufacturing units in Canada, France, Hungary, UK, US, Indonesia, Ireland, India and Belgium.

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6 |Bajaj Electricals Ltd.
Corporate office – Mumbai, Mharashtra | **Establishment** – 1938 |
Business – Electrical Appliances | **Website** – *www.bajajelectricals.com* |
Bajaj Electricals is a leader in the field of electrical equipment and headquartered in Mumbai. It is one of the top 5 electrical companies in India having 19 branch offices across India. Bajaj Electricals provides complete range of consumer durable such as fan, electrical appliances, lighting which includes tubes, lamps etc.

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7 | Eason Reyrolle
Corporate office – Bangalore, Karnataka | **Establishment** – 1986 |
Business – Electric Equipments & Industrial Consumables | **Website** – *www.easunreyrolle.com* |
Established in 1980 Easun Reyrolle is a Power Management Products, Transmission, Distribution & Industrial Application, Systems, Solutions and Services provider having significant presence in global market as reputed electrical products manufacturer.

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8 | Schneider Electrical
Corporate office – Rueil Malmaison, France | **Establishment** – 1981 |
Business – Electric Equipment | **Website** – *www.schneider-electric.co.in* |
Schneider Electric a French company established in the year 2000 is among the top electrical companies in India which is involved in energy management. Company has a workforce of more than 17000 employees and has 31 global manufacturing Plants.

9| Wipro Lighting
Corporate office – Pune, Maharashtra | **Establishment** – |
Business – Lamps, Luminaires and Accessories | **Website** – *www.wiprolighting.com* |
Wipro lightings a part of Wipro group and a leading electrical company in India producing Lamps, luminaries and accessories. Company's product portfolio comprises of high end lighting control and architectural dimming system, high intensity discharge lamp Luminaries, brightness management lighting products etc.

10| Kelvin Electrical
Corporate office – Al-Ain, U.A.E | **Establishment** – 2005 |
Business – | **Website** – *www.kelvin-electrical.com* |
Kelvin Electrical LLC founded in 2005 is based in United Arab Emirates (UAE). Kelvin Electrical deals in Cable Management Systems, Interior, Architectural, Exterior and Special lighting, Cable Support Systems, Raised Floor, Wiring Accessories etc.

K.L.N. COLLEGE OF ENGINEERING
DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

Lists of core companies to offer Electrical jobs in India

Types of Electrical Core Companies

1. **Electrical motors and Generators**
2. **Consultancy (Electrical Engineering)**
3. **Electrical appliances**
4. **Electrical components companies**
5. **Lighting & luminaries**
6. **Power Generation**
7. **Electric wires & Cables**
8. **Electrical exporters**
9. **Measurements & Instrumentation**
10. **Power Distribution**
11. **Transformers**
12. **Green Energy Companies in India**
13. **Internationally renowned MNC'S**
14. **Top 20 core companies in India to offer electrical jobs**
15. **Exclusive Government jobs for Electrical Engineers**

Electrical motors and Generators

1. Ajay Engineers http://www.ajayengineers.com
2. All India Electric Motor Manufacturers' Association http://www.aiemma.com/
3. Aqua Brand Submersible Sewage Pump http://www.aquapumps.com
4. Compact http://www.compactlighting.net
5. Crown Electric Company http://www.crown-gear.com
6. Lawkim http://lawkimindia.com/
7. MMC Electric Company http://www.dynafluxindia.com
8. MS Enterprises and Trimega Power Corporation http://www.msein.com
9. National Electrical Industries - Ahmedabad. http://www.elmomachines.com/
10. Numeric Power Systems http://www.numericups.com
11. Pranshu Electricals http://www.pranshuelec.com/
12. Reva Industries http://www.reva.com/
13. Rotomag Motors & Controls Pvt. Ltd. http://www.rotomag.com
14. Rudrashakti Electronics http://www.rudrashakti.com
15. Sanjay Diesels - Diesel Generating Sets. http://www.dgsets.com/
16. Venus Industrial Corporation http://www.venusind.com/
17. A-One Industries. http://www.aoneindustries.com/contactus.html

Consultancy (Electrical Engineering)

1. APJ Projects http://www.apjprojects.com
2. Consolidated Consultants and Engineers Pvt. Ltd http://www.consolidatedconsultants.com
3. DSON Enterprises http://www.dsonenterprises.com
4. Eltech Engineers http://www.eltechindia.com/
5. John Mech-El Technologies (P) Ltd http://www.johnmech-el.com/
6. Mandvi Electric Works http://www.bicserve.com/
7. Miraj Instrumentation Services http://www.mirajinstrumentation.com
8. PG Associates http://www.engineeringconsultant.in
9. Power Gem Engineers - Consultants in Power Generation. http://www.powergem.com/
10. Secon Engineers http://www.seconindia.com
11. Shanti Enterprises Electricals Limited http://www.shantielectricals.com
12. Shashi Electricals http://www.shashielectricals.com
13. SK Systems http://www.sksystem.com
14. Tata Consulting Engineers http://www.tce.co.in
15. Nutronics India http://www.nutronicsindia.com/

Electrical appliances

1. Ajay Industrial Corporation http://www.ajayindustrial.com/
2. Ankit Electricals http://www.ankitelectricals.com
3. A.P.C. System & Products Pvt. Ltd http://www.apcsp.com
4. Arka Trading & Services http://www.mfdplaza.in
5. Bajaj Electricals Ltd - Part of Bajaj Group. http://www.bajajelectricals.com/
6. Electroil http://www.electroil.com/
7. Eveready Industries India Ltd http://www.evereadyindustries.com/
8. Graftec india http://graftec.trade-india.com
9. Indexelectronics http://www.indexelectronics.com
10. Khaitan Group http://www.khaitan.com/
11. Lloyd Electric & Engineering Limited http://www.lloydengg.com/
12. Modern Electrical Stores http://www.modernelectricalsindia.com/
13. Needo electronics and electricals pvt. Ltd. http://www.needoindia.com
14. Picasso home products http://www.picassoappliances.com/
15. Polor Industries Ltd http://www.polarinc.com/
16. Rajshree India Ltd. http://www.rajshreefans.com
17. Shilpa Electricals http://www.shilpaelectricals.com/
18. Super Impex http://www.superimpex.com
19. Tri Star Engineering Industries http://www.tristarengg.com
20. Vijay Electricals http://www.vijayelectricalspune.com/
21. Vxl Technologies Ltd. http://www.vxldesign.com
22. XtremeWorx http://www.xtremeworx.net

Electrical components companies

1. Ace Bimetalliks India Pvt. Ltd. http:// www.aceelectricals.com
2. Aditron India Pvt. Ltd. (Engineering Division) http://www.aiplen.com
3. Admir Ovens http://www.admir.com
4. Arvind Anticor Ltd http://www.picklingplant.com
5. Asiatic Electronic Industries. http://www.asiatic-india.com/
6. Axis Electrical Components India Pvt. Ltd. http://www.axis-india.com
7. Balar Marketing Pvt. Ltd http://www.allelectricalproducts.com/
8. Bhartia Industries Limited http://www.bchindia.com
9. Brass Copper & Alloy (I) Ltd. http://www.hexworldwide.com
10. Brightech Valves and Controls Pvt. Ltd. http://www.brightechvalves.com
11. Caltech Engineering Services http://www.caltechindia.com
12. Color Design India http://www.colordesigntech.com/
13. Consult Techniques (I) Pvt. Ltd http://www.consulttechnique.com/
14. Deki Electronics Ltd. http://www.dekielectronics.com
15. Elpro International Limited http://www.elproindia.com/
16. Elymer http://www.elymer.com
17. E S Electronics (India) Pvt. Ltd http://www.energysaversindia.com/
18. Finetech Engineering Corporation http://www.finetechindia.com
19. Gayatri Control, Ahmedabad http://www.gayatricontrol.com/
20. Gemscab Industries Ltd http://www.gemscab.com/
21. Hallmark Electronics http://www.hallmarkelect.com/
22. India International House Ltd http://www.builderhardware.com/
23. Jaykrishna magnetics pvt.ltd http://www.jkmagnetics.com
24. Leotech Group http://www.leotechindia.com/
25. Maxx Mobile Phone Accessories Pvt. Ltd http://www.maxmobile.co.in
26. Mehta Engineering Enterprise http://www.mehtaswitch.com

27. Mehta Tubes Ltd http://www.mehta-group.com/
28. Mellcon Engineers http://www.mellcon.com
29. Micromot Controls http://www.micromotcontrols.com
30. Muskaan Engineers http://www.electricitysaver.com/
31. Neelam Import Pvt. Ltd. http://www.cellking.org
32. Onload Gears http://www.onloadgears.com/
33. Orton Engineering Pvt. Ltd, Thane http://www.ortonengineering.com/
34. Persang Alloy Industries http://www.webmasterindia.com/persangalloy
35. PMT Engineers http://www.pmtengineers.com
36. Powercap Systems (Madras) Pvt. Ltd http://www.transformersindia.com/
37. Powertek Equipment Company http://www.powertekindia.com/
38. Pragati Electrocom Pvt. Ltd http://www.pragatielectrocom.com/
39. Pran Electronics Pvt. Ltd. http://www.pranelectronics.com
40. Precicraft Components India Pvt. Ltd http://www.precicraft.com/
41. Prima Automation India Pvt. Ltd http://www.prima-automation.com/
42. Rittal India Pvt Ltd http://www.rittal-india.com
43. Sanghi Yantra Udyog http://www.skyuindia.com/
44. SKN - Bentex Group of Companies. http://www.sknbentex.com/
45. South India Industrial Suppliers http://siis-india.com/bus_bar_support.html
46. Square Automation Pvt. Ltd http://www.squareautomation.com/
47. Sudhir Switchgears http://www.sudhirswitchgears.com
48. Syntron Controls http://www.syntron-controls.com
49. Torque Master Tools Pvt. Ltd http://www.torquemasterindia.com/
50. United Core http://www.unitedcores.com/
51. Utiliti Controls http://www.utiliticontrols.com/
52. valrack modular systems pvt.ltd http://www.valrack.com
53. Wavetronics http://www.wavetronicsindia.com
54. Rane Holdings Limited http://www.rane.co.in

Lighting & luminaries

1. A.K. Electricals http://www.akelectricals.com/
2. APCO India http://www.indiabizclub.net/Electrical/APCO_INDIA.html
3. Aquascape engineers http://www.fountainsnozzles.com
4. Arihant Enterprises : http://www.arihantsecurityindia.com/
5. Atlas Electricals www.indiabizclub.net/Electrical/ATLAS_ELECTRICALS.html
6. Baliga Lighting http://www.baliga.com/
7. Crompton Greaves Limited. http://www.cglonline.com/
8. Decon Lighting http://deconlighting.com
9. GE Lighting India http://www.gelighting.com/india/index.html
10. Jain Industrial Lighting Corporation http://www.indiamart.com/jilco/
11. Jayanta Lamp Industries Pvt.Ltd : http://www.jayantagroup.com
12. Kuber Lighting Pvt Ltd http://www.kuber.biz
13. Litray Lighting : http://www.litraylighting.com/
14. Mindscreen Pvt. Ltd. http://www.mindscreenfilms.com/
15. Peralites http://www.indiabizclub.net/Electrical/PEARLITES.html
16. Sam International http://www.indiamart.com/
17. Shyam Electricals - http://www.shyamelectricals.com/
18. Hpl Electric & Power Pvt.Ltd http://www.hplindia.com

Power Generation

1. Advance Engineering Company - http://www.advanceengineering.com/
2. APGENCO http://www.apgenco.com/

3. Birla Power Solutions Limited http://www.birlapower.com
4. Dyna Hitech Power Systems Ltd http://www.dynahitech.com
5. Essar Group http://www.essar.com/Group/group.asp
6. Essar Power Ltd. http://www.essar.com/
7. Jindal Steel & Power Ltd. http://www.jindalsteelpower.com
8. Kaiga Atomic Power Station http://www.npcil.org/docs/kaigaps.htm
9. Kakrapar Atomic Power Station http://www.npcil.org/docs/kaps.htm
10. Kirloskar Electric Co http://www.kirloskar-electric.com/
11. Lanco Industries http://www.lancogroup.com/groups/kpower/kpower.html
12. Madras Atomic Power Station (MAPS) http://www.npcil.org/
13. Magnum Power Generation Ltd http://www.magnumgrouponline.com/power/
14. Narora Atomic Power Station http://www.npcil.org/docs/naps.htm
15. National Thermal Power Corporation (NTPC) http://www.ntpc.co.in
16. NEPC India Ltd http://www.nepcindia.com
17. PTC India http://www.ptcindia.com
18. Rajasthan Atomic Power Station (RAPS) http://www.npcilraps.com/
19. Rajasthan Renewable Energy Corporation Limited (RRECL) http://www.rrecl.com/
20. Reliance Energy http://www.rel.co.in
21. Tarapur Atomic Power Station http://www.npcil.org/docs/taps.htm
22. Tata Electric Companies http://www.tata.com
23. Tata Power http://www.tatapower.com/
24. Techno Instrument India Pvt.Ltd web site url: http://www.tiiindia.com/
25. Torrent Power web site url: http://www.torrentpower.com/
26. Uttar Pradesh Power Corporation Ltd http://www.uppcl.org/
27. ABB Ltd www.abb.co.in/
28. Adani Power Ltd www.adanipower.com/
29. Aplab Ltd www.aplab.com/
30. BF Utilities Ltd www.bfutilities.com/
31. CESC Ltd. www.cescltd.com/
32. CMI Ltd. www.cmilimited.com.au/
33. DLF Power Limited www.eipowertech.com/dlf_power_limited.htm
34. DPSC Ltd www.dpscl.com/
35. Energy Development Company Ltd www.energy.com.ph/
36. Entegra Ltd www.entegra.co.in/
37. GMR Infrastructure Ltd www.gmrgroup.in/
38. Gujarat Industries Power Company Ltd www.gipcl.com/
39. GVK Power & Infrastructure Ltd www.gvk.com/
40. HBL Power Systems Ltd www.hbl.in/
41. Indowind Energy Ltd www.indowind.com/
42. Indo power projects Ltd www.indopowerprojects.in/
43. Jaiprakash Power Ventures Ltd www.jppowerventures.com/
44. Kalpataru Power Transmission Ltd www.kalpatarupower.com/
45. KSK Energy Ventures Ltd www.ksk.co.in/
46. National Wind & Power Corpn. Ltd www.nationalwind.com/
47. Neyveli Lignite Corpn. Ltd www.nlcindia.com/
48. NHPC Ltd. www.nhpcindia.com/
49. NTPC Limited www.ntpc.co.in/
50. Power Grid Corpn. Of India Ltd www.powergridindia.com/
51. PTC India Ltd www.ptcindia.com/
52. Reliance Power Ltd www.reliancepower.co.in/

53. Savant Infocomm Ltd www.savant-infocomm.com/
54. Sun Source (India) Ltd www.sunsource.in/about_us.htm
55. Suryachakra Power Corpn. Ltd www.suryachakra.in/
56. Suzlon Energy Limited www.suzlon.com/

Electric wires & Cables

1. Aksh Optifibre Limited http://www.akshoptifibre.com/
2. Anant Distributors Private Ltd. http://www.proflexcable.com/
3. Brimson Cables Private Ltd http://www.brimsoncable.com/
4. Capital Cables India Limited - http://www.indiantrade.com/cci/
5. Colt Cables Private Limited http://www.coltcables.com/
6. Cords Cable Industries Ltd http://www.cordscable.com/
7. Delton Cables Limited - http://www.deltoncables.com/
8. Fort Gloster Industries Limited http://www.glostercables.com/
9. Kaydour Cables India http://www.kaydourcables.com
10. KEI Industries Limited http://www.kei-ind.com/
11. Lapp India http://www.lappindia.com/
12. National Cable Industries http://www.nationalcables.com/
13. Navinbhai Cables Private Ltd http://www.ncplindia.com/
14. Neolex Cables http://www.neolexcable.com/
15. North Eastern Cables Private Ltd //www.khetangroup.com/
16. Novoflex Marketing Private Limited. http://www.novoflexgroup.com/
17. Polycab Wires Private Limited http://www.polycab.com/
18. Q-Flex Cables Limited http://www.qflexcable.com/
19. Ravin Cables limited - Primecab brand of cables. http://www.primecab.com/
20. Relemac India http://www.relemacindia.com
21. RollRing Industries - Calicut, Kerala. http://www.rollring.com/
22. Samdaria Electricals http://www.samdariaelectricals.co.in/
23. Satish Enterprises http://www.satishenterprise.com/
24. Shree Nakoda Cables Private Limited. http://www.nakodacables.com/
25. Skytone Electricals (India) http://www.skytonecables.com/
26. Surbhi Cables Industries Private Limited. http://www.indiamart.com/surbhi/
27. Surbhi Telelink Pvt. Ltd http://www.surbhiindia.com/
28. Torrent Cables Ltd http://www.torrentcables.com/
29. Universal Cables http://www.universalcablesltd.com
30. Usha Martin http://www.ushamartin.com
31. Weather Crafts Ltd http://www.weathercraft.com/
32. Finolex Cables Limited http://www.finolex.com

Electrical exporters

1. Arbariya steels http://www.arbariya.com/
2. Bajaj International Pvt. Ltd. http://www.bajajinternational.com/
3. Biax http://www.biaxmetals.com/
4. Brightech Valves and Controls Pvt Ltd http://www.brightechvalves.com
5. Dynamic Scaffolding & Equipment Co http://www.dynamicscaffolding.com/
6. Excel Metal And Engg. Industries http://www.excelmetal.net
7. Impex Trading Company http://www.impextradingco.com
8. Miltop Trading Company http://www.miltop.com/
9. Om(India)Exports http://omindiaexpo.com
10. Oriental Export Corporation http://www.indialinks.com/oriental/
11. Sevana Electrical Group http://www.sevana.com/
12. Veejay Lakshmi Engineering Works Limited http://www.veejaylakshmi.com

13. Vishal Electromag Industries http://www.vishalmotor.com
14. Vaibhav Electricals http://www.vaibhavelectricals.com
15. Industrial Forging Industries http://www.ifi-india.net/
16. Imperial Brass Component http://electronics-electrical.exportersindia.com
17. M/s Horizon Exports http://www.horizonexport.net
18. Golden Crest Marketing Network Pvt. Ltd. http://www.aceenergy.co.in/
19. Shree Krishna Enterprises http://www.shreekrishnaenterprises.co.in/
20. Sahiba International Trading Company http://www.sahibainternational.com
21. Pushpak Metals web site url: http://www.pushpakmetals.com/
22. IEEMA http://www.ieema.org
23. ELSTER METERING (P) LTD http://www.elstermetering.com/
24. Shivam Electronics http://www.shivamelectronics.com
25. SUBRTO http://www.subrtoburnishing.com/
26. Unitek Engineers http://www.unitekengineers.com
27. Euro Technologies http://www.eurotapes.in/

Measurements & Instrumentation

1. Active Control Pvt Ltd http://www.indiamart.com/activecontrols/
2. Autometers Alliance Limited. http://www.autometers.com/
3. EIP Bulk Control Pvt Ltd http://www.eipbulkcontrols.com/
4. IMP Power Limited http://www.imp-power.com/
5. Instruments International http://www.indorecity.com/ii/index.html
6. Kanji Precision Works http://www.kanjimeters.com
7. Mittal Enterprises http://www.indiamart.com/mittalenterprises/
8. Modsonic http://www.modsonic.com/
9. Nippon Instruments http://www.nipponinstruments.com/
10. Poonawala Electro Weigh http://www.peweigh.com
11. Prok Devices http://www.prokdvs.com
12. Shanti Instruments http://www.shanti-instruments.com
13. Texlab Industries http://www.texlabindia.com
14. Vasavi Electronics http://www.vasavi.com
15. VPL Infotech http://vplinf.com

Power Distribution

1. Areva T&D India http://www.areva-td.co.in/
2. BSES Yamuna Power Ltd and BSES Rajdhani Power Ltd. http://www.bsesdelhi.com/
3. Central Power Distribution Company of Andhra Pradesh Limited http://www.apcentralpower.com/
4. CESC Limited http://www.cescltd.com
5. Eastern Power Distribution Company of Andhra Pradesh Limited http://www.apeasternpower.com/
6. Elpro International Limited http://www.elproindia.com/
7. Gujarat Electricity Board http://www.gseb.com
8. Haryana Power Utilities http://www.haryanaelectricity.com/
9. Hubli Electricity Supply Company Limited (HESCOM) http://www.hescom.org/
10. Maharashtra State Electricity Distribution Company Limited http://www.mahadiscom.in
11. Natinal Hydroelectric Power Corporation of India http://www.nhpcindia.com
12. Noida Power Company Ltd http://www.noidapower.com
13. North Delhi Power Limited http://www.ndplonline.com/
14. Power Grid Corporation Of India http://www.powergridindia.com
15. Southern Power Distribution of Andhra Pradesh http://www.apspdcl.in
16. Transmission Corporation of Andhra Pradesh (AP TRANSO) http://www.aptranscorp.com/

Transformers

1. Emco Limited http://www.emcoindia.com
2. Golecha Electro Stampings. http://www.golecha.com/

3. Intaf India http://www.intafindia.com/
4. Kappa Electricals Private Ltd http://www.kappaelectricals.com/
5. Kotsons Transformers http://www.kotsons.com/
6. Mahindra Electrical Works http://www.mewindia.com
7. Marson's Electricals http://www.marsonselectricals.com/
8. P.M. Electronics Limited. http://www.indiamart.com/pme/
9. Prismatic India http://www.wind-it.com/
10. Raksan Transformers Private Ltd http://www.raksantransformers.com/
11. Roland Electronics and devices Private Ltd. http://www.redpl.com/
12. Sai Electricals http://www.saielectricals.com/
13. Tesla Transformers Limited http://www.teslatransformers.com/
14. Transformers and Electricals Kerala Limited. http://www.telk.com/
15. Transformers and Rectifiers (India) Ltd. http://www.jmtril.com
16. T.S. International http://www.transformers-reactors.com

Green Energy Companies in India

1. **Suzlon Energy:** Suzlon is of course the first company that comes to mind. They are one of the leading wind energy companies in India are one of the better known alternative energy companies in India. Here are some details from their website.

Conceived in 1995 with just 20 people, Suzlon is now a leading wind power company with:

- Over 16,000 people in 25 countries
- Operations across the Americas, Asia, Australia and Europe
- Fully integrated supply chain with manufacturing facilities in three continents
- Sophisticated R&D capabilities in Belgium, Denmark, Germany, India and The Netherlands
- Market leader in Asia, Suzlon Market Share (Combined with REpower) rose to 9.8% thereby making Suzlon 3rd * largest wind turbine manufacturing company in the world.

2. **Orient Green Power Limited:** Primarily engaged in the Wind and Biomass energy space. Currently wind constitutes the majority of their energy portfolio, so this is another one of India's wind energy companies. As of March 31, 2010, their total portfolio of operating projects included 193.1 MW of aggregate installed capacity, which comprised 152.6 MW of wind energy projects and 40.5 MW of biomass projects. Their portfolio of committed and development projects included approximately 815.5 MW of prospective capacity, which comprised an estimated 622.0 MW of wind energy projects, 178.5 MW of biomass projects and a 15.0 MW small hydroelectric project

3. **Indowind Energy Limited:** Indowind Energy Limited is also a wind energy company that develops wind farms for sale, manages the wind assets, and generates green power for sale to utilities and corporates. Turnkey implementation of Wind Power Projects, from concept to commissioning. Wind Asset Management Solution for installed assets, including operations, billing, collection of revenue to project customers. Supply of Green Power to Customers. CERs (Carbon Credit) Sales and Trading.

4. **Suryachakra Power Corporation Limited:** SPCL is the flagship company of Suryachakra Group with interests in Power generation – renewable energy (biomass, Solar, hydro, Wind) and Clean Technology / Ultra Super Critical Thermal Power Plants (coal, Gas), Engineering Consultancy and Urban infrastructure development activities. Suryachakra Power Corporation Limited has established 3 wholly owned subsidiaries for setting up of renewable energy (biomass) power projects and also acquired stake in Sri Panchajanya Power Private limited, which was setting up a 10 MW Biomass Power Plant at Hingoli, Maharashtra.

5. **NEPC India:** This is a Public Limited Company promoted by the Khemka Group with the primary objective of promoting wind energy. This successful Group has a multi crore turnover from diversified activities in the field of Power Generation from Wind Energy and manufacture and marketing of Wind Turbine Generator (a renewable energy device).

6. **Azure Power:** Azure Power is the green energy space as it is one of the solar energy companies in India. It is a solar power company, and they are supplying power to 20,000 people in 32 villages in Punjab.

7. **AuroMira Energy:** Auro Mira is also a green technology energy company that is private, and present in the Biomass, Small Hydel and Wind Sectors. It plans to develop over 1000 MW capacity by 2012. AME is presently focusing in Biomass, Small Hydro and Wind Sectors. AME plans to invest $ 900 Million to develop, own and operate over 1000 MW in clean energy in addition to WTG manufacture and to develop over 15000 acres of energy plantation in the next five years. AME intends to foray into other clean energy technologies, solar, bio-diesel etc. in the future.

8. **Husk Power Systems:** This is truly an alternate energy company which owns and operates 35-100 kW "mini power-plants" that use discarded rice husks to deliver electricity to off-grid villages in the Indian "Rice Belt

9. **RRB Energy Limited:** This company is in the field of Wind Power Generation, and is an ISO 9001:2008 and ISO 14001:2004 certified Company. RRBEL is also an Independent Power Producer having established wind farms of aggregate megawatt capacity.

10. **Moser Baer Solar Limited:** This is a subsidiary of Moser Baer that is one of the solar energy companies as well. The Group's photovoltaic manufacturing business was established between 2005 and 2007 with the primary objective of providing reliable solar power as a competitive non-subsidized source of energy.

Internationally renowned MNC's to offer electrical jobs

Cisco, Hewlett Packard, Intel, AMD, IBM, Ford, General Electric, General Motors, Lockheed Martin, Lucent Technologies, Moog, Micron, Motorola, Nokia, Qualcomm, Rockwell, Sun Microsystems, Atto Technology, MTI and Texas Instruments.

Top core companies in India to offer electrical jobs

1. Bharat Sanchar Nigam Limited
2. Tata Consultancy Services
3. Bharti Airtel Limited
4. Wipro Ltd
5. Infosys Technologies Limited
6. Hewlett-Packard India
7. HCL Infosystems Limited
8. Reliance Communications Ltd
9. LG Electronics India Pvt Ltd
10. IBM India Pvt Ltd
11. Videocon Industries Ltd
12. HCL Technologies Limited
13. Satyam Computer Services Ltd
14. Siemens Ltd.
15. Samsung India Electronics Pvt. Ltd.
16. Mahanagar Telephone Nigam Ltd
17. Redington (India) Limited
18. Cognizant Technology Solutions
19. Idea Cellular Ltd
20. Videsh Sanchar Nigam Limited

Exclusive Government jobs for Electrical Engineers

1. ISRO
2. DRDO
3. BEL
4. BHEL
5. GAIL
6. SAIL
7. HAL
8. HPCL
9. NTPC
10. ONGC
11. IOCL
12. RRB
13. ECIL
14. APGENCO
15. APTRANSCO

Ref: http://www.regencyengg.com/eee_job_offer.html

K.L.N COLLEGE OF ENGINEERING
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
SAMPLE TCS QUESTION PAPER

1. Two bowls are taken, one contains water and another contains tea.one spoon of water is added to second bowl and mixed well, and a spoon of mixture is taken from second bowl and added to the second bowl. Which statement will hold good for the above?

(Ans: second liquid in first bowl is smaller than the first mixture in second bowl)

2. Which is the smallest no divides 2880 and gives a perfect square?
a.1 b.2 c.5 d.6
Ans: c
3. Form 8 digit numbers from by using 1, 2,3,4,5 with repetition is allowed and must be divisible by4?
a.31250 b.97656 c.78125 d.97657
Ans: c
4. One problem on (a3-b3)/(a2+ab+b2)

Ans: 'a-b'

5. Rearrange and categorize the word 'RAPETEKA'?

Ans: bird

6. In school there are some bicycles and 4wheeler wagons.one Tuesday there are 190 wheels in the campus. How many bicycles are there?

Ans: 15

7. Key words in question (Fibonacci series, infinite series, in the middle of the question one number series is there….I got the series 3 12 7 26b 15?

Ans:54

(Logic: 3*2+1=7 12*2+2=26

7*2+1=15 26*2+2=54)

8. A father has 7 penny's with him and 1 water melon is for 1p, 2chickoos for 1p, 3 grapes foe 1p.he has three sons. How can he share the fruits equally?
Ans: 1 watermelon,2chickoos,1grape

9. A lies on mon, tues, wed and speak truths on other days, B lies on thur, fri, sat

and speaks truths on other days.. one day a said I lied today and B said I too lied today. What is the day?
10. Man, Bear, North, South, walks.

Ans: White

11. (1/2) of a number is 3 times more than the (1/6) of the same number?

Ans: 9

12. There are two pipes A and B. If A filled 10 liters in hour B can fills 20 liters in same time. Likewise B can fill 10, 20, 40, 80,160….if B filled in (1/16) th of a tank in 3 hours, how much time will it take to fill completely?

Ans:7 hours

13. KEYWORDS:T.Nagar,Chennai,1-100,prime numbers b/n 140-180,How many 2's are there?

Ans: 20 (Not only 2's ,1's,3's,4's,5's,6's,7's,8's,9's,0's also 20)

14. One question has last part like difference between two terms is 9 and product of two numbers is 14, what is the squares of sum of numbers?
Ans:109
15. A man is standing before a painting of a man and he says I have no bro and sis and his father is my father's son?

Ans: His son

16. What is the value of [(3x+8Y)/(x-2Y)]; if x/2y=2?
Ans:10 {the numerical may change)
17. A pizza shop made pizzas
with to flavours.in home there are 'N' different flavors, in that 'M' flavors are taken to made pizza.in how many ways they can arrange?
(Logic: NcM)
18. One grandfather has three grandchildren, two of their age difference is 3, eldest child age is 3 times youngest child's age and eldest child's age is two times of sum of other two children. What is the age of eldest child?
Ans:15
19. In a market 4 man are standing .the average age of the four before 4years is 45,aftyer some days one man is added and his age is 49.what is the
average weight of all?
Ans: 49
20. KEYWORDS: one organization ,material labor and maintenance are in the ratio of 4:6:7,the material cost is:100,what is the total cost?
Ans: 425

21. KEYWORDS: density, reluctance, sensitivity, voltage ,current, what is the resistance Formula is "R=V/I"
22. KEYWORDS: Sports readers,10 tables,4chairs per table, each table has differentnumber of people then how many tables will left without at least one person?
Ans : 6
23. KEYWORDS: Die, card, coin, b/n 2 to 12
Ans: All are equal
24. In a school for a student out of a 100 he got 74 of average for 7 subjects and he got 79 marks in 8th subject. what is the average of all the subjects?
Ans: 74.625
25. In a question ,last part has ,the ages of two people has the ratio of 6:6 and by adding the numbers we get 44,after how many years the ratio would be 8:7?
Ans: 8

26. Two years before Paul's age is 2times the Alice age and the present age of Paul is 6times the Alice. what is the presents Paul's age???(3years) "u try to solve this question once"
27. One train travels 200m from A to B with 70 km/ph. and returns to A with 80kmph, what is the average of their speed?

This are the only question which i remember

All The Very Best to my dear friends !

25 Sample Questions of TCS

Q1) Given a collection of points P in the plane , a 1-set is a point in P that can be separated from the rest by a line, .i.e the point lies on one side of the line while the others lie on the other side. The number of 1-sets of P is denoted by n1(P). The minimum value of n1(P) over all configurations P of 5 points in the plane in general position (.i.e no three points in P lie on a line) is

a) 3
b) 5
c) 2

Q2) Paul the octopus who has been forecasting the outcome of FIFA world cup matches with tremendous accuracy has now been invited to predict ICC world cup matches in 2011. We will assume that the world cup contenders have been divided into 2 groups of 9 teams each. Each team in a group plays the other teams in the group. The top two teams from each group enter the semi finals (after which the winner is decided by knockout).

However, Paul has a soft spot for India and when India plays any team, Paul always backs India. Alas, his predictions on matches involving India are right only 2 out of 3 times. In order to qualify for the semi finals, it is sufficient for India to win 7 of its group matches. What is the probability that India will win the ICC world cup?

a) (2/3)^10
b) (2/3)^9 + 8/3 * (2/3)^9
c) 8/3 * (2/3)^9
d) (2/3)^10 + 8/3*(2/3)^9

Q3) A toy train produces at least 10 different tunes when it moves around a circular toy track of radius 5 meters at 10 meters per minute. However , the toy train is defective and it now produces only two different tunes at random. What are the odds that the toy train produces 4 consecutive music tunes of the same type?

a) 1 in 16
b) 1 in 4
c) 1 in 8

Q4) A number when divided by D leaves a remainder of 8 and when divided by 3D leaves a remainder of 21 . What is the remainder left, when twice the number is divided by 3D?

a) 13
b) cannot be determined
c) 3
d) 42 **(solution:c)**

Q5) Six friends decide to share a big cake. Since all of them like the cake, they begin quarreling who gets to first cut and have a piece of the cake. One friend suggests that they have a blindfold friend choose from well

shuffled set of cards numbered one to six. You check and find that this method works as it should simulating a fair throw of a die. You check by performing multiple simultaneous trials of picking the cards blindfold and throwing a die. You note that the number shown by the method of picking up a card and throwing a real world die, sums to a number between 2 and 12. Which total would be likely to appear more often – 8,9 or 10?

a) 8
b) All are equally likely
c) 9
d) 10

Q6) One day Alice meets pal and byte in fairyland. She knows that pal lies on Mondays, Tuesdays and Wednesdays and tells the truth on the other days of the week byte, on the other hand, lies on Thursdays, Fridays and Saturdays, but tells the truth on the other days of the week. Now they make the following statements to Alice – pal. Yesterday was one of those days when I lie byte. Yesterday was one of those days when I lie too. What day is it ?

a) Thursday
b) Tuesday
c) Monday
d) Sunday **(solution:a)**

Q7) A car manufacturer produces only red and blue models which come out of the final testing area completely at random. What are the odds that 5 consecutive cars of the same color will come through the test area at any one time?

a) 1 in 16
b) 1 in 125
c) 1 in 32
d) 1 in 25

Q8) Alok is attending a workshop "How to do more with less" and today's theme is *Working with fewer digits.* The speakers discuss how a lot of miraculous mathematics can be achieved if mankind(as well as womankind) had only worked with fewer digits.

The problem posed at the end of the workshop is

How many four digit numbers can be formed using the digits 1, 2,3,4 ,5 (but with repetition) that are divisible by 4?

Can you help Alok find the answer?

a) 100 b) 125 c) 75 d) 85

Q9) Rearrange the following letters to make a word and choose the category in which it Ms RAPETEKA

a) Bird
b) Vegetable
c) City

d) Fruit

Q10) On planet korba, a solar blast has melted the ice caps on its equator. 9 years after the ice melts, tiny planetoids called echina start growing on the rocks. Echina grows in the form of circle, and the relationship between the diameter of this circle and the age of echina is given by the formula

$d = 4*\sqrt{(t-9)}$ for $t \geq 9$

where d represents the diameter in mm and t the number of years since the solar blast.

Jagan recorded the radius of some echina at a particular spot as 7mm. How many years back did the solar blast occur?

a) 17
b) 21.25
c) 12.25
d) 12.06 **(solution:b)**

Q11) In the reading room of a library, there are23 reading spots. Each reading spot consists of a round table with 9 chairs placed around it. There are some readers such that in each occupied reading spot there are different numbers of readers. If in all there are 36 readers, how many reading spots do not have even a single reader?

a) 8
b) None
c) 16
d) 15 **(solution:d)**

Q12) Ferrari S.P.A is an Italian sports car manufacturer based in Maranello, Italy. Founded by Enzo Ferrari in 1928 as Scuderia Ferrari , the company sponsored drivers and manufactured race cars before moving into production of street-legal vehicles in 1947 as Feraari S.P.A. Throughout its history, the company has been noted for its continued participation in racing, especially in Formula One where it has employed great success .Rohit once bought a Ferrari . It could go 4 times as fast as Mohan's old Mercedes. If the speed of Mohan's Mercedes is 46 km/hr and the distance traveled by the Ferrari is 953 km, find the total time taken for Rohit to drive that distance.

a) 20.72
b) 5.18
c) 238.25
d) 6.18 **(solution:b)**

Q13) A sheet of paper has statements numbered from 1 to 70. For all values of n from 1 to 70. Statement n says ' At least n of the statements on this sheet are false. ' Which statements are true and which are false?

a) The even numbered statements are true and the odd numbered are false.

b) The odd numbered statements are true and the even numbered are false.

c) The first 35 statements are true and the last 35 are false.

d) The first 35 statements are false and the last 35 are false.

(solution:d)

Q14) Middle – earth is a fictional land inhabited by Hobbits, Elves, dwarves and men. The Hobbits and the Elves are peaceful creatures who prefer slow, silent lives and appreciate nature and art. The dwarves and the men engage in physical games. The game is as follows . A tournol is one where out of the two teams that play a match, the one that loses get eliminated. The matches are played in different rounds where in every round , half of the teams get eliminated from the tournament. If there are 8 rounds played in a knock-out tournol how many matches were played?

a) 257
b) 256
c) 72
d) 255 **(solution:d)**

Q15) A research lab in Chennai requires 100 mice and 75 sterilized cages for a certain set of laboratory experiments . To identify the mice, the lab has prepared labels with numbers 1 to 100 , by combining tags numbered 0 to 9. The SPCA requires that the tags be made of toxin-free material and that the temperature of the cages be maintained at 27 degree Celsius. Also , not more than 2 mice can be caged together and each cage must be at least 2 sq.ft in area. The 5 experiments to be conducted by lab are to be thoroughly documented and performed only after a round of approval by authorities. The approval procedure takes around 48 hours. How many times is the tag numbered '4' used by the lab in numbering these mice?

a) 9
b) 19
c) 20
d) 21 **(solution:b)**

Q16) There are two water tanks A and B, A is much smaller than B. While water fills at the rate of one litre every hour in A, it gets filled up like 10, 20, 40, 80, 160... in tank B.(At the end of first hour, B has 10 litres , second hour it has 20, and so on). If tank B is 1/32 filled after 21 hours, what is the total duration required to fill it completely?

a) 26 hrs
b) 25 hrs
c) 5 hrs
d) 27 hrs **(solution:a)**

Q17) Consider two tumblers, the first containing one litre of coffee. Suppose you take one spoon of water out of the first tumbler and pour it into the second tumbler. After moving you take one spoon of the mixture from the second tumbler and pour it back into the first tumbler . Which one of the following statement holds now?

a) There is less coffee in the first tumbler than water in the second tumbler.

b) There is more coffee in the firs tumbler than water in the second tumbler

c) There is as much coffee in the first tumbler as there is water in the second tumbler

d) None of the statements holds true.

Q18) Francois Pachet , a researcher at Sony Computer Science laboratories is also a jazz musician. He decided to build a robot able to improvise like a pro. Named Continuator, the robot can duet with a live musician in real- time. It listens to a musical phrase and then computes a complementary phrase with the same playing style. If the cost of making the robot is divided between and then computes a complementary phrase with the same playing style. If the cost of making the robot is divided between materials , labour and overheads in the ratio of 4:6:2.If the materials cost $108. the cost of the robot is

a) $270
b) $324
c) $216
d) $ 648 **(solution:b)**

Q19) A lady has fine gloves and hats in her closet- 18 blue- 32 red and 25 yellow. The lights are out and it is totally dark inspite of the darkness. She can make out the difference between a hat and a glove. She takes out an item out of the closet only if she is sure that if it is a glove. How many gloves must she take out to make sure she has a pair of each colour?

a) 50
b) 8
c) 60
d) 42

Q20) A man jogs at 6 mph over a certain journey and walks over the same route at 4 mph. What is his average speed for the journey?

a) 2.4 mph
b) 4 mph
c) 4.8 mph
d) 5 mph **(solution:d)**

Q21) Spores of a fungus, called late blight, grow and spread infection rapidly. These pathogens were responsible for the Irish potato famine of the mid-19th century. These seem to have attacked the tomato crops in England this year. The tomato crops have reduced and the price of the crop has risen up . The price has already

gone up to $45 a box from $27 a box a month ago. How much more would a vegetable vendor need to pay to buy 27 boxes this month over what he would have paid last month?

a) $27
b) $ 18
c) $45
d) $ 486

Q22) Given a collection of 36 points P in the plane and a point equidistant from all points in P, which of the following are necessarily true?

A. The points in P lie on a circle.

B. The distance between any pair of points in P is larger than the distance between X and a point in P

a) A and B
b) Neither A nor B
c) B only
d) A only

Q23) In the year 2002, Britain was reported to have had 4.3m closed – circuit television (CCTV) cameras – one for every 14 people in the country . This scrutiny is supposed to deter and detect crime. In one criminal case, the police interrogates two suspects . The ratio between the ages of the two suspects is 6:5 and the sum of their ages is 6:5 and the sum of their ages is 55 years. After how many years will the ratio be 8:7.?

a) 11
b) 6
c) 10
d) 5

Q24) Susan made a block with small cubes of 8 cubic cm volume to make a block 3 small cubes long, 9 small cubes wide and 5 small cubes deep. She realizes that she has used more small cubes than she really needed. She realized that she could have glued a fewer number of cubes together to lock like a block with same dimensions, if it were made hollow. What is the minimum number of cubes that she needs to make the block?

a) 114
b) 135
c) 21
d) 71

Q25) Alok and Bhanu play the following coins in a circle game. 99 coins are arranged in a circle with each coin touching two other coin. Two of the coins are special and the rest are ordinary. Alok starts and the players take turns removing an ordinary coin of their choice from the circle and bringing the other coins closer until they again form a (smaller) circle. The goal is to bring the special coins adjacent
to each other and the first player to do so wins the game. Initially the special coins are separated by two ordinary coins O1 and O2. Which of the following is true ?

a) In order to win, Alok should remove O1 on his first turn.

b) In order to win, Alok should remove one of the coins different from O1 and O2 on his first turn.

c) In order to win, Alok should remove O2 on his first turn.

d) Alok has no winning strategy.

****

TCS MOCK EMAIL WRITING QUESTIONS

Directions:

1. Use all the phrases given
2. Minimum words should be 50 otherwise your email cannot be validated
3. Addressing and signing should be done as in the question given.
4. Common grammatical rules, punctuation should be according to standard English.
5. You can use your own phrases along with the phrases given.

Question : 1

As a member of your residential society, write an email to inspector of local Police station, Mr.Sharma, informing him about miscreants who ride their bikes rashly every evening outside your society. Sign the email as william.
residential area - ride - rashly - children - play - elderly - walk - grocery shop - across the road - dangerous - accidents - nuisance - action - immediately.

Sample Answer:

Dear Mr.Sharma,

We are the residents of Siddartha Nagar. We would like to bring to your notice that a few guys are riding their bikes very rashly in the evening hours in the main road of the colony. As you know that this is the time when children play on the road and elderly go for an evening walk. Also there is a grocery shop across the road and many housewifes used to cross the road to buy any groceries. In the recent times we observed that due this rash driving many accidents were happened and several injured. This is creating a constant nuisance for all. So we would like to request you to take necessary action to curb these activities.

Thanking you
Yours sincerely,
William.

Question 2:

As a recent buyer of their car, write an email to the Manager of Smart Automative company, Mr.Ahmed, regarding the poor quality of service facility available in the city. Sign the email as Chopra.
Outline:

very few - service centers - complaints - pending problems - maintenance - cost - time - delivery - increase - customer satisfaction

Dear Mr. Ahmed

I recently bought Fiat palio from "Sridhar Fiat show room" in Nagole. Recently I faced small problem with car AC and bought the car for maintenance. But to my utter surprise, the howroom staff told me that service is not available in their showroom and they asked me to take the car to near by service center. I found that there are very

few service centers available compared to sales showrooms, and there are many complaints regarding this. This in turn is causing many pending problems and increased maintenance cost, time and delivery time. I would like to suggest you that if more service centers are opened in the city, customer satisfaction also goes up which finally converts into more sales.

Thanks and Regards
Chopra

Question 3:

As a former student, write an email to your professor, Mr.Matt, thanking her for teaching and guidance that contributed to your overall development. Sign the email as peter.

Outline:

Successful - Placed - grateful - help - advice - grooming - values - shaping my future - sincere - professional

Dear Mr.Matt

I am very happy to tell you that I got successful in the recently conducted campus placement drive at my college. I am placed with TCS. I am extremely grateful for your help regarding my preparation. More over your advice regarding personality development helped for my personal grooming. In addition to that, your style of teaching inculcates not only those skills related to professional success but also for developing values which I believe helps for shaping my career. Once again I would like to thanks for your sincere and professional help.

with warm regards
Peter.

Question 4:

As an intern at ABC consulting Pvt.Ltd, write an email to your internship Project Manager, Mr.Ramesh, informing about the progress that you are making and some difficulties that your are encountering. Sign the email as Ben.

Outline:

Thank - challenging - progress - tight schedule - support - report - analytics - guidance - access - doubt - requirements - design.

Dear Mr.Ramesh
Thank you for allotting a challenging project for my internship. I am making steady progress and learning many new things. The project is due next month and we are on tight schedule. I need some additional support with regard to the reporting of Analytics. Your guidance helped me access the database with ease but I have several doubts regard to the requirements of the design. But I am facing little problem in reporting.
Thanks and regards
Ben

Tips for Effective Communication

Have courage to say what you think.

Be confident in knowing that you can make worthwhile contributions to conversation. Take time each day to be aware of your opinions and feelings so you can adequately convey them to others. Individuals who are hesitant to speak because they do not feel their input would be worthwhile need not fear. What is important or worthwhile to one person may not be to another and may be more so to someone else.

Practice.

Developing advanced communication skills begins with simple interactions. Communication skills can be practiced every day in settings that range from the social to the professional. New skills take time to refine, but each time you use your communication skills, you open yourself to opportunities and future partnerships.

Make eye contact.

Whether you are speaking or listening, looking into the eyes of the person with whom you are conversing can make the interaction more successful. Eye contact conveys interest and encourages your partner to be interested in you in return.

Use gestures.

These include gestures with your hands and face. Make your whole body talk. Use smaller gestures for individuals and small groups. The gestures should get larger as the group that one is addressing increases in size.

Manifest constructive attitudes and beliefs.

The attitudes you bring to communication will have a huge impact on the way you compose yourself and interact with others. Choose to be honest, patient, optimistic, sincere, respectful, and accepting of others. Be sensitive to other people's feelings, and believe in others' competence.

Develop effective listening skills:

Not only should one be able to speak effectively, one must listen to the other person's words and engage in communication on what the other person is speaking about. Avoid the impulse to listen only for the end of their sentence so that you can blurt out the ideas or memories your mind while the other person is speaking.

Enunciate your words.

Speak clearly and don’t mumble. If people are always asking you to repeat yourself, try to do a better job of articulating yourself in a better manner.

Pronounce your words correctly.

People will judge your competency through your vocabulary. If you aren’t sure of how to say a word, don’t use it.

Use the right words.

If you’re not sure of the meaning of a word, don’t use it. Grab a dictionary and start a daily habit of learning one new word per day. Use it sometime in your conversations during the day.

Slow your speech down.

People will perceive you as nervous and unsure of yourself if you talk fast. However, be careful not to slow down to the point where people begin to finish your sentences just to help you finish.

Developing Leadership Skills

No one is a born leader; everyone can develop leadership skills and everyone can benefit from using them. First, take time to honestly analyze yourself. Learn to understand yourself.

It's the first step to understanding others. Consider these important questions:

1. What kind of leader am I? One who helps to solve problems? A leader who helps people get along? How do others see me as a leader?
2. What are my goals, purposes, and expectations in working with this particular group? Identify areas for improvement.

Ask yourself these questions:

1. Do I try to be aware of how others think and feel?
2. Do I try to help others perform to the best of their abilities?
3. Am I willing to accept responsibility?
4. Am I willing to try new ideas and new ways of doing things?
5. Am I able to communicate with others effectively?
6. Am I a good problem solver?
7. Do I accept and appreciate other perspectives and opinions?
8. Am I aware of current issues and concerns on campus or in my community?

Then after analyzing your strengths and weaknesses -- take action

Devise a strategy for upgrading your skills. Here are a few strategies to consider:

1) Communicate effectively:

Effective communication is dialogue. Barriers are created by speaking down to people, asking closed questions that elicit yes or no answers, using excessive authority, and promoting a culture that depends on unanimity. If your focus is winning the argument or if you react defensively to criticism, you'll create fear of openness and hinder the organization's growth.

Try these steps to effective communication:

• Listen actively - ask open questions. Be genuinely interested in what other's say.

• Thank people for their openness -- stress how much you value it -- even if you don't like specifically what is being said.

• Point to areas of agreement before jumping on areas of disagreement - this reduces defensiveness; members wont fear being "attacked."

• Set aside your authority to create an atmosphere of partnership to reduce fear in group members.

• Promote a culture of constructive dissent - though not to the point of paralysis.

• Portray disagreement as simply a difference of opinion. Get rid of the "I'm right, you're wrong" attitude.

2) Encourage enthusiasm and a sense of belonging. Show:

• Friendliness: others will be more willing to share ideas if you're interested in them as people too.

• Understanding: everyone makes mistakes. Try to be constructive, tolerant and tactful when offering criticism.

• Fairness: equal treatment and equal opportunity lead to an equally good effort from all group members.

• Integrity: members will take tasks more seriously if you show that you're more interested in group goals than your own personal gain.

3) Keep everyone working toward agreed upon goals:

• Remind everyone of the group's purposes from time to time. It's easy to become too narrowly focused and lose sight of the larger goals.

• Provide encouragement and motivation, by showing your appreciation for good ideas and extra effort.

• Harmonize differences and disagreements between group members by stressing compromise and cooperation.

• Involve everyone in discussions and decisions, even if asking for opinions and ideas means a longer discussion.

4) Get to know the people around you Everyone has different abilities, wants, needs, and purpose in life.

To get along with others and get results, you need to get to know them.

• Interact with group members as often as possible. The only way to get to know someone is through direct personal contact.

• Become familiar with every member of your group. Take note of each person's unique qualities and characteristics.

5) Treat others as individuals

Put your knowledge and understanding of each group member to work!

• Be aware of expectations. Everyone expects something different: recognition, a chance to learn, a chance to work with other people, etc.

• Be creative. A repetitious routine can cause boredom. A successful leader thinks of new and better approaches to old ways of doing things.

• Provide rewards. Recognition by the group is a source of personal satisfaction and positive reinforcement for a job well done.

• Delegate responsibilities. If everyone shares the work, everyone can share pride in the group's accomplishments. Let each member know what's expected of him/her, available resources, deadlines, etc.

6) Accept responsibility for getting things done

• Take the initiative. Why stand around and wait for someone else to get things started? Set an example.

• Offer help and information. Your unique knowledge and skills may be just what's needed.

• Seek help and information. Ask for advice if you need it. This will encourage group involvement and help accomplish group goals.

• Make things happen. By being decisive, energetic, and enthusiastic, you can and will help get things done!

• Know when and how to say "no."

If your time and resources are already committed, turn down extra tasks, but do it nicely.

7) Problem solve in a step - by-step way

Whether you are faced with a decision to make or a conflict to resolve, following a logical approach will help.

1. State the problem as simply and clearly as possible.
2. Gather all relevant information and available resources.
3. Brainstorm as many ideas or solutions as you can think of (with others if possible).
4. Evaluate each idea or solution and choose the best one.
5. Design a plan for using your idea or solution. Include a timetable, assigned roles, and resources to be used.
6. Follow up on your plan by asking if your idea worked and why or why not.

Q. 1 – Q. 5 carry one mark each.

Q.1 The man who is now Municipal Commissioner worked as _____.

(A) the security guard at a university

(B) a security guard at the university

(C) a security guard at university

(D) the security guard at the university

Q.2 Nobody knows how the Indian cricket team is going to cope with the difficult and seamer-friendly wickets in Australia.

Choose the option which is closest in meaning to the underlined phrase in the above sentence.

(A) put up with (B) put in with (C) put down to (D) put up against

Q.3 Find the odd one in the following group of words.

mock, deride, praise, jeer

(A) mock (B) deride (C) praise (D) jeer

Q.4 Pick the odd one from the following options.

(A) CADBE (B) JHKIL (C) XVYWZ (D) ONPMQ

Q.5 In a quadratic function, the value of the product of the roots (α, β) is 4. Find the value of

$$\frac{\alpha^n + \beta^n}{\alpha^{-n} + \beta^{-n}}$$

(A) n^4 (B) 4^n (C) 2^{2n-1} (D) 4^{n-1}

Q. 6 – Q. 10 carry two marks each.

Q.6 Among 150 faculty members in an institute, 55 are connected with each other through Facebook® and 85 are connected through WhatsApp®. 30 faculty members do not have Facebook® or WhatsApp® accounts. The number of faculty members connected only through Facebook® accounts is _____.

(A) 35 (B) 45 (C) 65 (D) 90

Q.7 Computers were invented for performing only high-end useful computations. However, it is no understatement that they have taken over our world today. The internet, for example, is ubiquitous. Many believe that the internet itself is an unintended consequence of the original invention. With the advent of mobile computing on our phones, a whole new dimension is now enabled. One is left wondering if all these developments are good or, more importantly, required.

Which of the statement(s) below is/are logically valid and can be inferred from the above paragraph?

(i) The author believes that computers are not good for us.
(ii) Mobile computers and the internet are both intended inventions

(A) (i) only (B) (ii) only (C) both (i) and (ii) (D) neither (i) nor (ii)

Q.8 All hill-stations have a lake. Ooty has two lakes.

Which of the statement(s) below is/are logically valid and can be inferred from the above sentences?

(i) Ooty is not a hill-station.
(ii) No hill-station can have more than one lake.

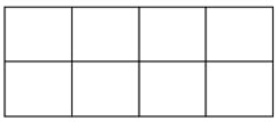
(A) (i) only

(B) (ii) only

(C) both (i) and (ii)

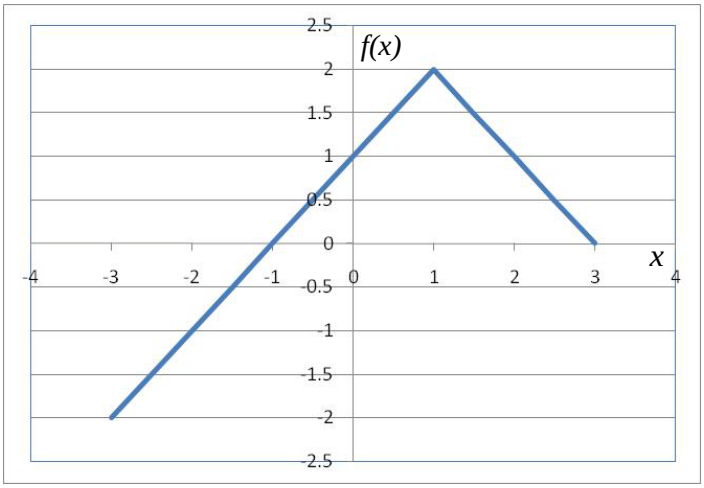
(D) neither (i) nor (ii)

Q.9 In a 2 × 4 rectangle grid shown below, each cell is a rectangle. How many rectangles can be observed in the grid?



(A) 21 (B) 27 (C) 30 (D) 36

Q.10



Choose the correct expression for *f(x)* given in the graph.

(A) $f(x) = 1 - |x - 1|$

(B) $f(x) = 1 + |x - 1|$

(C) $f(x) = 2 - |x - 1|$

(D) $f(x) = 2 + |x - 1|$

END OF THE QUESTION PAPER

Q. 1 – Q. 25 carry one mark each.

Q.1 The maximum value attained by the function $f(x) = x(x-1)(x-2)$ in the interval [1, 2] is _____.

Q.2 Consider a 3×3 matrix with every element being equal to 1. Its only non-zero eigenvalue is ____.

Q.3 The Laplace Transform of $f(t) = e^{2t}\sin(5t)\,u(t)$ is

(A) $\frac{5}{s^2-4s+29}$ (B) $\frac{5}{s^2+5}$ (C) $\frac{s-2}{s^2-4s+29}$ (D) $\frac{5}{s+5}$

Q.4 A function $y(t)$, such that $y(0) = 1$ and $y(1) = 3e^{-1}$, is a solution of the differential equation $\frac{d^2y}{dt^2} + 2\frac{dy}{dt} + y = 0$. Then $y(2)$ is

(A) $5e^{-1}$ (B) $5e^{-2}$ (C) $7e^{-1}$ (D) $7e^{-2}$

Q.5 The value of the integral

$$\oint_C \frac{2z+5}{\left(z-\frac{1}{2}\right)(z^2-4z+5)}dz$$

over the contour $|z| = 1$, taken in the anti-clockwise direction, would be

(A) $\frac{24\pi i}{13}$ (B) $\frac{48\pi i}{13}$ (C) $\frac{24}{13}$ (D) $\frac{12}{13}$

Q.6 The transfer function of a system is $\frac{Y(s)}{R(s)} = \frac{s}{s+2}$. The steady state output $y(t)$ is $A\cos(2t+\varphi)$ for the input $\cos(2t)$. The values of A and φ, respectively are

(A) $\frac{1}{\sqrt{2}}, -45^\circ$ (B) $\frac{1}{\sqrt{2}}, +45^\circ$ (C) $\sqrt{2}, -45^\circ$ (D) $\sqrt{2}, +45^\circ$

Q.7 The phase cross-over frequency of the transfer function $G(s) = \frac{100}{(s+1)^3}$ in rad/s is

(A) $\sqrt{3}$ (B) $\frac{1}{\sqrt{3}}$ (C) 3 (D) $3\sqrt{3}$

Q.8 Consider a continuous-time system with input $x(t)$ and output $y(t)$ given by

$$y(t) = x(t)\cos(t)$$

This system is

(A) linear and time-invariant
(B) non-linear and time-invariant
(C) linear and time-varying
(D) non-linear and time-varying

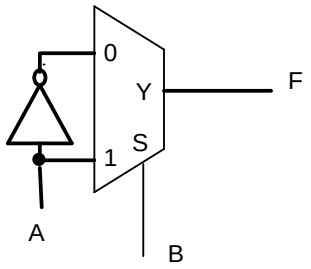
Q.9 The value of $\int_{-\infty}^{+\infty} e^{-t}\,\delta(2t-2)\,dt$, where $\delta(t)$ is the Dirac delta function, is

(A) $\frac{1}{2e}$ (B) $\frac{2}{e}$ (C) $\frac{1}{e^2}$ (D) $\frac{1}{2e^2}$

Q.10 A temperature in the range of -40° C to 55° C is to be measured with a resolution of 0.1° C. The minimum number of ADC bits required to get a matching dynamic range of the temperature sensor is

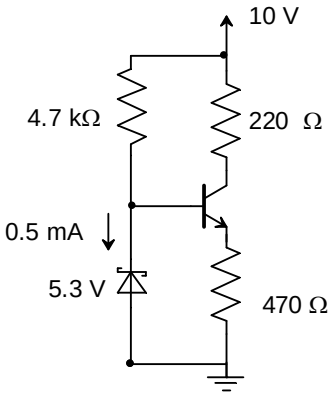
(A) 8 (B) 10 (C) 12 (D) 14

Q.11 Consider the following circuit which uses a 2-to-1 multiplexer as shown in the figure below. The Boolean expression for output F in terms of A and B is



(A) $A \oplus B$ (B) $\overline{A+B}$ (C) $A+B$ (D) $\overline{A \oplus B}$

Q.12 A transistor circuit is given below. The Zener diode breakdown voltage is 5.3 V as shown. Take base to emitter voltage drop to be 0.6 V. The value of the current gain β is _____.

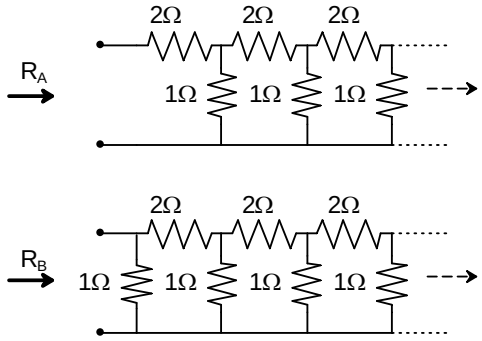


Q.13 In cylindrical coordinate system, the potential produced by a uniform ring charge is given by $\varphi = f(r, z)$, where f is a continuous function of r and z. Let $\vec{E}$ be the resulting electric field. Then the magnitude of $\nabla \times \vec{E}$

(A) increases with r. (B) is 0. (C) is 3. (D) decreases with z.

Q.14 A soft-iron toroid is concentric with a long straight conductor carrying a direct current I. If the relative permeability μ_r of soft-iron is 100, the ratio of the magnetic flux densities at two adjacent points located just inside and just outside the toroid, is _____.

Q.15 R_A and R_B are the input resistances of circuits as shown below. The circuits extend infinitely in the direction shown. Which one of the following statements is TRUE?

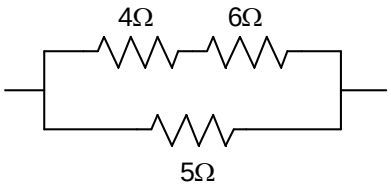


(A) $R_A=R_B$ (B) $R_A=R_B=0$ (C) $R_A< R_B$ (D) $R_B= R_A /(1+R_A)$

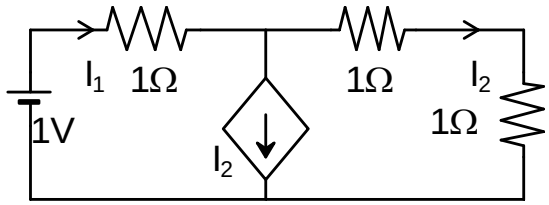
Q.16 In a constant V/f induction motor drive, the slip at the maximum torque

(A) is directly proportional to the synchronous speed.
(B) remains constant with respect to the synchronous speed.
(C) has an inverse relation with the synchronous speed.
(D) has no relation with the synchronous speed.

Q.17 In the portion of a circuit shown, if the heat generated in 5 Ω resistance is 10 calories per second, then heat generated by the 4 Ω resistance, in calories per second, is _____.



Q.18 In the given circuit, the current supplied by the battery, in ampere, is _____.



Q.19 In a 100 bus power system, there are 10 generators. In a particular iteration of Newton Raphson load flow technique (in polar coordinates), two of the PV buses are converted to PQ type. In this iteration,

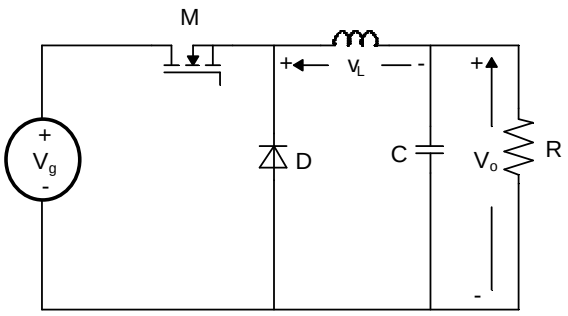
(A) the number of unknown voltage angles increases by two and the number of unknown voltage magnitudes increases by two.
(B) the number of unknown voltage angles remains unchanged and the number of unknown voltage magnitudes increases by two.
(C) the number of unknown voltage angles increases by two and the number of unknown voltage magnitudes decreases by two.
(D) the number of unknown voltage angles remains unchanged and the number of unknown voltage magnitudes decreases by two.

Q.20 The magnitude of three-phase fault currents at buses A and B of a power system are 10 pu and 8 pu, respectively. Neglect all resistances in the system and consider the pre-fault system to be unloaded. The pre-fault voltage at all buses in the system is 1.0 pu. The voltage magnitude at bus B during a three-phase fault at bus A is 0.8 pu. The voltage magnitude at bus A during a three-phase fault at bus B, in pu, is _____.

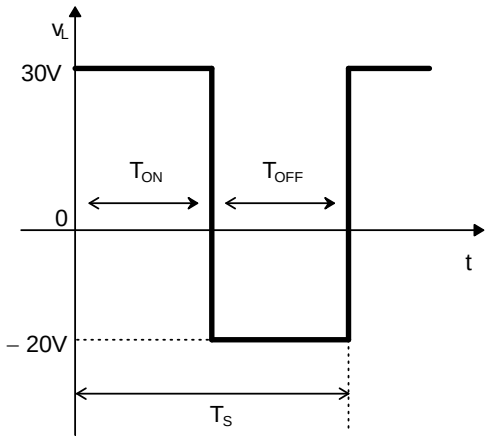
Q.21 Consider a system consisting of a synchronous generator working at a lagging power factor, a synchronous motor working at an overexcited condition and a directly grid-connected induction generator. Consider capacitive VAr to be a source and inductive VAr to be a sink of reactive power. Which one of the following statements is TRUE?

(A) Synchronous motor and synchronous generator are sources and induction generator is a sink of reactive power.
(B) Synchronous motor and induction generator are sources and synchronous generator is a sink of reactive power.
(C) Synchronous motor is a source and induction generator and synchronous generator are sinks of reactive power.
(D) All are sources of reactive power.

Q.22 A buck converter, as shown in Figure (a) below, is working in steady state. The output voltage and the inductor current can be assumed to be ripple free. Figure (b) shows the inductor voltage v_L during a complete switching interval. Assuming all devices are ideal, the duty cycle of the buck converter is _____.

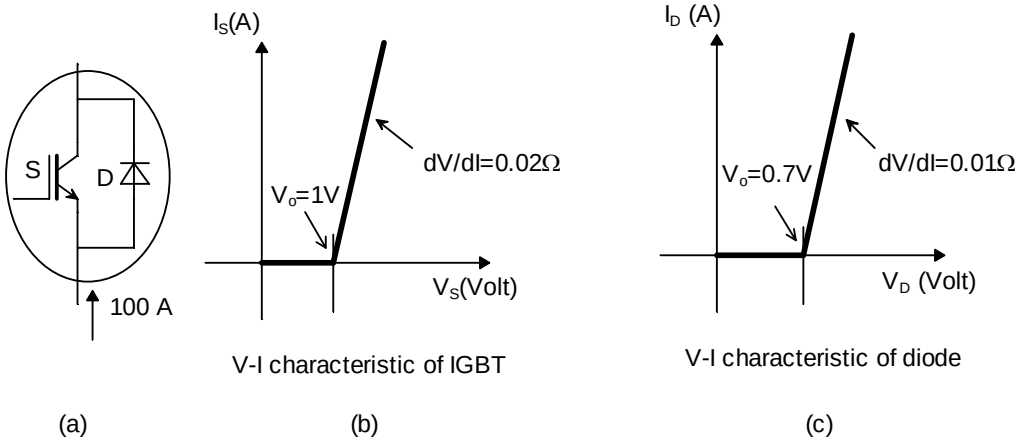


(a)



(b)

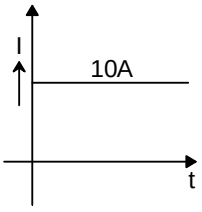
Q.23 A steady dc current of 100 A is flowing through a power module (S, D) as shown in Figure (a). The V-I characteristics of the IGBT (S) and the diode (D) are shown in Figures (b) and (c), respectively. The conduction power loss in the power module (S, D), in watts, is _____.



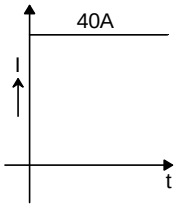
(a) (b) (c)

Q.24 A 4-pole, lap-connected, separately excited dc motor is drawing a steady current of 40 A while running at 600 rpm. A good approximation for the waveshape of the current in an armature conductor of the motor is given by

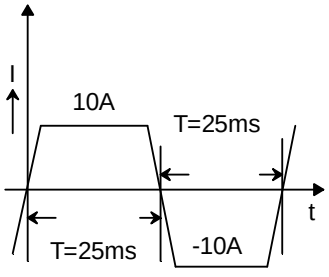
(A)



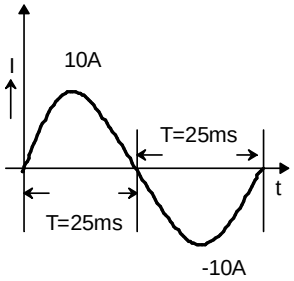
(B)



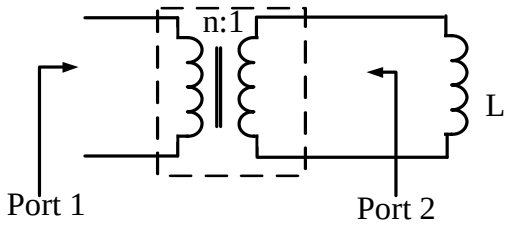
(C)



(D)



Q.25 If an ideal transformer has an inductive load element at port 2 as shown in the figure below, the equivalent inductance at port 1 is



(A) nL (B) n^2L (C) $\frac{n}{L}$ (D) $\frac{n^2}{L}$

Q. 26 – Q. 55 carry two marks each.

Q.26 Candidates were asked to come to an interview with 3 pens each. Black, blue, green and red were the permitted pen colours that the candidate could bring. The probability that a candidate comes with all 3 pens having the same colour is _____.

Q.27 Let $S = \sum_{n=0}^{\infty} n\alpha^n$ where $|\alpha| < 1$. The value of α in the range $0 < \alpha < 1$, such that $S = 2\alpha$ is _____.

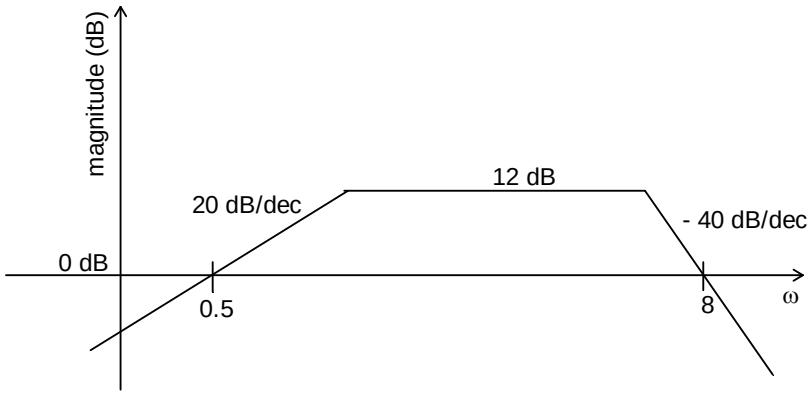
Q.28 Let the eigenvalues of a 2 x 2 matrix A be 1, -2 with eigenvectors x_1 and x_2 respectively. Then the eigenvalues and eigenvectors of the matrix $A^2 - 3A + 4I$ would, respectively, be

(A) 2, 14; x_1, x_2
(B) 2, 14; $x_1 + x_2, x_1 - x_2$
(C) 2, 0; x_1, x_2
(D) 2, 0; $x_1 + x_2, x_1 - x_2$

Q.29 Let A be a 4×3 real matrix with rank 2. Which one of the following statement is TRUE?

(A) Rank of A^TA is less than 2.
(B) Rank of A^TA is equal to 2.
(C) Rank of A^TA is greater than 2.
(D) Rank of A^TA can be any number between 1 and 3.

Q.30 Consider the following asymptotic Bode magnitude plot (ω is in rad/s).



Which one of the following transfer functions is best represented by the above Bode magnitude plot?

(A) $\frac{2s}{(1+0.5s)(1+0.25s)^2}$

(B) $\frac{4(1+0.5s)}{s(1+0.25s)}$

(C) $\frac{2s}{(1+2s)(1+4s)}$

(D) $\frac{4s}{(1+2s)(1+4s)^2}$

Q.31 Consider the following state-space representation of a linear time-invariant system.

$$\dot{\boldsymbol{x}}(t) = \begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix} \boldsymbol{x}(t),\ \ y(t) = \boldsymbol{c}^{\mathrm{T}}\boldsymbol{x}(t),\ \ \boldsymbol{c} = \begin{bmatrix} 1 \\ 1 \end{bmatrix} \text{ and } \boldsymbol{x}(0) = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$$

The value of $y(t)$ for $t = \log_e 2$ is _____.

Q.32 Loop transfer function of a feedback system is $G(s)H(s) = \frac{s+3}{s^2(s-3)}$. Take the Nyquist contour in the clockwise direction. Then, the Nyquist plot of $G(s)H(s)$ encircles $-1+j0$

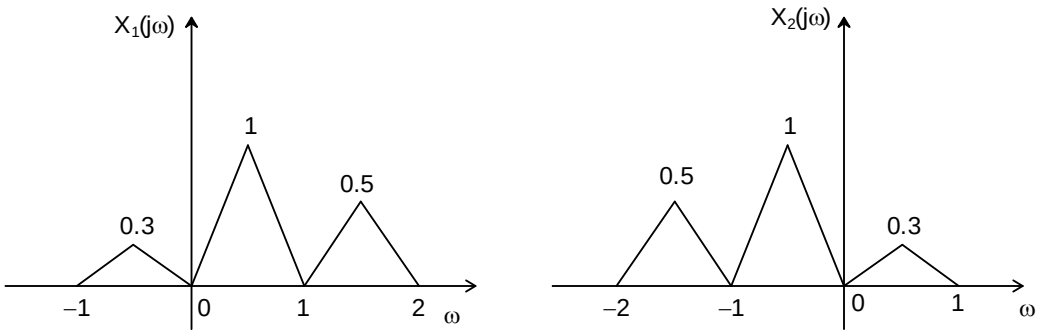
(A) once in clockwise direction
(B) twice in clockwise direction
(C) once in anticlockwise direction
(D) twice in anticlockwise direction

Q.33 Given the following polynomial equation

$$s^3 + 5.5\,s^2 + 8.5\,s + 3 = 0,$$

the number of roots of the polynomial, which have real parts strictly less than -1, is _____ .

Q.34 Suppose $x_1(t)$ and $x_2(t)$ have the Fourier transforms as shown below.



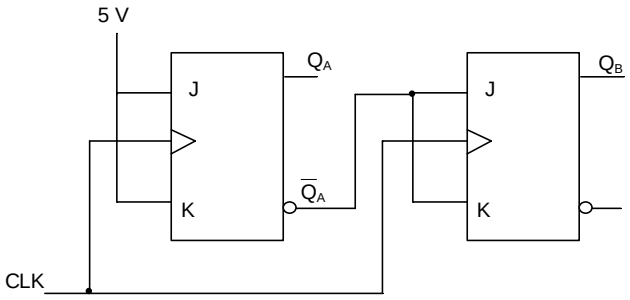
Which one of the following statements is TRUE?

(A) $x_1(t)$ and $x_2(t)$ are complex and $x_1(t)x_2(t)$ is also complex with nonzero imaginary part
(B) $x_1(t)$ and $x_2(t)$ are real and $x_1(t)x_2(t)$ is also real
(C) $x_1(t)$ and $x_2(t)$ are complex but $x_1(t)x_2(t)$ is real
(D) $x_1(t)$ and $x_2(t)$ are imaginary but $x_1(t)x_2(t)$ is real

Q.35 The output of a continuous-time, linear time-invariant system is denoted by $\boldsymbol{T}\{x(t)\}$ where $x(t)$ is the input signal. A signal $z(t)$ is called eigen-signal of the system $\boldsymbol{T}$, when $\boldsymbol{T}\{z(t)\} = \gamma\, z(t)$, where γ is a complex number, in general, and is called an eigenvalue of $\boldsymbol{T}$. Suppose the impulse response of the system $\boldsymbol{T}$ is real and even. Which of the following statements is TRUE?

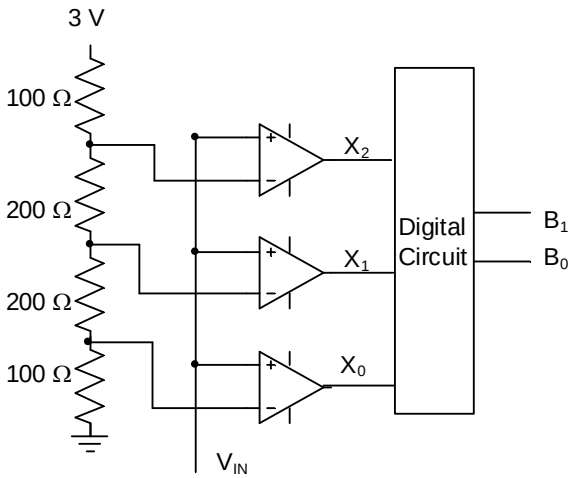
(A) $\cos(t)$ is an eigen-signal but $\sin(t)$ is not
(B) $\cos(t)$ and $\sin(t)$ are both eigen-signals but with different eigenvalues
(C) $\sin(t)$ is an eigen-signal but $\cos(t)$ is not
(D) $\cos(t)$ and $\sin(t)$ are both eigen-signals with identical eigenvalues

Q.36 The current state $Q_A\,Q_B$ of a two JK flip-flop system is 00. Assume that the clock rise-time is much smaller than the delay of the JK flip-flop. The next state of the system is



(A) 00 (B) 01 (C) 11 (D) 10

Q.37 A 2-bit flash Analog to Digital Converter (ADC) is given below. The input is $0 \le V_{IN} \le 3$ Volts. The expression for the LSB of the output B_0 as a Boolean function of X_2, X_1, and X_0 is

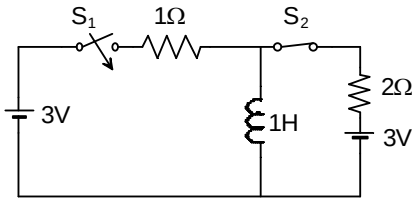


(A) $X_0[\overline{X_2 \oplus X_1}]$ (B) $\bar{X}_0[\overline{X_2 \oplus X_1}]$ (C) $X_0[X_2 \oplus X_1]$ (D) $\bar{X}_0[X_2 \oplus X_1]$

Q.38 Two electric charges q and $-2q$ are placed at (0,0) and (6,0) on the *x-y* plane. The equation of the zero equipotential curve in the *x-y* plane is

(A) $x = -2$ (B) $y = 2$ (C) $x^2 + y^2 = 2$ (D) $(x + 2)^2 + y^2 = 16$

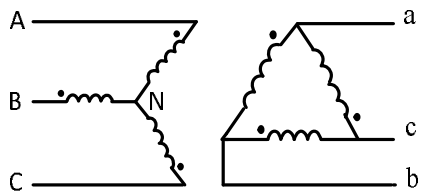
Q.39 In the circuit shown, switch S_2 has been closed for a long time. At time $t = 0$ switch S_1 is closed. At $t = 0^+$, the rate of change of current through the inductor, in amperes per second, is _____.



Q.40 A three-phase cable is supplying 800 kW and 600 kVAr to an inductive load. It is intended to supply an additional resistive load of 100 kW through the same cable without increasing the heat dissipation in the cable, by providing a three-phase bank of capacitors connected in star across the load. Given the line voltage is 3.3 kV, 50 Hz, the capacitance per phase of the bank, expressed in microfarads, is _____.

Q.41 A 30 MVA, 3-phase, 50 Hz, 13.8 kV, star-connected synchronous generator has positive, negative and zero sequence reactances, 15%, 15% and 5% respectively. A reactance (X_n) is connected between the neutral of the generator and ground. A double line to ground fault takes place involving phases 'b' and 'c', with a fault impedance of j0.1 p.u. The value of X_n (in p.u.) that will limit the positive sequence generator current to 4270 A is _____.

Q.42 If the star side of the star-delta transformer shown in the figure is excited by a negative sequence voltage, then

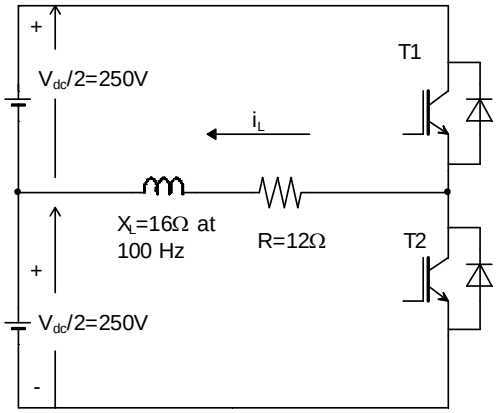


(A) V_{AB} leads V_{ab} by 60°
(B) V_{AB} lags V_{ab} by 60°
(C) V_{AB} leads V_{ab} by 30°
(D) V_{AB} lags V_{ab} by 30°

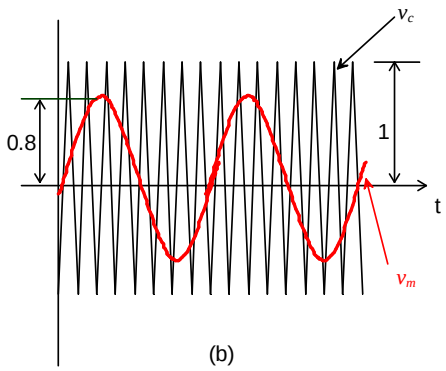
Q.43 A single-phase thyristor-bridge rectifier is fed from a 230 V, 50 Hz, single-phase AC mains. If it is delivering a constant DC current of 10 A, at firing angle of 30°, then value of the power factor at AC mains is

(A) 0.87 (B) 0.9 (C) 0.78 (D) 0.45

Q.44 The switches T1 and T2 in Figure (a) are switched in a complementary fashion with sinusoidal pulse width modulation technique. The modulating voltage $v_m(t) = 0.8 \sin(200\pi t)$ V and the triangular carrier voltage (v_c) are as shown in Figure (b). The carrier frequency is 5 kHz. The peak value of the 100 Hz component of the load current (i_L), in ampere, is _____ .

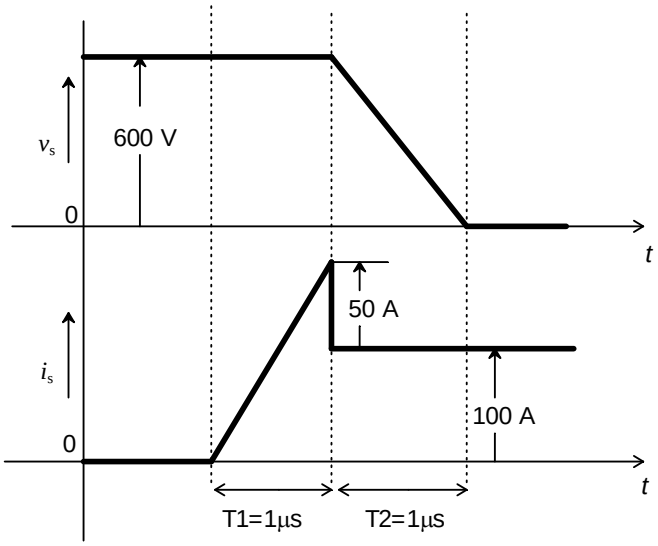


(a)



(b)

Q.45 The voltage (v_s) across and the current (i_s) through a semiconductor switch during a turn-ON transition are shown in figure. The energy dissipated during the turn-ON transition, in mJ, is _____.



Q.46 A single-phase 400 V, 50 Hz transformer has an iron loss of 5000 W at the rated condition. When operated at 200 V, 25 Hz, the iron loss is 2000 W. When operated at 416 V, 52 Hz, the value of the hysteresis loss divided by the eddy current loss is _____.

Q.47 A DC shunt generator delivers 45 A at a terminal voltage of 220 V. The armature and the shunt field resistances are 0.01 Ω and 44 Ω respectively. The stray losses are 375 W. The percentage efficiency of the DC generator is _____.

Q.48 A three-phase, 50 Hz salient-pole synchronous motor has a per-phase direct-axis reactance (X_d) of 0.8 pu and a per-phase quadrature-axis reactance (X_q) of 0.6 pu. Resistance of the machine is negligible. It is drawing full-load current at 0.8 pf (leading). When the terminal voltage is 1 pu, per-phase induced voltage, in pu, is _____.

Q.49 A single-phase, 22 kVA, 2200 V/ 220 V, 50 Hz, distribution transformer is to be connected as an auto-transformer to get an output voltage of 2420 V. Its maximum kVA rating as an auto-transformer is

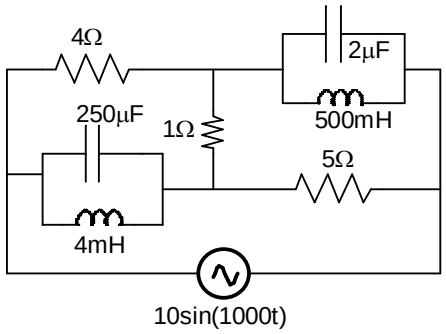
(A) 22 (B) 24.2 (C) 242 (D) 2420

Q.50 A single-phase full-bridge voltage source inverter (VSI) is fed from a 300 V battery. A pulse of 120^o duration is used to trigger the appropriate devices in each half-cycle. The rms value of the fundamental component of the output voltage, in volts, is

(A) 234 (B) 245 (C) 300 (D) 331

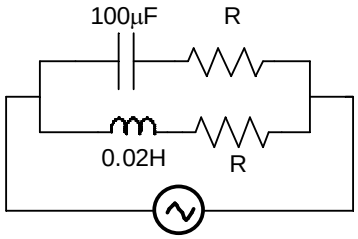
Q.51 A single-phase transmission line has two conductors each of 10 mm radius. These are fixed at a center-to-center distance of 1 m in a horizontal plane. This is now converted to a three-phase transmission line by introducing a third conductor of the same radius. This conductor is fixed at an equal distance D from the two single-phase conductors. The three-phase line is fully transposed. The positive sequence inductance per phase of the three-phase system is to be 5% more than that of the inductance per conductor of the single-phase system. The distance D, in meters, is _____.

Q.52 In the circuit shown below, the supply voltage is $10\sin(1000t)$ volts. The peak value of the steady state current through the 1 Ω resistor, in amperes, is _____.

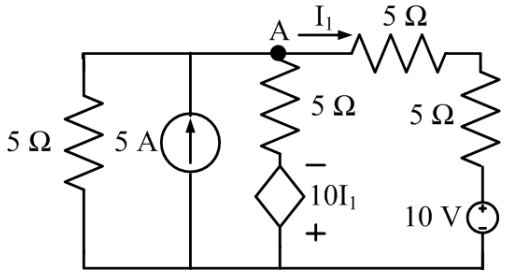


Q.53 A dc voltage with ripple is given by $v(t) = [100 + 10\sin(\omega t) - 5\sin(3\omega t)]$ volts. Measurements of this voltage $v(t)$, made by moving-coil and moving-iron voltmeters, show readings of V_1 and V_2 respectively. The value of $V_2 - V_1$, in volts, is _____.

Q.54 The circuit below is excited by a sinusoidal source. The value of R, in Ω, for which the admittance of the circuit becomes a pure conductance at all frequencies is _____.



Q.55 In the circuit shown below, the node voltage V_A is _____ V.



END OF THE QUESTION PAPER

GATE QUESTION – 2016 ANSWER

Q. No	Type	Section	Key	Marks
1	MCQ	GA	B	1
2	MCQ	GA	A	1
3	MCQ	GA	C	1
4	MCQ	GA	D	1
5	MCQ	GA	B	1
6	MCQ	GA	A	2
7	MCQ	GA	D	2
8	MCQ	GA	D	2
9	MCQ	GA	C	2
10	MCQ	GA	C	2
1	NAT	EE-1	0.0 : 0.0	1
2	NAT	EE-1	3.0 : 3.0	1
3	MCQ	EE-1	A	1
4	MCQ	EE-1	B	1
5	MCQ	EE-1	B	1
6	MCQ	EE-1	B	1
7	MCQ	EE-1	A	1
8	MCQ	EE-1	C	1
9	MCQ	EE-1	A	1
10	MCQ	EE-1	B	1
11	MCQ	EE-1	D	1
12	NAT	EE-1	18.0 : 20.0	1
13	MCQ	EE-1	B	1
14	NAT	EE-1	99.0 : 101.0	1
15	MCQ	EE-1	D	1
16	MCQ	EE-1	C	1
17	NAT	EE-1	1.9 : 2.1	1
18	NAT	EE-1	0.5 : 0.5	1
19	MCQ	EE-1	B	1
20	NAT	EE-1	0.83 : 0.85	1
21	MCQ	EE-1	A	1
22	NAT	EE-1	0.39 : 0.41	1
23	NAT	EE-1	169.0 : 171.0	1
24	MCQ	EE-1	C	1
25	MCQ	EE-1	B	1
26	NAT	EE-1	0.2 : 0.2	2
27	NAT	EE-1	0.28 : 0.31	2
28	MCQ	EE-1	A	2
29	MCQ	EE-1	B	2
30	MCQ	EE-1	A	2
31	NAT	EE-1	5.9 : 6.1	2
32	MCQ	EE-1	A	2
33	NAT	EE-1	2.0 : 2.0	2
34	MCQ	EE-1	C	2
35	MCQ	EE-1	D	2
36	MCQ	EE-1	C	2
37	MCQ	EE-1	A	2
38	MCQ	EE-1	D	2
39	NAT	EE-1	1.9 : 2.1	2
40	NAT	EE-1	47.0 :	2
41	NAT	EE-1	1.05 :	2
42	MCQ	EE-1	D	2
43	MCQ	EE-1	C	2
44	NAT	EE-1	9.9 :	2
45	NAT	EE-1	74.0 :	2
46	NAT	EE-1	1.4 :	2
47	NAT	EE-1	86.0 :	2
48	NAT	EE-1	1.58 :	2
49	MCQ	EE-1	C	2
50	MCQ	EE-1	A	2
51	NAT	EE-1	1.41 :	2
52	NAT	EE-1	1.0 :	2
53	NAT	EE-1	0.30 :	2
54	NAT	EE-1	14.0 :	2
55	NAT	EE-1	11.25	2

K.L.N. College of Engineering.

How to prepare for Anna University Examinations.

1. Don't study just for passing the tests/exams. Ensure that you understood the concepts and you can explain/ demonstrate/justify/analyze/ answer/ argue/ design /implement/draw/develop any mathematical model, based on what you have learnt. If you are confident enough, you can successfully solve any question papers/technical interviews/competitive examinations at any time without fear/confusion/ delay. Remember that, you will be working in an environment, after graduation, where all the process/operation of machineries/equipments are based on the basic scientific and engineering concepts what you have studied from first year to final year of your Engineering programme, where you are the only person to solve any problems aroused. You can't get away/escape from these. Hence, it is a lifelong learning, a wonderful experience.

2. Syllabus, books (at least 2-one Text books as prescribed in the syllabus, -one local author book) previous year question papers(atleast10), class notes, are your God/religion/food/ destiny/light. Ensure that you have studied all the contents of the syllabus, prepared correct answers for all questions in the AU question paper. **Remember that ignoring any one word in the syllabus** means you are losing 5 to 10 marks in each unit in the AU exams. Similarly, ignoring any one questions in the previous year question paper means you are losing 10 marks in each unit of AU exams. Don't expect that your Professor would cover 100% of the syllabus. Even if he/she has covered 100% of the syllabus don't think that he/she has covered 100% of each line in the syllabus. It is your responsibility to prepare 10% in excess of each lines in each units of the syllabus in addition to the contents taught by your Professors. This is possible by referring the books and the questions asked in the competitive exam books like GATE/TANCET/IES.

3. Plan your studies –right from the second week of the commencement of the classes till the semester examination is over. In a year, you will be attending the college only for 200 days(including theory/practical exams-8hours /day). You have 165 days(24 hours /day) away from the college. Prepare a time table from Monday-Friday. Take a rest on Saturday and Sunday. Allocate 3-4 hours in the evening for study.1-2 hours for completing assignments/observation/record note work. Remaining 2-3 hours for studying subjects A,B.(Mon),C,D(Tue)E,F(Wed), A,B(Thu),C,D(Fri),E,F(Sat or Sun).Each day, in addition to studying subjects for the current syllabus, you should refer competitive exam books (GATE/TANCET/IES/ Objective type questions – technical) corresponding to the current syllabus. This parallel preparation will ensure that you have prepared for state level and National level examinations there by you will be meeting the expectations of the Engineering Educational Objectives. Your preparation for AU examination should be vigorous (minimum), 15 days from the commencement of the exam and it should be maximum 2 days before the exam. You need to allocate for 8 hours per day during minimum days(early morning-6AM-10AM with a break for an hour,10AM-12 Noon-sleep/rest,12 noon-2PM-study,2PM-5PM-sleep/rest,6PM-10PM –study).Repetition/memorizing is required to retain certain contents to improve confidence on the subject. During rest time you can have group discussion with your friends or you can teach slow learners, thereby you will gain more knowledge and also help others.

4. Presentation – AU exam-General complaints by students that the valuation is not fair or poor valuation. Remarks of examiners that there is nothing in the answer paper. Parents may say that either "college is not good" or "it is a fate". Public may say "poor quality" and the experts may comment that " only 20% are employable". These statements will go on for centuries. Many students believes that they have written right answers mostly(but many

of them actually wrong) and few examiners assumed certain answers by students are wrong(but many of them are actually correct). It is 70% true that students are not presenting the answers well and it is 30% true that the valuation is not fair. But it is 95% true that the deserved students are getting expected results in most of the papers. This is because of good presentation. Good presentation involves many factors such as legible writing, good handwriting. answering correctly(100% correct),all answers with mathematical modeling/pictorial representation/drawing/layout/sketches with different colours, writing 7 pages for 16 mark questions with valid points and sketches, 4 pages for 8 marks with valid points and sketches/drawings/equations, characterizes,. Such students will solve problems correctly without any overwriting/ strikeouts. Simply, they do not cheat. These are the in-born qualities or developed over the years due to good habits, friendship, good character, obedience, hard work, well brought up by parents and blessing by God. Everyone can become like them if their attitude is good. Fear of God is the beginning of Wisdom. The examiners will know about your quality, just by referring the way you have answered Part-A- questions. A well prepared student would get a maximum of 18 out of 20 .This impresses the examiner so that they will award a maximum of 14-16 for each part-B-questions. Most of the students would answer wrongly in the Part-A-questions. This is due to their poor preparation during Class tests/internal tests, frequently taking leave, lot of diversion, skipping the classes for attending Co-Curricular/ /extra-curricular activities etc inside or outside the college.. Attending the classes is more important than attending college. Students are expected to attend 98%classes to maintain the continuity of the subjects learnt. One day absence means it will take a week to study on his/her own. If he/she fails to study on his/her own to review the classes not attended means a loss of 10 marks in the exams.

5. Know well about Why one should apply for revaluation without /with Photocopy, schedule and fees to be paid. Some times a well deserved students get low CGPA than he/she expected or even may fail. This may be due to error in valuation/data entry. Hence such students should not hesitate to apply for revaluation with/without photocopy. The parents should also be informed, all about these unfortunates (the misunderstanding between parents /sons/daughter/faculty may lead to unnecessary things).90% of those deserved students who applied for revaluation with photo copy benefitted after revaluation. Ignorance/communication failure of these formalities, by deserved students, may damage their life. Some students failed in revaluation secured “S”grade in the REVIEW, shows some hope in the examination system and the better prospect of the students.

6. Need to maintain high CGPA in every semester. :This is possible only when one gets “S” grade in all practical’s (from first to eighth semester).Those who are regular in attending the lab classes, submitting the observation and record note in time, disciplined behavior with staff and students in the class room/laboratory/campus etc will impress the faculty in-charge of practical’s, so that he/she will help such students during regular lab classes. This will improve the students to do the lab experiments with confidence and fetch them toget more marks. This will reflect in internal assessment marks also. Classification of degree-First class with distinction-More than 8.5CGPA(passed all subjects in first attempt),First class-More than 6.5CGPA at the end of eighth semester, less than this would be second class.

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