



MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION, MUMBAI
TEACHING AND EXAMINATION SCHEME FOR POST S.S.C. DIPLOMA COURSES

COURSE NAME : ELECTRICAL ENGINEERING GROUP

COURSE CODE : EE/EP

DURATION OF COURSE : SIX SEMESTERS

WITH EFFECT FROM 2012-13

SEMESTER : SECOND

DURATION : 16 WEEKS

FULL TIME / PART TIME : FULL TIME

SCHEME : G

SR. NO	SUBJECT TITLE		abbrevi ation	SUB CODE	TEACHING SCHEME			EXAMINATION SCHEME										SW (17200)
					TH	TU	PR	PAPER HRS.	TH (1)		PR (4)		OR (8)		TW (9)			
									Max	Min	Max	Min	Max	Min	Max	Min		
1	Communication Skills		\$ CMS	17201	02	--	02	03	100	40	--	--	25#	10	25@	10	50	
2	Engineering Mechanics		β EGM	17204	03	01	02	03	100	40	--	--	--	--	25@	10		
3*	Applied Science	Physics	APH	17210	02	02	02	02	50	100	40	25@	50	20	--	--		--
		Chemistry	ACH	17211	02	--	02	02	50			25@			--	--		--
4	Fundamentals of Electrical Engineering		FEE	17214	04	--	02	03	100	40	25#	10	--	--	25@	10		
5	Engineering Mathematics		\$ EMS	17216	03	01	--	03	100	40	--	--	--	--	--	--		
6	Development of Life Skills		\$ DLS	17010	01	--	02	--	--	--	--	--	25@	10	--	--		
Total					17	02	12	--	500	--	75	--	50	--	75	--	50	

Student Contact Hours Per Week: **31 Hrs.**

THEORY AND PRACTICAL PERIODS OF 60 MINUTES EACH.

Total Marks : **750**

@ - Internal Assessment, # External Assessment, [] No Theory Examination, \$ - Common to all branches, β - Common to CE, ME, EE and CH Groups

Abbreviations: TH-Theory, TU- Tutorial, PR-Practical, OR-Oral, TW- Term Work, SW- Sessional Work

- Conduct two class tests each of 25 marks for each theory subject. Sum of the total test marks of all subjects is to be converted out of 50 marks as sessional work (SW).
- Progressive evaluation is to be done by subject teacher as per the prevailing curriculum implementation and assessment norms
- Code number for TH, PR, OR, TW are to be given as suffix 1, 4, 8, 9 respectively to the subject code.
- * Applied Science is divided into two parts- Applied Science (Physics) and Applied Science (Chemistry). Theory examination of both parts as well as practical examination of both parts will be conducted on separate days. Sum of theory marks of both parts shall be considered for passing theory examination of Applied Science. Similarly it is also applicable to practical examination. It is mandatory to appear theory and practical examination of both parts. Remaining absent in any examination of any part will not be declared successful for that examination head.
- * **Candidate remaining absent in examination of any one part of Applied Science subject i.e. Physics, Chemistry will be declare as Absent in Mark List and has to appear for examination. The marks of the part for which candidate was present will not be processed or carried forward.**

Communication Skills [CMS]

F.Y. Diploma : Sem. II

[All Branches]

EVALUATION SYSTEM

	Time	Marks
Theory Exam	3 Hrs.	100
Practical Exam	–	–
Oral Exam	–	25#
Term Work	–	25@
Sessional Work (Two Test)	–	25 (each)

@ - Internal Assessment; # - External Assessment

SYLLABUS

Topic 1 Introduction to Communication

Specific Objective

- Describe the process of communication.

Content

- Definition of communication
- Process of communication
- Types of communication -- Formal, Informal, Verbal, Nonverbal, Vertical, Horizontal, Diagonal

Topic 2 Effective communication

Specific Objective

- Identify the principles and barriers in the communication process

Content

- Principles of communication.
- Barriers to communication
 - (a) **Physical Barrier:**
 - Environmental (time, noise, distance & surroundings)
 - Personal (deafness, stammering, ill-health, spastic, bad handwriting)
 - (b) **Mechanical :** Machine oriented
 - (c) **Psychological:** Day dreaming, prejudice, emotions, blocked mind, generation gap, phobia, status inattentiveness, perception.
 - (d) **Language :** Difference in language, technical jargons, pronunciation & allusions.

Topic 3 Non verbal & Graphical communication

Specific Objective

- Effective use of body language & nonverbal codes
- View and interpret graphical information precisely.

Contents

3.1 Non- verbal codes:

- Proxemics
- Chronemics
- Artefacts

3.2 Aspects of body language (Kinesics)

- Facial expression
- Eye contact
- Vocalics, paralanguage
- Gesture
- Posture
- Dress & appearance
- Haptics

3.3 Graphical communication

- Advantages & disadvantages of graphical communication
- Tabulation of data & its depiction in the form of bar graphs & pie charts.

Topic 4 Listening

Specific Objective

- Effective use of listening

Contents

- Introduction to listening
- Listening versus hearing
- Merits of good listening
- Types of listening
- Techniques of effective listening

Topic 5 Formal Written Communication

Specific Objectives

- Use different formats of formal written skills.

Contents

- Office Drafting: Notice , memo & e-mail
- Job application with resume.
- Business correspondence: Enquiry letter, order letter ,complaint letter, adjustment letter.
- Report writing: Accident report, fall in production, investigation report.
- Describing objects & giving instructions

Reference :

1. Text book of Communication Skills, (*MSBTE Mumbai*) MSBTE, Mumbai.
2. CD On Communication Skills, (*MSBTE*) MSBTE, Mumbai.
3. Communication Skills (*Joyeeta Bhattacharya*) Reliable Series.
4. Communication Skills (*Sanjay Kumar, Pushpa Lata*) Oxford University Press.
5. Website: www.mindtools.com/page8.html-99k
6. Website: www.khake.com/page66htm/-72k
7. Website: [www.BMConsultant India.Com](http://www.BMConsultantIndia.Com)
8. Website: www.letstak.co.in
9. Website: www.inc.com/guides/growth/23032.html-45k



Engineering Mechanics [EGM]

F.Y. Diploma : Sem. II

[AE/CE/CH/CR/CS/CV/EE/EP/FE/ME/MH/MI/PG/PT/PS]

EVALUATION SYSTEM

	Time	Marks
Theory Exam	3 Hrs.	100
Practical Exam	–	–
Oral Exam	–	–
Term Work	–	25@
Sessional Work (Two Test)	–	25 (each)

@ - Internal Assessment

SYLLABUS

Topic 1 Simple Machines

Specific Objectives:

- Calculate velocity ratio for given machine.
- Find Efficiency of given machine.

Contents

1.1 Definitions

Simple machine, compound machine, load, effort, mechanical advantage, velocity ratio, input of a machine, output of a machine, efficiency of a machine, ideal machine, ideal effort and ideal load, load lost in friction, effort lost in friction.

1.2 Analysis

Law of machine, maximum mechanical advantage and maximum efficiency of a machine, reversibility of a machine, condition for reversibility of a machine, self locking machine. Simple numerical problems.

1.3 Velocity Ratio for simple machines

Simple axle and wheel, differential axle and wheel, Weston's differential pulley block, single purchase crab, double purchase crab, worm and worm wheel, geared pulley block, screw jack, calculation of mechanical advantage, efficiency, identification of type such as reversible or not etc.

Topic 2 Force systems

Specific Objectives :

- Define related terms in mechanics.
- Calculate Components of forces.

Contents

2.1 Fundamentals and Force systems

Definitions of mechanics, Engineering mechanics, statics, dynamics, Kinetics, Kinematics, rigid body, classification of force system according to plane coplanar and non coplanar, sub classification of coplanar force system- collinear, concurrent, non concurrent, parallel, like parallel, unlike parallel, general etc. Definition of a force, S.I. unit of a force, representation of a force by vector and by Bow's notation method. Characteristics of a force, effects of a force, principle of transmissibility.

2.2 Resolution of a force and Moment of a force

Definition, Method of resolution, along mutually perpendicular direction and along two given direction. Definition of moment, S. I. unit, classification of moments, sign convention, law of moments Varignon's theorem of moment and its use, definition of couple, S.I. unit, properties of couple with example.

Topic 3 Composition of Forces

Specific Objectives:

- Calculate resultant analytically for given force system.
- Calculate resultant graphically.

Contents

3.1 Analytical method

Definition of Resultant force, methods of composition of forces, Law Of parallelogram of forces, Algebraic method for determination of resultant for concurrent and non concurrent, parallel coplanar force system.

3.2 Graphical method

Space diagram, vector diagram, polar diagram, and funicular polygon. Resultant of concurrent and parallel force system only.

Topic 4 Equilibrium

Specific Objectives:

- State conditions of equilibrium for given force system.
- Calculate reactions of beams for different static loading.

Contents

4.1 Equilibrant and Lami's Theorem

Definition of equilibrant, relation between resultant and equilibrant, equilibrant of concurrent and non-concurrent force system. Analytical and graphical conditions of equilibrium for concurrent, non-concurrent and parallel force system, free body and free body diagram. Statement and explanation of Lami's theorem, Application of Lami's theorem for solving various engineering problems.

4.2 Beams

Definition, Types of beams (cantilever, simply supported, overhanging, fixed, continuous), Types of end supports (simple support, hinged, roller), classification of loads, point load, inclined point load, uniformly distributed load. Analytical method to determine reactions of simply supported, cantilever and over hanging beam subjected to point loads and UDL and graphical method to determine reactions for beams subjected to vertical point loads & udl only.

Topic 5 Friction

Specific Objectives

- Define terms related to friction.
- Apply conditions of equilibrium for forces acting on a body associated with friction.

Contents

5.1 Definition

Friction, limiting frictional force, coefficient of friction, angle of friction, angle of repose, relation between angle of friction, angle of repose and coefficient of friction. Cone of friction, types of friction, laws of friction, advantages and disadvantages.

5.2 Equilibrium of body on Horizontal and inclined plane

Equilibrium of body on horizontal plane subjected to horizontal and inclined force.
Equilibrium of body on inclined plane subjected to forces applied parallel to the plane only. Concept of ladder fraction.

Topic 6 Centroid and Centre of Gravity

Specific Objectives:

- Calculate centroid of composite plain figures.
- Calculate centre of gravity of composite solids.

Contents:

6.1 Centroid

Definition of centroid. Moment of an area about an axis. Centroid of basic geometrical figures such as square, rectangle, triangle, circle, semicircle and quarter circle. Centroid of composite figure with not more than three geometrical figures.

6.2 Center of gravity

Definition, center of gravity of simple solids such as cylinder, sphere, hemisphere, cone, cube, and rectangular block. Centre of gravity of composite solids with not more than Two simple solids. (Hollow solids are not expected.)

References :

1. Engineering Mechanics (*R.S.Khurmi*) S. Chand & Company Ltd.
2. Engineering Mechanics (*Shames and Rao*) Pearsion Education.
3. Engineering Mechanics (*R.C.Hibbeler*) Pearsion Education.
4. Applied Mechanics (S. Ramamruthum) Dhanpat Rai & Sones, Delhi.
5. Essentials of Engg. Mech. (S Rajasekaran) Vikas Publishing House Pvt. Ltd.



Applied Physics [APH]

F.Y. Diploma : Sem. II

[EE/EP/EJ/EN/ET/EX/EV/IC/IE/IS/MU/DE/ED/EI/IU/CO/CM/IF/CD/CW]

EVALUATION SYSTEM

	Time	Marks
Theory Exam	2 Hrs.	50
Practical Exam	–	25@
Oral Exam	–	–
Term Work	–	–
Sessional Work (Two Test)	–	25 (each)

@ - Internal Assessment

SYLLABUS

Topic 1 Basic Electric circuits

Specific objectives

- Calculate basic electric parameters for designing the simple electric circuits.
- Use basic electronic components like resistor, capacitor in electronic circuits.
- Use various networks such as Whetastone's network , potentiometer
- Study principle and applications of condenser

1.1 Simple D.C. electric circuits

Electric current: definition, symbol and unit, Ohm's law: statement, mathematical expression, resistivity: definition, unit, conductivity: definition, unit.

1.2 Wheatstone's network and potentiometer

Wheatstone's network, working principle, balancing condition, principle of potentiometer, potential gradient.

1.3 Condensers

Capacity of condenser-definition and its unit, definition of 1 farad capacity, principle of condenser, derivation of capacity of parallel plate condenser, statement and derivation of series and parallel combination of condensers.

Topic 2 Semiconductor Physics

Specific objectives

- Differentiate between conductor, semiconductor, insulator
- Verify characteristics of P-N junction diode
- Study applications of P-N junction diode, photodiode.
- Classification of solids on the basis of band theory: forbidden energy gap, conductor, insulator, semiconductor.
- Classification of semiconductors, P-N junction diode, forward characteristics of P-N junction diode, reverse characteristics of P-N junction diode, photodiode, its symbol, principle and applications.

Topic 3 Modern physics

Specific objectives

- State the concept of photocell
- State applications of X – ray
- State properties and applications of LASER

3.1 Photo electricity

- Photon (quantum), Plank's hypothesis, energy of photon, properties of photons.
- Photo electric effect: circuit diagram, process of photoelectric emission, definitions:- threshold frequency, threshold wavelength, stopping potential, characteristics of photoelectric effect
- Work function, Einstein's photoelectric equation, photo resistor (LDR) – symbol, principle, applications, photoelectric cell:- principle, applications.

3.2 X-rays

- Origin of X-rays, production of X-rays using Coolidge's X-ray tube, minimum wavelength of X-ray, properties of X-rays, applications of X- rays: engineering, medical and scientific.

3.3 Laser

- Laser, properties of laser, spontaneous and stimulated emission, population inversion, optical pumping.
- He-Ne Laser: Principle, construction and working, engineering applications of Laser

Topic 4 Physics of Nanoparticles

Specific Objectives

- Study properties of nanoparticles.
- Study applications of nanotechnology.
- History, nanoparticles, properties of nanoparticles, methods of synthesis of nanoparticles: physical method of synthesis of nanoparticles, engineering applications of nanotechnology.

Reference :

1. Physics (*Resnick and Hailday*) Wisley Toppan Publishers – England.
2. Engineering Physics (*B.L. Theraja*) S. Chand Publishers – New Delhi.
3. Engineering Physics (*V. Rajendran*) Tata McGraw-Hill Publications.
4. Conceptual Physics (*P.G.Hewitt*) Pearson education (10th Edition).
5. Physics for Engineers (*M.R.Srinivasan*) New Age international publishers.
6. Physics- Std XI, Std XII, HSC board/CBSE Board
7. Engineering Physics (*D.K. Bhattacharya A. Bhaskaran*) Oxford university press
6. Website : <http://hyperphysics.phy-astr.gsu.edu/hbase/permot2.html>
7. Website : <http://physics.info>
8. Website : <http://physics.org>
9. Website : <http://about.com>
10. Website : <http://classroom.com>
11. Website : <http://101science.com>
12. CD : Educational Cd of NCERT
Educational cd of Pearson education India
13. Videos : <http://www.youtube.com> Laser cutter
<http://www.cmslaser.com>
14. PPT
www.slideshare.net/donpraju/laser-ppt
www.research.usf.edu/cs/rad/laser-ppt
www.studyvilla.com/laser-ppt-ruby laser
www.coursesuperconductor.ppt
www.khanacademy.com



Applied Chemistry [ACH]

F.Y. Diploma : Sem. II

[EE/EP/EJ/EN/ET/EX/EV/IC/IE/IS/MU/DE/ED/EI/IU/CO/CM/IF/CD/CW]

EVALUATION SYSTEM

	Time	Marks
Theory Exam	2 Hrs.	50
Practical Exam	–	25@
Oral Exam	–	–
Term Work	–	–
Sessional Work (Two Test)	–	25 (each)

@ - Internal Assessment

SYLLABUS

Topic 1 Metallurgy

Specific Objectives

- Describe the extraction processes of copper and aluminium.
- State engineering applications of copper and aluminium based on their properties.

1.1 Metallurgy of Copper

Definition of metallurgy, Extraction process: Ores of copper, extraction of copper from copper pyrite by concentration, roasting, smelting, bessemerisation, electrolytic refining, Physical, chemical properties – action of air, water, acid, alkali. Applications of copper.

1.2 Metallurgy of Aluminium

Extraction process: Ores of aluminium, extraction of aluminium from bauxite by Bayer's process, electrolytic reduction of alumina, electrolytic refining of aluminium, Physical, chemical properties–action of air, water, acid, alkali. Applications of aluminium, anodizing of aluminium.

1.3 Solders

Composition, properties and applications of- soft solder, tinmann's solder, brazing alloy, rose metal, plumber's solder.

Topic 2 Corrosion

Specific Objectives

- Explain Mechanism of atmospheric corrosion and immersed corrosion.
- Describe different methods of protection of metal from corrosion

2.1 Corrosion

Definition of corrosion, Types of corrosion, Atmospheric Corrosion: Definition, mechanism of oxidation corrosion, types of oxide films and their significance, factors affecting rate of atmospheric corrosion. Immersed Corrosion: Definition, mechanism of immersed corrosion by galvanic cell action- with evolution of hydrogen gas and absorption of oxygen gas, factors affecting immersed corrosion.

2.2 Protection of metals by

Modification of environment, modification of properties of metal, electrochemical protection by sacrificial anodic protection and impressed current cathodic protection, use of protective coatings. Application of metallic coatings: By galvanising, tinning, metal spraying, electroplating, metal cladding, cementation- sherardizing, chromising, colourising. Application of non-metallic coatings: paint-definition, characteristics, constituents of paint and their functions.

Topic 3 Cells and Batteries

Specific Objectives

- Explain the concept of electrochemical cell.
- Describe construction and working of different types of cells.

Electrochemical cells/ batteries

- Basic concepts : Definition of electrolyte, conductivity of electrolytes, Ohm's law, specific conductance, equivalent conductance, cell, battery, electrolytic cell, electrochemical cell, charging, discharging.
- Classification of electrochemical cells: Primary and secondary cells.
- Primary cells: construction, working and applications of - Dry Cell, Daniel cell.
- Secondary cells: construction, working and applications of - Lead-acid storage cell, Ni-Cd Cell.
- Fuel cell : Definition, construction, working, advantages, limitations and applications of Hydrogen- oxygen fuel cell.

Topic 4 Chemistry of Electronic Materials

Specific Objectives

- State role of polymers in electronic engineering.
- Describe applications of dielectrics and insulators in electronic devices.

4.1 Polymers

Definitions, examples and applications of electrically conducting polymers, photoconductive polymers, electrically insulating polymers, liquid crystal polymers (LCP).

4.2 Insulators, Dielectrics and Adhesives

Definition of dielectrics and insulator, Properties of gaseous, liquid and solid insulators, their examples. Properties and applications of- inert gases, silicone fluids, teflon, bakelite, ceramics and glass.

Definition, characteristics, advantages of adhesives, properties and applications of phenol formaldehyde resin, urea formaldehyde resin and epoxy resin.

Reference :

1. Engineering Chemistry (S.S. Dara) S. Chand Publication.
2. Engineering Chemistry (Jain & Jain) Dhanpat Rai and Sons.
3. Engineering Chemistry (B. Sivasankar) The McGraw-Hill Companies.
4. Environmental Chemistry (K. B. Chandrasekhar, U. N. Das, Sujatha Mishra) SCITECH.
5. Website : http://en.wikipedia.org/wiki/conductive_polymer
<http://en.wikipedia.org/wiki/waste-management>
<http://www.footprints-science.co.uk/Chemistry.htm>
<http://www.youtube.com/watch?v=8tqfDE6vqcs&feature=related>
<http://www.splung.com/content/sid/3/page/batteries>
www.teachnet-uk.org.uk/...Metals/...metals/Properties%20of%20Meta...
http://www.substech.com/dokuwiki/doku.php?id=full_index_of_articles_on_ceramics
http://www.substech.com/dokuwiki/doku.php?id=full_index_of_articles_on_polymers
<http://www.powerstream.com/BatteryFAQ.html>
<http://physchem.co.za/OB12-sys/batteries.htm#lead-acid> (Dry Cell & Lead acid cell)
<http://www.kentchemistry.com/links/Redox/flash/RedoxAgentsElectrodesBattery.swf> (Battery)

<http://www.kentchemistry.com/links/Redox/flash/battery.swf>
<http://www.kentchemistry.com/links/Redox/flash/halfcells.swf> (Voltaic Cell)
<http://group.chem.iastate.edu/Greenbowe/sections/projectfolder/animations/ZnCbatteryV8web.html>(Dry Cell)
<http://www.usetute.com.au/battery.html> (Batteries)
http://www.sherardizing.com/resources/files/9_Sherardizing_Corrosion.pdf
(Sheradizing)
http://www.galvanizeit.org/aga/animation/4728?keepThis=true&TB_iframe=true&height=480&width=640 (Galvanizing)
http://www.galvanizeit.org/aga/animation/4728?keepThis=true&TB_iframe=true&height=480&width=640 (Galvanizing)
http://www.ehow.com/list_6725219_different-types-metal-cladding.html (Metal Clading)
<http://www.authorstream.com/Presentation/sheelachawla-590475-insulators/> (Insulators)
http://www.sut.ac.th/engineering/metal/pdf/Nonferrous/02_Aluminium%20and%20aluminium%20alloy.pdf
<http://www.youtube.com/watch?v=zU5sP64DeYA> (Flow chart of extraction of Al)
http://www.youtube.com/watch?v=0Rs4vHo6_oc&feature=related (extraction of Al)
<http://www.youtube.com/watch?v=XWGbUYsChOI> (extraction of Cu)
<fka.ump.edu.my/images/fka/.../5.2%20Adhesives.ppt>
<images.emchiey.multiply.multiplycontent.com/.../08a%20Adhesives...>



Fundamentals of Electrical Engineering [FEE]

F.Y. Diploma : Sem. II

[EE/EP]

EVALUATION SYSTEM

	Time	Marks
Theory Exam	3 Hrs.	100
Practical Exam	–	25#
Oral Exam	–	–
Term Work	–	25@
Sessional Work (Two Test)	–	25 (each)

@ - Internal Assessment; # - External Assessment

SYLLABUS

Topic 1 Basic Concepts

Specific Objectives : The students will be able to :

- Understand various parameters and quantities used in electric circuit.
- Classify types of electric currents.
- Calculate various electric quantities such as power ,current, energy and p.d. in simple circuits

Contents

1.1 Electrical Quantities

- Concept of Electric Current.
- Concept of Electric Potential, Potential Difference(P D)
- Electro-Motive-Force (EMF).

1.2 Resistance

- Concept of Resistance
- Definition of Resistance
- Concept of Resistivity and Conductivity
- Effect of Temperature on Resistance.
- Temp.co-efficient of Resistance (simple numerical)

1.3 Classification of Electric Current

- Direct Current (DC)
- Alternating Current (AC)

1.4 Sources of D.C. Supply

- Concept of Voltage Source: Ideal and Practical
- Concept of Current Source: Ideal and Practical
- Source Conversion. (simple numerical)

1.5 Effects of Electric Current (Only Introduction)

- Heating Effect
- Magnetic Effect
- Chemical Effect

1.6 Concept of Electrical Work, Power and Energy.

Their SI units (simple numerical)

1.7 Types of Resistors and their Applications.

- Carbon Composition
- Deposited Carbon
- High Voltage Ink Film
- Metal Film
- Metal Glaze
- Wire Wound
- Cermet

Topic 2 D.C. Circuits

Specific Objectives : The students will be able to :

- Calculate internal resistance of a given d.c.source and terminal voltage.
- Calculate equivalent resistance of various simple d.c. circuits.
- Apply Kirchhoff's laws.
- Identify different D.C.Circuits.and convert star to delta and vice versa.

Contents

2.1 Ohm's Law and related terms

- Ohm's Law
- Internal resistance of source
- Concept of internal voltage drop
- Terminal Voltage.

2.2 Various connections of resistances

- Resistance in Series, Voltage Division Formula.
- Resistance in Parallel, Current Division Formula.
- Calculations of Equivalent Resistance of simple Series,
- Parallel and Series Parallel Circuits.(Simple Numericals)

2.3 Duality Between Series and Parallel Circuits.

2.4 Definitions of terms Related to Electric Circuits

- Active and Passive Circuit Parameters
- Linear Circuit and Non-linear Circuit,
- Unilateral Circuit and Bi-lateral Circuit,
- Electric Network, Passive and Active Network,
- Node, Branch, Loop, Mesh.

2.5 Kirchhoff's Laws (Simple Numericals with two equations only)

- Kirchhoff's Current Law
- Kirchhoff's Voltage Law

2.6 Star/Delta and Delta/Star Transformation. (Simple Numericals)

Topic 3 Capacitors

Specific Objectives : The students will be able to :

- Understand the concept of capacitance
- Identify types of capacitor
- Calculate equivalent capacitance of various simple d.c. circuits.
- Draw charging and discharging curves of capacitor.

- Derive basic formulae for energy stored and formula for capacitance of parallel plate capacitor

Contents

3.1 Concept and Definition of Capacitor

3.2 Parallel Plate Capacitor:(Derivation and Simple Numerical)

- Uniform Di-electric Medium
- Medium Partly Air.

3.3 Various connections of capacitances (Simple Numerical)

- Equivalent capacitance of capacitors in series. :(Derivation and Simple Numerical)
- Equivalent capacitance of capacitors in parallel. :(Derivation and Simple Numerical)
- Calculations of Equivalent Capacitance of Series Parallel : (Simple Numerical)

3.4 Energy Stored in Capacitor.(Derivation and Simple Numerical)

3.5 Charging and Discharging of Capacitor (No Derivation and No Numerical)

3.6 Concept of Breakdown Voltage and Di-electric strength

3.7 Types of Capacitors and their Applications.

- Electrolytic
- Non-Electrolytic (Paper, Mica, Film, Ceramic, Glass)

Topic 4 Magnetic Circuits

Specific Objectives : The students will be able to :

- Understand various terms involved in magnetic circuit.
- Find out various parameters/quantities of magnetic circuit.
- Draw B-H curve and hysteresis loop.
- Distinguish between series and parallel magnetic circuit.

Contents

4.1 Concept of magnet and electromagnetic.

4.2 Concept of magnetic lines of force.

4.3 Magnetic Circuit –

- Definition of magnetic circuit.
- Ohm's law of Magnetic Circuit.

4.4 Definitions Concerning Magnetic Circuit.

- Magneto-Motive-Force (MMF),
- Ampere Turns (AT)
- Reluctance
- Permeance
- Reluctivity.

4.5 Comparison Between Electric and Magnetic circuit.

4.6 Concept Series Magnetic Circuit and Parallel Magnetic Circuit.

4.7 Calculations of Amp.-Turns for simple Series (without and with air gap)

- 4.8 Concept of Leakage Flux, Useful Flux & Fringing.
- 4.9 Magnetisation Curve (B - H Curve) (No Derivation and No Numericals)
- Magnetisation Curve for Magnetic and Non-Magnetic
 - Materials
 - Magnetic Hysteresis, Hysteresis Loop.
 - Area of Hysteresis Loop, Hysteresis Loss.
- 4.10 Applications of magnet
- Permanent Magnet
 - Electromagnet.

Topic 5 Electromagnetic Magnetic Induction

Specific Objectives: The students will be able to :

- Understand relation between magnetism and electricity.
- Apply faraday's laws to calculate induced e.m.f.
- Distinguish between statically and dynamically induced e.m.f.
- Find out self inductance and energy stored in magnetic field.

Contents

- 5.1 Relation Between Magnetism and Electricity.
- 5.2 Development of Induced e.m.f. and Current.
- 5.3 Faraday's Laws of Electromagnetic Induction. (Simple Numerical)
- Faraday's First Law
 - Faraday's Second Law
- 5.4 Induced e.m.f.(Simple Numerical)
- Statically Induced E.M.F
 - Dynamically Induced E.M.F.
- 5.5 Direction of Induced E.M.F. and Currents.
- 5.5 Direction of induced e,m,f,
- Lenz's Law for statically induced e,m,f,
 - Fleming's Right Hand Rule for dynamically induced e.m.f.
- 5.6 Self Inductance
- 5.7 Coefficient of Self-induction (L) (Simple Numerical)
- 5.8 Mutual inductance
- 5.9 Coefficient of Mutual inductance (M)
- 5.10 Self induced e.m.f. and mutually induced e.m.f
- 5.11 Coefficient of Coupling (No Derivation and No Numerical)
- 5.12 Inductances in series. (No Derivation and No Numerical)
- 5.13 Types of inductors and their applications.
- Air Cored Inductors
 - Iron Cored Inductors
 - Ferrite Cored Inductors.
- 5.14 Energy Stored in Magnetic Field(Derivation and Simple Numerical)

Topic 6 Storage batteries

Specific Objectives : The students will be able to :

- Understand difference between cell and battery.

- Understand series and parallel connections of batteries.
- Conduct maintenance of batteries.
- Find out self inductance and energy stored in magnetic field.

Contents

- 6.1 Concept of Cell and Battery
- 6.2 Electrical Characteristics of Batteries.
 - e.m.f.
 - Terminal Voltage
 - Internal Resistance
 - Amp.Hour Capacity
 - Efficiency: AH Efficiency and Watt Hr Efficiency
- 6.3 Necessity of Series Connection of Batteries
- 6.4 Necessity of Parallel Connection of Batteries
- 6.5 Charging of Batteries
 - Current Charging Method
 - Constant Voltage Charging Method
 - Precautions During Charging
 - Indications of Fully Charged Cells
- 6.6 Maintenance of Lead Acid Batteries.
- 6.7 Dry cell and Liquid Cell(Comparison)
- 6.8 Applications of Storage Batteries

Topic 7 Basic of A.C. Fundamentals

Specific Objectives : The students will be able to :

- Understand induction of sinusoidal a.c. supply
- Understand basic a.c. quantities

Contents

- 7.1 Simple loop a.c.generator with explanation of sinusoidal e.m.f.
- 7.2 Basic definitions : Cycle, Frequency, Time and Amplitude

Topic 8 Electric Materials

Specific Objectives : The students will be able to :

- Understand various materials used in electrical m/c, equipments.
- Understand importance of various properties of materials.

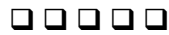
Contents

- 8.1 Classification of electrical materials.
- 8.2 Conducting Materials (Physical, Mechanical and Electrical properties)
 - Current Carrying Conducting Materials(Copper, Aluminum, Bronze and Iron)
 - Non Current Carrying Conducting Materials(Cast iron, Cast Steel,etc)
- 8.3 Insulating Materials(Thermal , Mechanical and Electrical properties)
 - Classification on basis of state of materials as solid ,liquid gaseous insulating materials (Introduction and applications)
 - Classification on the basis of temperature withstanding ability as Y, A, E, B, F,H and C type with list of insulating materials in each type.
- 8.4 Magnetic Material (Introduction and Applications)
 - Classification of magnetic material as Paramagnetic, Diamagnetic and Ferromagnetic material

- C.R.G.O. Silicon Steel
- H.R.G.O. Silicon Steel
- Amorphous Metal

Reference :

1. A Text Book of Electrical, Technology Vol-I (Basic Electrical Engg.) Multicolour Edition 2005 And Subsequent Reprint (*B.L. Theraja, A.K. Theraja*) S. Chand & Co. Ramnagar, New Delhi
2. Basic Electrical Engg., Any Edition After 2005 (*V. N. Mittle*) Tata McGraw-Hill
3. Electrical Technology, Second and Any Subsequent Edition (*Edward Hughes*) Pearson Education, New Delhi
4. Basic Electrical Engineering, Second Edition (*R.S. Ananda Murthy*) Pearson
5. Basic Electrical Engineering, First Edition (*T. Thyagarajan*) Scitech
6. Basic Electrical Engineering, First Edition (*K Uma Rao*) Pearson
7. Basic Electrical Engineering, First Edition (*Sunil T.Gailwad*) Dreamtech Press 19-A Daryaganj, N.Delhi
8. Websites:
www.wikipedia.com , www.youtube.com , www.norsa.com, www.dreamtechpress.com



Engineering Mathematics [EMS]

F.Y. Diploma : Sem. II

[AE/CD/CE/CH/CM/CO/CR/CS/CV/CW/DE/ED/EE/EI/EJ/EN/EP/ET/EV/EX/
FE/IC/IE/IF/IS/IU/ME/MH/ MI/MU/PG/PS/PT]

EVALUATION SYSTEM

	Time	Marks
Theory Exam	3 Hrs.	100
Practical Exam	–	–
Oral Exam	–	–
Term Work	–	–
Sessional Work (Two Test)	–	25 (each)

SYLLABUS

Topic 1 Complex number

- **Complex number**

Specific objectives

- Find roots of algebraic equations which are not in real.
- Definition of complex number, Cartesian, polar and exponential forms of complex number.
- Algebra of complex number such as equality, addition, subtraction, multiplication and division.
- De- Moivre's theorem with simple examples.
- Euler's form of circular functions, hyperbolic functions and relation between circular and hyperbolic functions.

Topic 2 Differential Calculus

2.1 Function

Specific objectives

- Identify the function and find the value of function.
- Definition of function, range and domain of function.
- Value of function at a point.
- Types of functions and examples.

2.2 Limits

Specific objectives

- To evaluate limit of function.
- Concept and definition of limit.
- Limits of algebraic, trigonometric, logarithmic and exponential functions with examples.

2.3 Derivatives

Specific objectives

- Find the derivatives by first principle.
- Solve problems using rules and methods of derivatives
- Definition of derivatives, notation, derivatives of standard function using first principle.
- Rules of differentiation such as, derivatives of sum or difference, product, and quotient with proofs.
- Derivative of composite function with proof (Chain rule)
- Derivatives of inverse trigonometric functions using substitution
- Derivatives of inverse function.
- Derivatives of implicit function.
- Derivatives of parametric function.
- Derivatives of one function w.r.t another function.
- Logarithmic differentiation.
- Second order differentiation.

Topic 3 Numerical Method

3.1 Solution of algebraic equation

Specific objectives

- Find the approximate root of algebraic equation
- Bisection method
- Regula falsi method
- Newton Rapshon method

3.2 Numerical solution of simultaneous equations

Specific objectives :

- Solve the system of equations in three unknowns.
- Gauss elimination method
- Jacobi's method
- Gauss Seidal method

Reference :

1. Mathematics for Polytechnic (*S.P. Deshpande*) Pune Vidyarthi Griha Prakashan – Pune.
2. Calculus : Single Variable (*Robert T. Smith*) Tata McGraw Hill.
3. Advanced Engineering Mathematics (*Dass H.K.*) S. Chand Publication – New Delhi.
4. Fundamentals of Mathematical Statistics (*S.C. Gupta & Kapoor*) S. Chand Publications – New Delhi.
5. Higher Engineering Mathematics (*B.S. Grewal*) Khanna Publication – New Delhi.
6. Applied Mathematics (*P.N. Wartikar*) Pune Vidyarthi Griha Prakashan – Pune.
7. Websites : www.khan.academy



Development of Life Skills [DLS]

F.Y. Diploma : Sem. II

[All Branches]

EVALUATION SYSTEM

	Time	Marks
Theory Exam	–	–
Practical Exam	–	–
Oral Exam	–	25@
Term Work	–	–

@ - Internal Assessment

SYLLABUS

Topic 1 SELF ANALYSIS

Specific Objectives

- To introduce oneself.

Contents

1.1 Need of Self Analysis

1.2 Attitude and types (positive, negative, optimistic and pessimistic) Guidelines for developing positive attitude.

Topic 2 STUDY TECHNIQUES

Specific Objectives

- To identify different process and strategies.
- To improve reading, listening and notes taking skills.

Contents

2.1 Learning strategies

2.2 Learning process

2.3 Organization of knowledge

2.4 Reading skills

2.5 Listening skills

2.6 Notes taking

2.7 Enhancing memory

Topic 3 INFORMATION SEARCH

Specific Objectives

- To search information as per the need.

Contents

3.1 Sources of information

3.2 Techniques of information search (library, internet, etc)

Topic 4 SELF DEVELOPMENT

Specific Objectives:

- To set primary goals using SMART parameters.
- To Priorities the work effectively.
- To cope up with stress effectively.

Contents

- 4.1 Goal setting and its importance.
- 4.2 Characteristics of Goal setting (**SMART**- Specific, Measurable, Attainable, Realistic, Time bound)
- 4.3 Time Management - Importance, prioritization of work, time matrix, time savers, and time wasters.
- 4.4 Stress Management - Definition, types of stress, causes of stress, managing stress, and stress busters.

Topic 5 PRESENTATION TECHNIQUES**Specific Objectives**

- To plan for presentation.
- To prepare contents for presentation.

Contents

- 5.1 Importance of presentation.
- 5.2 Components of effective presentation (Body language, voice culture , rehearsal, etc)
- 5.3 Preparing for presentation.
- 5.4 Use of audio/video aids. (audio, video, transparency's, PowerPoint presentations, etc)
- 5.5 Performing presentation (Seminars, paper presentations, compering, etc)

Topic 6 GROUP DISCUSSION**Specific Objectives**

- To understand the concept of group discussion
- To know the purpose of group discussion

Contents

- 6.1 Group discussion concept and purpose
- 6.2 Method of conduction

Reference :

1. Target setting and goal achievement (*Richard Hale and Peter Whitlam*) Kogan Page.
2. Successful Presentation Skills (*Andrew Bradbury*) The Sunday Times – Kogan
3. Effective Presentation (*Ros Jay and Antony Jay*) Pearson – Prentice Hall.
4. Handbook on Development of Life Skills (*Subject Experts – MSBTE*) MSBTE
5. Effective Communication and Soft Skills (*Nitin Bhatnagar and Mamta Bhatnagar*) Pearson
6. Business Communication and Soft Skills (*D. Sudha Rani*) Pearson.
7. Personality Development and Soft Skills (*Barak K Mitra*) Oxford University Press
8. Soft Skills for Managers (*Dr. T. Kalayani Chakravarti and Dr. Latha Chakravarti*) Biztantra



