

ADMISSION-

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Detailed Syllabus

Of

**DIPLOMA IN ELECTRICAL
ENGINEERING**

**COURSE TITLE: DIPLOMA IN ELECTRICAL
ENGINEERING**

DURATION :3 YEAR

MODE : SEMESTER

THIRD SEMESTER

COURSE TITLE	Paper Code	MARKS				TOTAL
		THEORY INTERNAL	EXTERNAL	PRACTICAL INTERNAL	EXTERNAL	
Computer Application I	DEE/S/310	40	60			100
Computer Application I	DEE/S/310P			40	60	100
Applied Machines	DEE/S/320	40	60			100
Applied Machines	DEE/S/320P			40	60	100

Electrical Engineering Materials	DEE/S/330	40	60			100
Electrical Science	DEE/S/340	40	60			100
Electrical Science	DEE/S/340P			40	60	100
Electrical Engineering Drawing 1	DEE/S/350	40	60			100

FOURTH SEMESTER

COURSE TITLE	Paper Code	MARKS				TOTAL
		THEORY		PRACTICAL		
		INTERNAL	EXTERNAL	INTERNAL	EXTERNAL	
Computer Application II	DEE/S/410	40	60			100
Computer Application II	DEE/S/410P			40	60	100
Electrical Machine I	DEE/S/420	40	60			100
Electrical Machine I	DEE/S/420p			40	60	100
Basic Electronics	DEE/S/430	40	60			100
Basic Electronics	DEE/S/430P			40	60	100
Electrical Measurement and Measuring Instruments	DEE/S/440	40	60			100
Electrical Workshop I	DEE/S/440P			40	60	100
Technique Microprocessor I	DEE/S/450	40	60			100
Technique Microprocessor I	DEE/S/450P			40	60	100

FIFTH SEMESTER

COURSE TITLE	Paper Code	MARKS				TOTAL
		THEORY		PRACTICAL		
		INTERNAL	EXTERNAL	INTERNAL	EXTERNAL	
Industrial Management	DEE/S/510	40	60			100
Electrical Machine II	DEE/S/520	40	60			100
Electrical Machine II	DEE/S/520p			40	60	100
Electronic Device and Circuits	DEE/S/530	40	60			100
Electronic Device and Circuits	DEE/S/530P			40	60	100
Electrical Power I (Trans. & Distr.)	DEE/S/540	40	60			100
Electrical Power I (Trans. & Distr.)	DEE/S/540P			40	60	100
Electrical Engineering Drawing -II	DEE/S/550	40	60			100

SIXTH SEMESTER

COURSE TITLE	Paper Code	MARKS				TOTAL
		THEORY		PRACTICAL		
		INTERNAL	EXTERNAL	INTERNAL	EXTERNAL	
Power Electronics I	DEE/S/610	40	60			100
Power Electronics I	DEE/S/610P			40	60	100
Electrical Power II	DEE/S/620	40	60			100
Electrical Power II	DEE/S/620p			40	60	100
Utilization of Electrical Energy	DEE/S/630	40	60			100
Utilization of Electrical Energy	DEE/S/630P			40	60	100
Electrical Workshop II	DEE/S/640P			40	60	100
Project Work	DEE/S/650P			40	60	100

SEMESTER I

DEE/S/110

APPLIED MATHEMATICS 1

Maximum Time : 3 Hrs.

University Examination :60 Marks

Total Marks : 100

Continuous Internal Assessment : 40 Marks

Minimum Pass Marks :40%

A) Instructions for paper setter

1. The question paper will consist five sections namely A, B, C, D and E.
2. Each of the sections A, B, C and D will contain two questions and candidates have to attempt at least one question compulsorily from each section. Each section carry 15% of the total marks
3. Section E will com prise of 1015 short answers type questions, which will cover the entire syllabus and will carry 40% of the total marks.

B) Instructions for candidates

1. Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.
2. Use of nonprogrammable scientific calculator is allowed.

SECTION A

1. AIGEBRA

Application of Quadratic equations simultaneous equations (one linear and other Quadratic equation) in two variables to engineering problems.

Arithmetic Progression, its nth term and sum of n terms with their applications to engineering problems. Geometrical Progression, its nth term and sum of n terms and to infinity with application to engineering problems.

Partial fractions (excluding repeated quadratic factors) formally introduction of permutations & combinations, applications of formulae for nPr nCr

Binomial theorem (expansion without proof) for positive integral index (expansion and general term).

Binomial theorem for any index (expansion without proof only). First and second binomial approximation with application to engineering problems.

SECTION B

2. TRIGNOMETRY

Concept of angles, measurement of angles in degrees, grades and radians and their conversions. Trigonometrical ratios and their relations.

Review of ratios of some standard angles (0,30,45,60,90 degrees), TRatios of Allied angles (without proof), Sum, difference formulae and their applications (without proof).

Product formulae (Transformation of product to sum, difference and vice versa).TRatios of multiple angles, submultiple angles (2A, 3A, A/2).

Area of a triangle, Hero's formulae, solution of triangles with direct applications of cosine formulae, sine formulae, Napier's analogy only.

SECTION C

3. COORDINATE GEOMETRY

Cartesian coordinates (two dimensions), Distance between two points, Internal and External division formulae, Application of area formulae (without proof).

Area of triangle when its vertices are given, coordinates of centroid, incentre of a triangle when the vertices are given, using the formulae, simple problems on locus.

Application of equation of straight line in various standard forms, intersection of two straight lines, angle between two lines. Perpendicular distance formulae.

General equation of a circle and its characteristics. To find the equation of a circle given (i) Center and radius (ii) Three points on it (iii) Coordinates of end points of a diameter.

SECTION D

Plotting of curves $y = f(x)$, $f(x)$ being algebraic function of x (maximum upto 2nd degree).

Definition of conic section. Standard equation of parabola, To find equations of parabola when its focus and directrix are given, Given the equation of a parabola, determination of its focus, vertex axis, directrix and latus rectum.

Ellipse and hyperbola (standard equations without proof), given the equation in the standard form, determination of focus, directrix, latus rectum. Axes, eccentricity and center.

Concept of Polar coordinates & their conversion to Cartesian coordinates & vice versa, cylinder, cone, 3D

DEE/S/120

APPLIED PHYSICS I

Maximum Time : 3 Hrs.

University Examination : 60 Marks

Total Marks : 100

Continuous Internal Assessment : 40 Marks

Minimum Pass Marks : 40%

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B) Instructions for candidates

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2. Use of nonprogrammable scientific calculator is allowed

SECTION A

MECHANICS

1. UNITS AND DIMENSIONS

Fundamental and derived units in SI System,
Dimensions of Physical Quantities,
Principle of homogeneity
Dimensional equation,
Applications of dimensional analysis: Checking the correctness of physical equations,
Derivation of simple physical relations, Limitation of Dimensional Analysis, significant figures and Error Analysis.

2. FORCE AND MOTION

Scalars and Vectors,
Velocity & acceleration,
Equations of motion,
Newton's law of motion,
Force & its derivation from Newton's laws of motion,
Composition and resolution of forces,
Parabolic Motion
Horizontal projection and projection at an angle, time of flight,
Horizontal range and maximum horizontal range,
Simple Problems,
Centripetal acceleration, centripetal and centrifugal forces,
Concept of friction and its application.
Application to banking of roads

SECTION B

3. WORK, POWER AND ENERGY

Work and its Units,
Work done on bodies moving on horizontal and inclined planes (consider frictional forces also).
Concept of Power and its units,
Calculations of power (simple cases).
Concept of Kinetic energy and potential energy
Expressions for P.E and K.E,
Conservation of energy in the case of freely falling bodies,
Principle of conservation of energy.

4. ROTATIONAL AND SIMPLE HARMONIC MOTIONS

Definition of moment of inertia,
Moment of inertia of disc, ring & sphere,
Torque and angular momentum and their inter relation,
Principles of conservation (angular momentum and its applications).
Kinetic energy of rolling body,
S.H.M – derivation of displacement, velocity, acceleration, time period and frequency,
Motion of cantilever, Free, forced and resonant vibrations (No derivation).

SECTION C

HEAT

1. TEMPERATURE AND ITS MEASUREMENT

Concept of heat and temperature on the basis of K.E. of molecules.

Unit of heat

Basic Principles of measurement of temperature,

Thermocouple,

Bimetallic and resistance,

Pyrometers and Thermometers

Criteria for the selection of thermometers.

2. EXPANSION OF SOLIDS

Coefficient of linear,

Surface and cubical expansions and relation amongst them,

Thermal stresses (qualitative only) and their applications.

SECTION D

3. HEAT TRANSFER

Three modes of transfer of heat,

Coefficient of thermal conductivity, its determination by Searle's method and Lee's disc method.

Conduction through compound media (Series and parallel for two materials only),

Heat radiation, Characteristics of heat radiations,

Prevost's theory of heat exchange,

Black body radiations,

Emissivity and absorbtivity

Kirchoff's law and stefan's law of radiation.

DEE/S/120P

APPLIED PHYSICSI

Maximum Time : 3 Hrs.

University Examination : 60 Marks

Total Marks : 100

Continuous Internal Assessment : 40 Marks

Minimum Pass Marks :40%

1. To determine the density of a cylinder using vernier calipers and balance.
2. To determine area of cross section of wire using screw guage.
3. To determine the thickness of glass piece using spherometer.
4. Calculation and verification of period of vibration of a cantilever (use graph)
5. Verify Parallelogram law of forces.
6. Measurement of K.E. gained by a body dropped through height h.
7. To find the coefficient of linear expansion of given rod.
8. Caliberation of Thermocouple.

Maximum Time : 3 Hrs.
Total Marks : 100
Minimum Pass Marks :40%

University Examination : 60 Marks
Continuous Internal Assessment : 40 Marks

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B) Instructions for candidates

1. Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.
2. Use of nonprogrammable scientific calculator is allowed

SECTION A**1. STRUCTURE OF ATOM**

Chemistry as important branch of science, Basic concept of Elements Mixture and compound, Chemical Equation, its balancing , implications and limitations.

Recapitulation of Fundamental Particles of atom i.e electron. Proton and neutron.

Bohr's model of atom

Line Spectrum of Hydrogen

Modern concept of atom four quantum numbers, shells, subshells, orbital (shapes of s & p orbitals

Pauli's exclusion principle.

Aufbau Energy ranking rule.

Orbital concept types of bonds covalency, formation of ss, sp, pp, bonding with examples.

Hybridization sp, sp², sp³, (consider BeF₂, BF₃, CH₄) molecules.

Brief concept of modern periodic table of elements.

SECTION B**2. CHEMICAL EQUATION, OXIDATION & REDUCTION**

Concept of Oxidation & Reduction.

Electronic concept of oxidation and reduction.

Redox reactions (direct and indirect).

Oxidation No. balancing of simple redox reactions by oxidation No.

SECTION C**3. IONIC EQUILIBRIUM**

Ionization., degree of ionization,

Focus effecting ionization

Ionization of water, ionization equilibrium in aqueous solutions, common ion effect

4. ACIDS AND BASES

Concept of acids and bases, their strength in ionization constant.

PH value, acid base titration, choice of indicators.

Hydrolysis

Buffer solution

5. ELECTROLYSIS

Concept of electrolysis.

Faraday's law of electrolysis.

Engineering applications (electrometallurgy, electroplating & electrorefining)

SECTION D

6. WATER

Hard and soft water, removal of hardness by :

a. Soda lime process.

b. Permutit's process.

c. Ion exchange method.

Disadvantages of hard water in industrial use, boiler scales, priming, foaming corrosion and caustic embrittlement.

Expressing the degree of hardness of water in (with simple problems)

a. Clark's degree

b. O'Hener;s method

Determination of degree of hardness by (with simple problems) :

a. Soap titration method :

b. O'Hener's method :

Water for drinking purposes .

7. SOLUTIONS & COLLOIDS

Solute, solvent, solution & colloids.

Particle size and colloidal state

Tyndell effect, Brownian movement , coagulation.

DEE/S/130P

APPLIED CHEMISTRY I

Maximum Time : 3 Hrs.

University Examination : 60 Marks

Total Marks : 100

Continuous Internal Assessment : 40 Marks

Minimum Pass Marks :40%

1. Introduction of basic concepts of volumetric analysis & other related equipment.
2. Find the strength in grams per litre of the given solution or sodium hydroxide with the help of standard oxalic acid solution.
3. Find the strength of sulphuric acid in grams per litre using standard oxalic acid solution and an intermediate alkali solution indicator phenolphthalein.
4. Determine the strength of oxalic acid solution in grams per litre using standard sulphuric acid , Indicator methyl orange.
5. Determine the total alkalinity in ppm in the given sample of water by soap solution method.
6. Estimate the total hardness of a sample of water by soap solution method.
7. Estimate the amount of chlorides present in water using silver nitrate solution. Indicator potassium chromate.
8. Determine percentage purity of commercial samples like blue vitrol and green vitrol volumetrically.
9. Qualitative analysis of some important acidic & basic radicals with direct testing with demonstration of group analysis.

Maximum Time : 3 Hrs.**University Examination : 60 Marks****Total Marks : 100****Continuous Internal Assessment : 40 Marks****Minimum Pass Marks :40%****A) Instructions for paper setter**

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3. Section E will comprise of 1015 short answers type questions, which will cover the entire syllabus and will carry 40% of the total marks.

B) Instructions for candidates

1. Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.
2. Use of nonprogrammable scientific calculator is allowed

SECTION A**information concepts & processing**

definition of information, data Vs information, introduction to information system, information representation digital media, images, graphics, animation, audio, video etc. Need a value & quality of information the concept of information entropy & numericals.

SECTION B**Computer appreciation**

definition of electronic computer, history, generation, characteristics & application of computers, classification of computers, RAM,ROM, computer hardware, CPU, various I/O devices, peripherals , storage media, software definition and concepts.

SECTION C**Data communication & networks**

computer networks , networking of computers, introduction to LAN, WAN, MAN, network topologies , basic concepts in computers computer networks, introduction to GPRS, CDMA,GSM & FM technologies.

SECTION D**Introduction to internet technologies**

HTML, DHTML,WWW,FTP, TELENET, web browser, net surfing , search engines, email, ISP, ecommerce, public key, private key, safety of business transaction on web.

Concepts in operation system

Elementary concepts in operation system, GUI, introduction to DOS, MS windows,

SEMESTER II

DEE/S/210

COMMUNICATION SKILLS1

Maximum Time : 3 Hrs.

University Examination : 60 Marks

Total Marks : 100

Continuous Internal Assessment : 40 Marks

Minimum Pass Marks :40%

A) Instructions for paper setter

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2. Each of the sections A, B, C and D will contain two questions and candidates have to attempt at least one question compulsorily from each section. Each section carry 15% of the total marks
3. Section E will comprise of 1015 short answers type questions, which will cover the entire syllabus and will carry 40% of the total marks.

B) Instructions for candidates

1. Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.
2. Use of nonprogrammable scientific calculator is allowed

SECTION A

1. Corresponding : (Official, Business And Personal)

? One Letter from each category (Official, Business and Personal) may be set in the examination paper and the students be asked to write one of them.

SECTION B

2. Grammar

? A brief review of easy form of tenses. Conversion of direct narration into indirect form of narration and vice versa (only simple sentences). Punctuation.

SECTION C

3. Essay

? Preferably on scientific topic from the given outlines. The paper setter may be instructed to give a choice of attempting one out of three topics. The question paper may provide the outlines. The essay will be of 250 to 300 words. The examiner may select three topics one from each of the following.

- (i) Science
- (ii) Technology
- (iii) General.

SECTION D

Written Communication

report, notices, agenda notes, business correspondence preparation of summery & prices.

DEE/S/210P

COMMUNICATION SKILLS1

Maximum Time : 3 Hrs.

University Examination : 60 Marks

Total Marks : 100

Continuous Internal Assessment : 40 Marks

Minimum Pass Marks :40%

1. Locate a particular book in the library.
2. Find out some words in the dictionary.
3. Pronunciation, stress and intonation.
4. Give abbreviations of particular words and vice versa
5. Give meaning of some words.
6. Spell some words.
7. Practice of handling some communication systems like telephone and noting down and conveying messages.

DEE/S/220

APPLIED MATHEMATICSII

Maximum Time : 3 Hrs.

University Examination : 60 Marks

Total Marks : 100

Continuous Internal Assessment : 40 Marks

Minimum Pass Marks :40%

A) Instructions for paper setter

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2. Each of the sections A, B, C and D will contain two questions and candidates have to attempt at least one question compulsorily from each section. Each section carry 15% of the total marks
3. Section E will comprise of 1015 short answers type questions, which will cover the entire syllabus and will carry 40% of the total marks.

B) Instructions for candidates

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2. Use of nonprogrammable scientific calculator is allowed

SECTION A

1. Differential Calculus

Concept of limits. Four standard limits

$$\lim_{x \rightarrow a} x^n = a^n$$

$$\lim_{x \rightarrow 0} \frac{\sin x}{x} = 1 \quad \lim_{x \rightarrow 0} \frac{x}{a-x} = \frac{1}{a}$$

Differentiation by definition of x , $\sin x$, $\cos x$, $\tan x$, e

Differentiation of sum, product and quotient of functions. Differentiation of function as a function.

Differentiation of trigonometric inverse functions. Logarithmic differentiation,

Successive differentiation (excluding nth order)

Applications :

- (a) Rate Measures
- (b) Errors
- (c) Maxima and Minima
- (d) Equation of tangent to a curve for explicit functions only and equation of a normal.
- (e) Newton's Method of solving equation using the formula $f(a) / f'(a)$

SECTION B

2. Integral Calculus

Integration as inverse operation of differentiation.

Simple Integration by substitution, by parts and by partial fractions (for linear factors only).

Evaluation of definite integrals (simple problems)

$$\text{Evaluation of } \int_0^{\pi/2} \sin^n x \, dx \quad \int_0^{\pi/2} \cos^n x \, dx \quad \int_0^{\pi/2} \sin^m x \cos^n x \, dx$$

using formulae without proof (m and n being positive integers only)

Applications :

- (a) area bounded by a curve and axes
- (b) volume of solid formed by revolution of an area about axes. (Simple problems).
- (c) Centre of gravity
- (d) Moment of Inertia
- (e) Average value
- (f) Root mean square value of a function
- (g) gamma function(reduction formula)

SECTION C

3. Differential Equation

Concept of formation of Differential Equation and solution of first order differential equation.

- (a) Variables separation.
- (b) Homogeneous differential Equation
- (c) Linear Differential Equation. $ax + n$

Solution of Linear differential Equations having e , $\sin ax$, $\cos ax$ and x in the right hand side.

SECTION D

matrix

addition, subtraction, multiplication, rank of matrix

Maximum Time : 3 Hrs.**University Examination : 60 Marks****Total Marks : 100****Continuous Internal Assessment : 40 Marks****Minimum Pass Marks :40%****A) Instructions for paper setter**

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B) Instructions for candidates

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2. Use of nonprogrammable scientific calculator is allowed

SECTION A**1. Waves**

Generation of waves by vibrating particles, wave motion and its parameters.
Equating a wave. Energy transfer by particle and wave.
Superposition of waves and interference (graphical).
Sound and light as waves frequencies, wavelength and velocities and their relationship.

SECTION B**2. Applications of Sound****Ultrasonics**

- (a) Production of ultrasonic waves by using magnetostriction and piezo – electric methods.
- (b) Applications to drilling cold welding, cleaning, flaw detection and exploration (Sonar).

Acoustics

- (a) Reflection, refraction and absorption of sound waves by surfaces.
- (b) Echo and reverbration.

3. Applications of Light

Refraction and refractive index.

Defects in image formation (Qualitative), Simple and compound microscope, astronomical and Galaleo telescopes and their magnifying powers.

4. Electrostatics

Coloumb's law, Unit charge

Electric field and Electric lines of force.

Electric intensity due to charged straight conductor and plane sheet.

Capacitance and its units, Parallel plate capacitor.

Grouping of capacitors in series and parallel (simple problems).

Dielectric constant its functions.

SECTION C**5. D.C. Circuits**

Ohm's law

Kirchoff's law
Wheatstone Bridge Principle.
Simple Problems on series and parallel circuits.

SECTION D

6. Electromagnetism

Magnetic fields and its units.
Magnetic field around a current carrying conductor.
Circular loop and solenoids.
Force on a moving charge and current in a magnetic field.
Force between two current carrying parallel conductors.
Moving coil galvanometer; Conversion of galvanometer into Ammeter and Voltmeter.
Permeability; Dia, para and Ferro magnetic materials.

7. Modern Physics

Introduction to laser, its characteristics and important applications.
Introduction to common modes of communication, viz Fax, Email, Internet etc.

DEE/S/230P

APPLIED PHYSICSII

Maximum Time : 3 Hrs.

University Examination : 60 Marks

Total Marks : 100

Continuous Internal Assessment : 40 Marks

Minimum Pass Marks :40%

1. To find the velocity of sound by resonance method.
2. Determine the focal length of a convex lens by displacement method.
3. Setting up a model of telescope and determination of its magnifying power.
4. Setting up a model of compound microscope and determination of its magnifying power.

DEE/S/240P

ENGINEERING DRAWINGI

Maximum Time : 3 Hrs.

University Examination : 60 Marks

Total Marks : 100

Continuous Internal Assessment : 40 Marks

Minimum Pass Marks :40%

SECTION A

1. Handling Use and Care of Drawing instruments and Materials.

Drawing Instruments

Materials

Layout of Drawing sheets

SECTION B

2. Free Hand Sketching and Lettering

Different types of lines in Engineering drawing as per ISI specifications.

Practice of free hand sketching of vertical, horizontal and inclined lines, geometrical figures such as triangles, rectangles and circles.

3. Lettering Technique and Practice

Instrumental single stroke lettering of 35 mm and 70 mm height in the ratio of 7:4 Free hand Lettering (Alphabet and numerals) lower case and upper case, single stroke and block letters, vertical and inclined at 75 degree in different standards, series of 3:5 8 and 12 mm heights in the ratio of 7:4

4. Dimensioning Technique

Necessity of dimensioning, method and principles of dimensioning (mainly theoretical instructions).

Dimensioning of Overall sizes, circles, threaded holes, chamfered surfaces, angles, tapered surfaces, holes, equally spaced on P.C.D., counter sink holes, counter bored holes, cylindrical parts, narrow spaces and gaps, radii, curves and arches.

DEE/S/240

ENGINEERING DRAWING

Maximum Time : 3 Hrs.

University Examination : 60 Marks

Total Marks : 100

Continuous Internal Assessment : 40 Marks

Minimum Pass Marks :40%

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2. Use of nonprogrammable scientific calculator is allowed

SECTION A

1. Scales

Scales – their need and importance –(Theoretical instructions).

Drawing of plain and diagonal scales.

SECTION B

2. Projection

Theory of projections (Elaborate theoretical instructions)

Drawing 3 views of given objects (Non symmetrical objects may be selected for this exercise).

Drawing 6 views of given objects (Non symmetrical objects may be selected for this exercise).

Identification of surfaces on drawn views and objects drawn.

Exercises on missing surfaces and views.

Orthographic drawing or interpretation of views.

Introduction to third angle projections.

SECTION C

3. Sections

Importance and salient features, Methods of representing sections, conventional sections of various materials, classification of sections, conventional in sectioning.

Drawing of full section, half section, partial or broken out sections, offset sections, revolved sections and removed sections.

Drawing of different conventions for materials in section, conventional breaks for shafts, pipes, rectangular, square angle, channel, rolled sections.

Exercises on sectional views of different objects.

SECTION D

4. Isometric Views

Fundamentals of isometric projections (Theoretical Projections)

Isometric views from 2 to 3 given orthographic views.

Preparation of simple working drawing of Furniture items like table, stool and any job prepared in the workshop.

DEE/S/250P

WORKSHOP PRACTICE I

Maximum Time : 3 Hrs.

University Examination : 60 Marks

Total Marks : 100

Continuous Internal Assessment : 40 Marks

Minimum Pass Marks :40%

The following shops are included in the syllabus : Student can opt relevant shops depending upon the need of his/her course :

1. Carpentry and painting shop.
2. Fitting shop.
3. Welding & sheet metal shop.
4. Electric shop.
5. Smithy or electronic shop.

SECTION A

1. Carpentry and Painting shop

Introduction to joints, their relative advantages and uses.

Job I Preparation of Dovetail joint.

Job II Preparation of Mitre joint.

Job III Preparation of lengthening joint.

Job IV Preparation of atleast one utility job with and without lamination.

Demonstration of job showing use of Rip saw, Bow saw and Tramme, method of sharpening various saws.

Demonstration of job on Band Saw and Circular saw, chain & diesel universal wood working machine, saw resharpening machine, Saw Brazing unit.

Demonstration of various methods of painting various items.

Job V Preparation of surface before painting.

Job VI – Application of primer coat

Job VII – Painting wooden items by brush/roller/spray

SECTION B

2. Fitting Shop

Description and demonstration of various types of drills, taps and dies

Selection of dies for tapping, Types of taps, tapping, dieing and drilling operations.

Job I – Making Internal and External Threads on a job by tapping and dieing operations (manually).

Precautions while drilling soft materials, specially lead.

Job II Drilling practice on soft metals (Aluminium, Brass and lead)

Care and maintenance of measuring tools like calipers, steel rule, try square, vernier micrometer, height gauge , combination set , reading gauge, Handling measuring instruments, checking of zero error, finding of least count.

Job III Preparation of a job by filing on nonferrous metal.

Job IV Production of a utility job involving all the operations.

different types of elbow T Union, Socket, stopstock, taps etc.

Job V Preparation of job involving thread on GI pipe / PVC pipe and fixing of different types of elbow TUnion, socket, stopstock,taps

Description and demonstration of various ypes of drills, taps and dies; Selection of dies for tapping; Types of taps, Tapping and dieing operations.

SECTION C

3. Welding Shop

? Introduction of the gas welding, gas welding equipment, adjustments of different types of flames, demonstration and precautions about handling welding equipment.

Job I Practice in handling gas welding equipment and welding practice.

Common welding joints generally made by gas welding.

Job II Preparation of Butt joint by gas welding.

Job III – Preparation of small cot conduit pipe frame by electric arc welding / gas welding.

Job IV Preparation of square pyramid from M.S Rods by welding (type of welding to be decided by students themselves).

Job V Exercise job on spot/seam welding machine.

Demonstration of various methods adopted for painting steel items.

Job VI Painting steel items by brush/roller/spray.

SECTION D

4. Electric Shop

Importance of three phase wiring and its effectiveness.

Job I Laying out of 3 phase wiring for an electric motor or any other 3 phase machine .

Estimating and costing power consumption.

Job II Connecting single phase energy meter and testing it. Reading and working out the power consumption and the cost of energy.

Job III Checking continuity of connection (with tester and bulbs) location of faults with a 00multimeter and their rectification in simple machines and/or/other electric circuits filled with earthing.

Demonstration of dismantling, servicing and reassembling a table fan/air cooler/mixer/electric iron, Electric Heater, geaser, electric oven.

Job IV To forge a ring to acquaint the students with forge welding.

Job V To prepare a trus joint of MS angle iron.

Job VI To forge a chisel and acquaint the students with simple idea of hardening and tempering.

Forge Welding, defects in forging and inspection.

Job IV To forge squares on both ends of a circular rod with the elp of power hammer.

Job V Fullering of a given mild steel flat.

Job VI Production of a utility job.

OR

5. Electronic Shop

Demonstrate (or explain) the joining (or connecting) methods or/and mounting and dismantling method as well as uses of the items mentioned below:

- a) Various types of single, multicored insulated screened pair, Audio video, general purpose wires/cables.
- b) Various types of plugs, sockets connectors suitable for general purpose audio video use.
Some of such connectors are: 2 and 3 pin mains plug and sockets.
Banana plugs, and sockets, BNC, RCA, DIN, UHF, Ear phone speaker connector, Telephone jacks and similar male and female connectors and terminal strips.
- c) Various types of switches such as normal/ miniature toggle, slide, push button piano key, rotatory, SPST, SPDT, DPST, DPDT,
- d) Various types of protective devices such as: Wire fuse, cartridge fuse, slow acting/ fast acting fuse, HRC fuse, thermal fuse, single/multiple miniature circuit breakers, over and current relays.

Demonstrate the skill to make facilities solder joints.

Demonstrate the skill to remove components/wires by unsoldering

Demonstrate the skill to assemble components on boards, chassis, tape strips

Explain (or demonstrate) various methods of making and laying of cable forms, wiring techniques

Exposure to modern soldering and desoldering processes.

Field visits

Job I Desolder, remove and clean all the components, wires from a given equipment

APCB or a tip strip

Job II Soldering iron

Job III Temperature Control soldering iron

Job IV Desoldering strip.

SEMESTER III

DEE/S/310

COMPUTER APPLICATIONSI

Maximum Time : 3 Hrs.

University Examination : 60 Marks

Total Marks : 100

Continuous Internal Assessment : 40 Marks

Minimum Pass Marks :40%

A) Instructions for paper setter

1. The question paper will consist five sections namely A, B, C, D and E.
2. Each of the sections A, B, C and D will contain two questions and candidates have to attempt at least one question compulsorily from each section. Each section carry 15% of the total marks
3. Section E will comprise of 1015 short answers type questions, which will cover the entire syllabus and will carry 40% of the total marks.

B) Instructions for candidates

1. Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.
2. Use of nonprogrammable scientific calculator is allowed

SECTION A

1. Familiarization With Operating System

Introduction to computer Operating System (Dos, Windows'95).

Introduction to Dos structure, system files, batch files & configuration files.

Booting the system from floppy & hard disk.

Brief Introduction to Dos internal & external commands.

Familiarisation with windows structures, its use and application.

SECTION B

2. Preparation of Documents Through Word Processing .

Idea of text editors like Microsoft word, write etc.

Opening a document.

Preparing documents, inserting diagrams & tables.

Editing document.

(a) Character, word and Line Editing.

(b) Margin Setting, Paragraph alignment.

(c) Block Operations.

(d) Spell Checker

(e) Saving a document.

SECTION C

3. Information Presentation For Decision Making Using Spread Sheet : (Excel/Lotus 1 23)

Applications of spread sheet.

Structure of spread sheet.

Preparing spread sheet for simple data and numeric operations.

Using formulae in spread sheet operations.

Making Tables, sorting and querying.

Creation of graphs, Pie charts, bar charts.

Printing reports.

SECTION D

4. Computer aided Drafting (CAD)

Making simple drawings using features of CAD and confirming the drafting specifications.

Saving and retrieving drawings.

Dimensioning.

Lettering.

Plotted drawing

DEE/S/310P

COMPUTER APPLICATIONSI

Maximum Time : 3 Hrs.

University Examination : 60 Marks

Total Marks : 100

Continuous Internal Assessment : 40 Marks

Minimum Pass Marks :40%

Simple exercises based upon theory syllabus.

DEE/S/320

APPLIED MECHANICS

Maximum Time : 3 Hrs.

University Examination : 60 Marks

Total Marks : 100

Continuous Internal Assessment : 40 Marks

Minimum Pass Marks :40%

A) Instructions for paper setter

1. The question paper will consist five sections namely A, B, C, D and E.
2. Each of the sections A, B, C and D will contain two questions and candidates have to attempt at least one question compulsorily from each section. Each section carry 15% of the total marks
3. Section E will comprise of 1015 short answers type questions, which will cover the entire syllabus and will carry 40% of the total marks.

B) Instructions for candidates

1. Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.
2. Use of nonprogrammable scientific calculator is allowed

SECTION A

1. Introduction

Concept of mechanics and applied mechanics Explanation of Mechanics and applied Mechanics, its importance and necessity, giving suitable examples on bodies at rest and in motion, explanation of branches of this subject. Concept of rigid bodies.

SECTION B

2. Laws of Forces

Force and its effects, units and measurement of force, characteristics of force vector representation, Bow's notation, Types of forces, action and reaction, tension, thrust and shear force. Force systems : Coplaner and space force systems. Coplaner concurrent and

nonconcurrent forces. Free body diagrams, Resultant and components concept of equilibrium ; Parallelogram law of forces. Equilibrium of two forces, superposition and transmissibility of forces, Newton's third law, triangle of forces, different cases of concurrent coplanar, two force systems, extension of parallelogram law and triangle law to many forces acting at one point polygon law of forces, method of resolution into orthogonal components for finding the resultant, graphical methods, special case of three concurrent, coplanar forces, Lami's theorem.

3. Moments

Concept of moment, Varignon's theorem – statement only. Principle of moments – application of moments to simple mechanism, parallel forces, calculation of their resultant, concept of couple properties and effect, moving a force parallel to its line of action, general cases of coplanar force system, general conditions of equilibrium of bodies under coplanar forces.

4. Friction

Concept of friction, laws of friction, limiting friction and coefficient of friction, sliding friction.

SECTION C

5. Centre of Gravity

Concept of gravity, gravitational force, centroid and center of gravity, centroid for regular lamina and center of gravity for regular solids. Position of center of gravity of compound bodies and centroid of composition area. CG of bodies with portions removed.

SECTION D

6. Laws of Motion

Concept of momentum, Newton's laws of motion, their application, derivation of force equation from second law of motion, numerical problems on second law of motion, piles, lifts, bodies tied with string. Newton's third law of motion and numerical problems based on it, conservation of momentum, impulsive force (definition only).

7. Simple Machines.

Concept of machine, mechanical advantage, velocity ratio and efficiency of a machine their relationship, law of machine, simple machines (lever, wheel and axle, pulleys, jacks winch crabs only).

DEE/S/320P

APPLIED MECHANICS

Maximum Time : 3 Hrs.

University Examination : 60 Marks

Total Marks : 100

Continuous Internal Assessment : 40 Marks

Minimum Pass Marks :40%

1. Verification of the laws of polygon of forces.
2. To verify the forces in the different members of a jib crane.
3. To verify the reaction in the supports of a simple supported beam.
4. To find the mechanical advantage, velocity ratio and efficiency in the case of inclined Planes.
5. To find the mechanical advantage, velocity ratio and efficiency in the case of Screw Jack.
6. To find the mechanical advantage, velocity ratio and efficiency in the case of Worm and Worm Wheel.
7. To find the mechanical advantage, velocity ratio and efficiency in the case of Winch CrabSingle Graphical Representation.
8. To find out center of gravity of regular laminas.
9. To find out center of gravity of irregular laminas.
10. To determine coefficient of friction between 3 pairs of given surfaces.
11. To determine personal horse power of the experimenter.

DEE/S/330

ELECTRICAL ENGINEERING MATERIALS

Maximum Time : 3 Hrs.

University Examination : 60 Marks

Total Marks : 100

Continuous Internal Assessment : 40 Marks

Minimum Pass Marks :40%

A) Instructions for paper setter

1. The question paper will consist five sections namely A, B, C, D and E.
2. Each of the sections A, B, C and D will contain two questions and candidates have to attempt at least one question compulsorily from each section. Each section carry 15% of the total marks
3. Section E will comprise of 1015 short answers type questions, which will cover the entire syllabus and will carry 40% of the total marks.

B) Instructions for candidates

1. Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.
2. Use of nonprogrammable scientific calculator is allowed

SECTION A

1. Classification

? Classification of material into conducting, semiconducting and insulating materials through a brief reference to their atomic structure.

2. Conducting Materials

? Introduction

? Resistivity and factors affecting, alloying and mechanical strength.

? Superconductivity.

? Classification of conducting material as low resistivity and high resistivity materials.

Low resistivity materials.

Copper:

Its general properties as conductors, temperature coefficient, density, mechanical properties of hard and annealed copper, corrosion, contact resistance.

General properties of conductors, resistivity, temperature coefficient density, mechanical properties of hard and annealed aluminium, solderability, contact resistance.

Steel:

General properties of conductors, resistivity, corrosion, temperature coefficient density, mechanical properties, temperature of low and high tensile steel, solderability resistance.

Applications of copper, aluminium and steel, suitability of copper, aluminium and steel for various applications.

Low resistivity copper alloys.

Brass, Bronze (Cadmium and Beryllium), their practical applications with reasons for the same.

? Applications of special metals eg Ag, Au, Pt etc.

? High resistivity materials and their application manganese, Nichrome, mercury, platinum and tungsten.

3. Semi Conducting Materials

? Introduction

? Semiconductor and their properties

? Different Semiconducting materials used in manufacture of various semiconductors (silicon and germanium).

? Materials used for electronic components like resistors, capacitors, diodes, transistors and inductors etc.

SECTION B

4. Insulating Materials; General Properties

? Electrical Properties:

Volume resistivity, surface resistance, dielectric loss, dielectric strength (breakdown voltage) dielectric constant.

? Physical Properties:

Hygroscopicity, tensile and compressive abrasive resistance, brittleness.

? Thermal Properties:

Heat resistance, classification according to high permissible temperature rise. Effect of overloading on the life of an electrical appliance, increase in rating with the use of insulating materials having higher thermal stability. Thermal conductivity, Electro thermal breakdown in solid dielectrics.

? Chemical Properties:

Solubility, Chemical resistance, weather ability

SECTION C

5. Insulating Materials and their Applications

? **Plastics**

Definition and classification

Thermosetting materials:

Phenol formaldehyde resins (i.e. Bakelite) amino resins (urea formaldehyde and Malamine formaldehyde), epoxy resins their important properties and applications.

Thermoplastic materials:

Polyvinyl chloride(PVC), Polyethylene, silicones, their important properties and applications.

? **Natural Insulating Materials**

Mica and Mica Products

Asbestos and asbestos products

Ceramic materials (porcelain and steatite)

Glass and glass products

Cotton

Silk

Jute

Paper (dry and impregnated)

Rubber, Bitumen

Mineral and insulating oil for transformers, switchgears, capacitors, high voltage insulated cables, insulating varnishes for coating and impregnation.

Enamels for winding wires

? Gaseous materials; air, Hydrogen, Nitrogen and SF

SECTION D

6. Magnetic Materials

? Introduction ferromagnetic materials, permeability, BH curve, magnetic saturation, hysteresis loop (including) coercive force and residual magnetism

? **Soft Magnetic Materials**

Alloyed steels with silicon, high silicon, alloy steel for transformers, low silicon alloy steel for electric rotating machines.

Cold Rolled Grain Oriented (CRGO) steels for transformers, Nonoriented steels for rotating machines

Nickel-iron alloys

Soft Ferrites

7. Materials For Special Purposes

? Thermocouple, lead soldering and fuse material, mention of their applications

8. Introduction of various engineering materials necessary for fabrication of electrical machines such as motors, generators, transformers etc.

Note:

1. The teacher may demonstrate the use of materials in different applications bringing the relevant apparatus into the room or by taking the students to the laboratories/ workshops whenever necessary
2. Student may be given exercise on identification of materials used in electrical gadgets, motors etc.

Maximum Time : 3 Hrs.**University Examination : 60 Marks****Total Marks : 100****Continuous Internal Assessment : 40 Marks****Minimum Pass Marks :40%****A) Instructions for paper setter**

1. The question paper will consist five sections namely A, B, C, D and E.
2. Each of the sections A, B, C and D will contain two questions and candidates have to attempt at least one question compulsorily from each section. Each section carry 15% of the total marks
3. Section E will comprise of 1015 short answers type questions, which will cover the entire syllabus and will carry 40% of the total marks.

B) Instructions for candidates

1. Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.
2. Use of nonprogrammable scientific calculator is allowed

SECTION A**1. DC CIRCUITS**

- ? Concept of electricity, Basic terms Voltage current , Potential Difference, Power, energy and their units.
 - ? Ohm's Law
 - ? Effect of temperature on resistance, temperature coefficient of resistance.
 - ? Resistances in series and parallel
 - ? Kirchoff's current law and kirchoff's voltage law and their applications to simple circuits. Conversion of circuits from star to Delta and Delta to Star.
 - ? Thevenin's Theorem, Superposition theorem, Norton's theorem and their use to solve simple problems.
- 2. BATTERY**
- ? Basic idea about primary and secondary cells.
 - ? Construction, working and applications of Lead and Battery and Nickel Cadmium cells, Silver Oxide cells
 - ? Charging methods used for lead acid accumulator
 - ? Care and maintenance of lead acid battery.
 - ? Series and parallel connections of batteries.

SECTION B**3. Magnetism and Electromagnetism**

- ? Introduction to electromagnetism, Magnetic field around a straight current carrying conductor and a solenoid and methods to find its direction, force between two parallel current carrying conductors.
- ? Force on a conductor placed in the magnetic field.
- ? Series and parallel magnetic circuits, simple problems
- ? Importance of air gap
- ? Concept of hysteresis and hysteresis loop.

4. Electromagnetic Induction

- ? Faraday's Laws of electromagnetic induction.
- ? Lenz's law and Fleming's Right and left hand rules.

- ? Principle of self and mutual induction, self and mutually induced e.m.f, simple numerical problems
- ? Energy stored in a magnetic field.
- ? Rise and decay of current in RL and RC circuits.

SECTION C

5. AC Theory

- ? Concept of alternating voltage and current
- ? Difference between AC and DC,
- ? Concept of cycle, frequency period, amplitude, value, average value, r.m.s value, maximum value, form factor and peak factor.
- ? Representation of sinusoidal quantities by phasors.
- ? Derivation of equation of sinusoidal waveform.
- ? Physical concept of alternating voltage applied to a pure resistance, pure inductance and pure capacitance.
- ? Inductive reactance, capacitive reactance
- ? Alternating voltage applied to resistance and inductance in series
- ? Alternating voltage applied to resistance and capacitance in series.
- ? Impedance triangle and phase angle
- ? Complex Numbers Various forms; addition, subtraction, multiplication and division, addition of sinusoidal terms
- ? Solutions and phasor diagrams for simple practical RLC circuits (series and parallel).
- ? Introduction series and parallel resonance and its conditions. Power in pure resistance, inductance, inductance and capacitance, power in combined RLC circuits, Power factor, active and reactive currents and their significance, practical importance of power factor, solution of simple circuits using j notation. Use of conductance, susceptance and admittance.

SECTION D

6. Polyphase System

- ? Concept of polyphase in power system
- ? Advantages of 3phase system over single phase system.
- ? Generation of 3phase voltages, relation between phase voltage and line voltage, phase current, line current and power in a star and delta connected system. Simple problems on 3phase balanced loads and concept of unbalanced loads.

DEE/S/340P

ELECTRICAL SCIENCE

University Examination : 60 Marks

Maximum Time :3 Hrs.

Total Marks : 100

Continuous Internal Assessment : 40 Marks

Minimum Pass Marks :40%

1. Determination of voltage-current relationship in a dc circuit under specific physical conditions and to draw conclusions.
2. To verify that $R_T = R_1 + R_2$ when resistances are in series and $R_T = \frac{R_1 R_2}{R_1 + R_2}$ when resistances are in parallel.
3. Verification of Kirchoff's current law and Kirchoff's Voltage Laws in a dc circuit
4. To measure the value of unknown resistance with the help of a Wheatstone bridge.
5. To observe the effect of temperature on resistance of a fan and hence calculate the value of temperature coefficient of the winding material.

6. To find the ratio of inductance values of a coil having aircore and ironcore respectively and to observe the effect of introduction of a magnetic core on coil inductance
7. To find the voltage current relationship in a single phase R.L. and RC Series circuits, draw their impedance triangles and determine the power factor in each case.
8. To find the voltage current relationship in a single phase R.L.C derives circuit, draw its impedance triangle and determine the power factor.
9. To test a leadacid storage battery for charged and discharged conditions and to recharge it.
10. To find out resonance frequency in an R.L.C. circuit.
11. Measurement of power and power factor in a single phase R.L.C. circuit and to calculate active and reactive power.
12. Plotting hysteresis loop of a given magnetic material with the help of a CRO.

DEE/S/350

ELECTRICAL ENGINEERING DRAWING I

Maximum Time : 3 Hrs.

University Examination : 60 Marks

Total Marks : 100

Continuous Internal Assessment : 40 Marks

Minimum Pass Marks :40%

A) Instructions for paper setter

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2. Each of the sections A, B, C and D will contain two questions and candidates have to attempt at least one question compulsorily from each section. Each section carry 15% of the total marks
3. Section E will comprise of 1015 short answers type questions, which will cover the entire syllabus and will carry 40% of the total marks.

B) Instructions for candidates

1. Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.
2. Use of nonprogrammable scientific calculator is allowed

SECTION A

1. Electrical and Electronic Symbols

- ? Electrical and Electronic symbols use in Electrical and Electronic installations like light, power, alarm and control circuits etc.

SECTION B

2. Simple Light Circuits

Schematic and wiring diagrams for the following circuits :

- ? Light and fan points controlled by individual switches
 ? Fluorescent tube controlled from one switch
 ? One lamp controlled by two switches (stair case circuit)
 ? Two lamps controlled by three switches (Double staircase circuit)

SECTION C

3. Simple Alarm Circuits Without and With Relays

Schematic and wiring diagrams for the following circuits :

- ? One bell controlled by one push button
- ? Two ordinary bells (for day and night) used at a Doctor's residence.
- ? Bell response circuit using one bell and a relay
- ? Bell response circuit of an office (for three rooms)
- ? Traffic control light system for two road crossing
- ? A light circuit which gets automatically connected to DC supply in case of power failure

SECTION D

4. Orthographic Projections of Simple Electrical Parts

To draw front elevation, side elevation and/or plan of the following from a given pictorial view:

- ? End cover of Induction motor
- ? Rotor of squirrel cage Induction motor
- ? Motor body (AC machine)
- ? Slip Rings
- ? Pin type insulator
- ? Field pole with coil
- ? Bus Bar Post
- ? Kit Kat fuse base
- ? Kit Kat fuse carrier
- ? Dry type single phase transformer

SEMESTER IV

DEE/S/410

COMPUTER APPLICATIONSII

Maximum Time : 3 Hrs.

University Examination : 60 Marks

Total Marks : 100

Continuous Internal Assessment : 40 Marks

Minimum Pass Marks :40%

A) Instructions for paper setter

1. The question paper will consist five sections namely A, B, C, D and E.
2. Each of the sections A, B, C and D will contain two questions and candidates have to attempt at least one question compulsorily from each section. Each section carry 15% of the total marks
3. Section E will comprise of 1015 short answers type questions, which will cover the entire syllabus and will carry 40% of the total marks.

B) Instructions for candidates

1. Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.
2. Use of nonprogrammable scientific calculator is allowed

SECTION A

1. Information Storage and retrieval

- ? Need for information storage and retrieval.
- ? Creating database file.
- ? Querying database file on single and multiple keys.
- ? Programming a very simple application.

SECTION B

2. Programming in 'C'.

- ? Basic structure of C programs.
- ? Executing a C program.
- ? Constants, variables and data types.
- ? Operators and expressions.
- ? Managing InputOutput operations like reading a character, writing a character, formatted input, output through print, scan, getch, putch statements etc.
- ? Decision making and branching using IF else, switch, go to statements.
- ? Decision making and looping using dowhile and for statements.
- ? Arrayone dimensional and two dimensional.

SECTION C

3. Computers Application Overview

- ? Commercial and business data processing application.
- ? Engineering computation.
- ? CAD, CAM, CAE, CAI.

SECTION D

4. Use of computers for measurement and control, Overview of a computer based data acquisition & control system in Vivavoice.

Note : There will be no theory paper in this subject. The Knowledge attained by students will be evaluated by asking question in Vivavoice.

DEE/S/410P

COMPUTER APPLICATIONSII

Maximum Time : 3 Hrs.

University Examination : 60 Marks

Total Marks : 100

Continuous Internal Assessment : 40 Marks

Minimum Pass Marks :40%

1. Creating database.
2. Querying the database.
3. Report generation.
4. Programming in dbase
5. Use of spread sheets/Matlab/Mathematics/Eureka (or any other package) for engineering computers.
6. Use of design packages (appropriate design packages may be selected depending upon the branch).
7. Use of CAI Packages.
8. Programming for DAS & control.
9. Exercises on data acquisition.
10. Exercises on control on/off switch and proportional control.
11. Programming exercise on executing a C program.
12. Programming exercise on editing a C program.
13. Programming exercise on defining variables and assigning values to variables.
14. Programming exercise on arithmetic and relational operators.
15. Programming exercise on arithmetic expressions and their evaluation.
16. Programming exercise on reading a character.
17. Programming exercise on writing a character.
18. Programming exercise on formatting input using print.
19. Programming exercise on formatting output using scan.
20. Programming exercise on simple if statement.
21. Programming exercise on IF else statement.
22. Programming exercise on switch statement.
23. Programming exercise on goto statement.
24. Programming exercise on do while statement.
25. Programming exercise on for statement.
26. Programming exercise on one dimensional arrays.
27. Programming exercise on two dimensional arrays.

Maximum Time : 3 Hrs.**University Examination : 60 Marks****Total Marks : 100****Continuous Internal Assessment : 40 Marks****Minimum Pass Marks :40%****A) Instructions for paper setter**

1. The question paper will consist five sections namely A, B, C, D and E.
2. Each of the sections A, B, C and D will contain two questions and candidates have to attempt at least one question compulsorily from each section. Each section carry 15% of the total marks
3. Section E will comprise of 1015 short answers type questions, which will cover the entire syllabus and will carry 40% of the total marks.

B) Instructions for candidates

1. Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.
2. Use of nonprogrammable scientific calculator is allowed

SECTION A**1. Generalised Treatment of Electrical Machines**

- ? Definition of motor and generator
- ? Torque due to alignment of fields and the concept of torque angle
- ? Electromagnetic force of an electrical machine
- ? Application of the concept of alignment of magnetic fields to the expansion of:
DC machines
AC machines

SECTION B**2. DC Machines**

- ? Main constructional features
- ? Function of commutator for motoring and generating action
- ? Factors determining induced emf
- ? Factors determining the electromagnetic torque
- ? Principles of motoring and generating action and relationship between terminal voltages and induced emf
- ? Different types of excitations
- ? Factors determining the speed of the motor by varying armature voltage and flux
- ? Performance and characteristics of the different types of DC motors
- ? Starting and speed control
- ? Causes of sparking and necessity of interpoles
- ? Various types of losses, calculation of efficiency by direct loading method and Swinburne's method and simple problem thereon
- ? Applications of DC motors
- ? Maintenance schedule of a DC machine
- ? Trouble shooting on a dc motor

SECTION C**3. Transformers (Single Phase)**

- ? Definition and principle, applications

- ? Constructional features of transformer
- ? EMF Equation
- ? Phasor diagram for a transformer on load
- ? Voltage regulation and calculation
- ? Testing of transformer as per Indian standards. Open circuit and short circuit test. Calculation of efficiency.
- ? Condition for maximum efficiency, all day efficiency and its significance
- ? Audio transformer construction, working and applications
- ? Instrument transformers, construction, working and applications
- ? Isolation Transformer
- ? Maintenance Schedule of a transformer
- ? Trouble shooting of a transformer

SECTION D

4. Three Phase Transformers

- ? Construction of three phase transformers
- ? Types of three phase transformers i.e. deltadelta, deltastar, stardelta and starstar
- ? Difference between power and distribution transformer
- ? Conditions for parallel operation
- ? On load tap changer
- ? Cooling of transformer, conservator, breather, bushings, temperature gauges etc.

Note : Students should be taken to Motor and Transformer manufacturing/repairing units for field visit while teaching this course (subject).

DEE/S/420P

ELECTRICAL MACHINES I

Maximum Time : 3 Hrs.

University Examination : 60 Marks

Total Marks : 100

Continuous Internal Assessment : 40 Marks

Minimum Pass Marks :40%

1. Measurement of the angular displacement of rotor of the three phase synchronous machine with respect to the stator on application of DC to the field winding and simultaneously to each phasewinding in sequence

OR

Measurement of the angular displacement of the rotor of a slipring induction motor on application of DC to stator phase winding in sequence and to each phase of rotor winding

2. Measurement of the induced emf of a separately excited DC machine as a function of the field current
3. Measurement of the terminal voltage of a separately excited DC machine as a function of the load current
4. Measurement of the terminal voltage of a DC shunt generator as a function of the load current
5. Study of DC series motor with starter (to operate the motor at no load for a moment.
6. Determination of the efficiency of a DC shunt motor by separate measurement of the losses (Swinburne's method)
7. Determination of the efficiency of a DC motor by direct method.

Note : Swinburne's and direct on the same machine and results compared

8. To observe the wave -shape of the no load current of a transformer by means of an oscilloscope.

9. Determination of the efficiency and regulation of a single phase transformer by means of opencircuit and short circuit test at
 - (i) full load
 - (ii) half load
 - (iii) quarter
10. Checking the polarity of the windings of a three phase transformer and connecting the windings in various configurations
11. Finding the voltage and current relationships of primary and secondary of a three phase transformer under balanced load in various configurations conditions.

DEE/S/430

BASIC ELECTRONICS

Maximum Time : 3 Hrs.

University Examination : 60 Marks

Total Marks : 100

Continuous Internal Assessment : 40 Marks

Minimum Pass Marks :40%

A) Instructions for paper setter

1. The question paper will consist five sections namely A, B, C, D and E.
2. Each of the sections A, B, C and D will contain two questions and candidates have to attempt at least one question compulsorily from each section. Each section carry 15% of the total marks
3. Section E will comprise of 1015 short answers type questions, which will cover the entire syllabus and will carry 40% of the total marks.

B) Instructions for candidates

1. Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.
2. Use of nonprogrammable scientific calculator is allowed

SECTION A

- 1.** Brief history of the development of electronics i.e. vaccum tube and solid state devices
- 2.** Voltage and current sources

Concept of voltage and current sources, constant voltage and current sources and their graphical representation. Conversion of voltage source into current source and viceversa.

SECTION B

3. SemiConductor Physics

- ? Atomic structure, crystalline structure, covalent bonds, generation and recombination, semi conductor materials, intrinsic semiconductors, effect of temperature on conductivity in germanium and silicon.
- ? Extrinsic semiconductors, doping, P & N type semiconductors, majority and minority carriers, effect of temperature.
- ? PN junction, drift and diffusion currents, depletion layer, potential barrier, effect of forward and reverse biasing of a PN junction. Energy band diagrams, Breakdown mechanisms.

4. SemiConductor Diodes

- ? Crystal diode, its working, characteristics, static and dynamic resistance
- ? Use of diode as half wave and full wave (center, static and dynamic resistance)
- ? Between DC output and AC input voltage

- ? Concept of ripples, filter circuits: shunt capacitor, series inductor and LC filters and their application to reduce ripples
- ? Diode rating/ specifications
- ? Zener diode and its VI characteristics

SECTION C

5. Transistors

Construction of a bipolar junction transistor with respect to:

- ? Doping, width and area, working principle of transistors, forward and reversed biasing
- ? Transistor configurations: Common Base(BC), Common Emitter (CE) and Common Collector (CC)
- ? Comparison between CB, CE and CC Configurations
- ? Current relationships, input and output characteristics in CB and CE configurations
- ? Applications of transistor amplifier in CE configurations

6. Transistor Biasing and Stabilization

- ? Transistor biasing, its need, operating point and need of stabilization of operating point
- ? Different biasing circuits, limitations, simple problems to calculate operating point in different biasing circuits
- ? Effect of temperature on the operating point of a transistor

7. Single Stage Transistor Amplifier

- ? Basic singlestage transistor amplifier circuit in CE configuration, function of each part
- ? Working of singlestage transistor amplifier, physical and graphical explanation, phase reversal
- ? Concept of DC and AC load line on output characteristics
- ? Small Signal voltage gains
- ? Concept of input and output impedance
- ? AC equivalent circuit of singlestage transistor amplifier

SECTION D

8. Regulated Power Supply

- ? Need of regulated power supply. Regulation and stabilization of voltage by Zener diode its limitations
- ? Block diagram of a regulated power supply
- ? Transistorised regulated power supply and short circuit protection

9. FET construction, working and applications

10 basic logic gates

or, nor, and, nand, not, xor, gates

Maximum Time : 3 Hrs.
Total Marks : 100
Minimum Pass Marks :40%

University Examination : 60 Marks
Continuous Internal Assessment : 40 Marks

1. Identification of electronic components : Passive components such as R, L and C their types, ratings and specifications and colour code. Active components such as diodes and transistors
2. Plotting VI characteristics of a semiconductor diode and finding its dynamic resistance
3. Plotting VI characteristics of a Zener diode and finding its reverse breakdown voltage
4. Observation of input and output wave shapes and verification of relationship between dc output voltage and ac input voltage for a half wave rectifier
5. Observation of input and output wave shapes and verification of relationship between dc output voltage and ac input voltage for a full wave rectifier
6. Observation of output wave shapes of a fullwave rectifier with (a) shunt capacitor (b) series inductor (c) Π filter circuit
7. Plotting input and output characteristics of a transistor in CB configuration
8. Plotting input and output characteristics of a transistor in CE configuration
9. Measurement of operating point (collector current (I_c), and collector emitter voltage, V_{ce}) in case of:
Fixed biasing of a transistor
Potential divider biasing of a transistor]
10. To observe and note the effect on the performance of a transistor due to change in temperature, also observe the effect on the performance on replacing the transistor by the same number
11. To measure the voltage gain and to observe and plot phase reversal of signal with same number
12. To plot frequency response curve of a singlestage transistor amplifier
13. To plot characteristics of a Field Effect Transistor (FET).

DEE/S/440 Electrical Measurement and Measuring Instruments

Maximum Time : 3 Hrs.

University Examination : 60 Marks

Total Marks : 100

Continuous Internal Assessment : 40 Marks

Minimum Pass Marks :40%

A) Instructions for paper setter

1. The question paper will consist five sections namely A, B, C, D and E.
2. Each of the sections A, B, C and D will contain two questions and candidates have to attempt at least one question compulsorily from each section. Each section carry 15% of the total marks
3. Section E will comprise of 1015 short answers type questions, which will cover the entire syllabus and will carry 40% of the total marks.

B) Instructions for candidates

1. Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.
2. Use of nonprogrammable scientific calculator is allowed

SECTION A

1. Introduction To Electrical Measuring Instruments

- ? Concept of measuring and instruments
 - ? Electrical quantities and instruments for their measurements
 - ? Types of electrical measuring instruments indicating, integrating and recording instrument
 - ? Essentials of indicating instruments deflecting, controlling and damping torques
- ### **2. Ammeters and Voltmeters (Moving Coil and Moving Iron Type)**
- ? Concept of ammeters and voltmeters and difference between them
 - ? Construction and working principles of moving coil and moving iron instruments
 - ? Merits and demerits, sources of error and application of these instruments

SECTION B

3. Wattmeters (Dynamometer Type)

- ? Construction, working principle, merits and demerits of single phase and three phase energy meters
- ? Errors and compensation
- ? Simple problems
- ? Construction and working principle of maximum demand indicators

4. Miscellaneous Measuring Instruments

- ? Construction, working principle and application of Meggar, Earth tester, Multimeter, Frequency meter (dynamometer type) single phase power factor meter (Electrodynamometer type). Working principle of synchroscope and phase sequence indicator, tong tester (Clampon meter)
- ? Instrument Transformers: Constructional details of
 - (a) CT
 - (b) PT and their ratio and phase angle error

SECTION C

5. Electronic Instruments

? Cathode Ray Oscilloscope : Block diagram, working of CRO and its various controls.

Applications of CRO

? Construction, working and applications of analog multimeter

? Digital multimeter and applications

7. LRC meters

8. Power Measurements In 3 Phase Circuits

? Three wattmeter method

? Two wattmeter method and simple problems

SECTION D

9. Measurement of NonElectrical Quantities

? Importance of measurements, basic measuring system, block diagram. Brief concept of transducers, wire wound potentiometers LVDT ; strain gauges types and applications; Electrical pickups, flow measurement, thermocouples, thermistors, pyrometers; bi metallic strips, level measurement

? Construction and working of pf meter, frequency meter (Analog type). Working principles of synchroscope and phase sequence indicator, tong tester.

? Digital P.F. & frequency meter

DEE/S/440P Electrical Measurement and Measuring Instruments

Maximum Time : 3 Hrs.

University Examination : 60 Marks

Total Marks : 100

Continuous Internal Assessment : 40 Marks

Minimum Pass Marks :40%

1. Use of multimeter for measuring voltage, current and resistance
2. To measure the unknown voltage using D.C. potentiometer
3. To calculate 1phase energy meter by direct loading method
4. To measure the value of earth resistance
5. To measure power, power factor in a 1phase circuit using wattmeter and power factor meter and verify results with calculations
6. Measurement of power and power factor of a threephase balanced load by 2wattmeter method
7. Measurement of voltage, frequency of sinusoidal signal with CRO
8. Connecting appropriate instruments at the supply of an installation to measure supply voltage, frequency power, maximum demand. Phase sequence, energy consumed (Instruments to be used are CRO, VTVM, Maximum demand indicator, phase sequence indicator. Energy meter and power factor meter)
9. Use of LCR meter for measuring inductance, capacitance and resistance

Maximum Time : 3 Hrs.
Total Marks : 100
Minimum Pass Marks :40%

University Examination : 60 Marks
Continuous Internal Assessment : 40 Marks

1. Unsheathing Wire baring and bending ears of solid wires
2. Soldering of thimbles to stranded wires
3. Crimping of Thimbles
4. Wire Jointing
 - ? Straight married joint
 - ? Tjoint
 - ? Western Union joint
 - ? Britannia joint
 - ? Twist sleeve joint
 - ? Bolted type joint
5. Types of wiring and to make different lamp control circuits in any one of the following wiring :
 - ? Cleat wiring
 - ? Batten wiring
 - ? Casing and capping wiring
 - ? Conduit wiring
6. To make a main distribution board with four out going circuits for light and fan loads including main switch and fuses (only internal connections to be made)
7. To make an extensive board with two 5 A sockets and one 15 A socket controlled by their respective switches. Also to provide a fuse and an indicator
8. To make a switch board containing at least two switches. One fan regulator and a socket
9. To make a series test lamp board and to use it for finding out simple electrical faults.
10. Testing of domestic wiring circuits with the help of Megger
11. Fault finding and repair of a tube light circuit
12. Wiring and testing of alarm and indicating circuits using relay, push button and belts (simple single phase circuits)
13. Repair and maintenance of domestic electrical appliances e.g. electric iron, geyser, fan., heat convector, washing machine, room cooler etc.
14. Connections of single phase and 3phase motors through an appropriate starter and to change their direction of rotation
15. Connections of Ammeter. Voltmeter, wattmeter, frequency meter, energy meter in an electrical circuit

SEMESTER V

DEE/S/510

INDUSTRIAL MANAGEMENT

Maximum Time : 3 Hrs.

University Examination : 60 Marks

Total Marks : 100

Continuous Internal Assessment : 40 Marks

Minimum Pass Marks :40%

A) Instructions for paper setter

1. The question paper will consist five sections namely A, B, C, D and E.
2. Each of the sections A, B, C and D will contain two questions and candidates have to attempt at least one question compulsorily from each section. Each section carry 15% of the total marks
3. Section E will comprise of 1015 short answers type questions, which will cover the entire syllabus and will carry 40% of the total marks.

B) Instructions for candidates

1. Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.
2. Use of nonprogrammable scientific calculator is allowed

SECTION A

1. Principles of Management

? Management, different functions of management planning, organizing, coordination and control.

? Structure of an industrial organization.

? Functions of different departments.

? Relationship between individual departments.

2. Human and Industrial Relations.

? Human relations and performance in organization.

? Understand self and others for effective behaviour.

? Behaviour modification techniques.

? Industrial relations and disputes.

? Relations with subordinates, peers and superiors.

? Characteristics of group behaviour and trade unionism

? Mob psychology.

? Grievance, Handling of grievances.

? Agitations, strikes, Lockout, Picketing and Gherao

? Labour Welfare

? Workers participation in management.

SECTION B

3. Professional Ethics

? Concept of Ethics.

? Concept of professionalism.

? Need for professional ethics.

? Code for professional ethics.

- ? Typical problems of professional engineers.
- ? Professional bodies and their role.

4. Motivation

- ? Factors determining motivation.
- ? Characteristics of motivation.
- ? Methods for improving motivation.
- ? Incentives, pay promotion, rewards.
- ? Job satisfaction and job enrichment.

5. Leadership.

- ? Need for Leadership.
- ? Functions of a Leader.
- ? Factors for accomplishing effective leadership.
- ? Manager as a leader.

6. Communication

- ? Importance of communication.
- ? The communication process.
- ? Barriers to communication.
- ? Making communication effective.

- ? Listening in communication.

7. Human Resource Development

- ? Introduction.
- ? Staff development and career development.
- ? Training strategies and methods.

SECTION C

8. Wage Payment

- ? Introduction to wages.
- ? Classification of wage payment scheme.

9. Labour, Industrial and Tax Laws.

- ? Importance and necessity of industrial legislation.
- ? Types of labour laws and disputes.
- ? Brief description of the following Acts

The Factory Act 1948, Payment of Wages Act 1936, Minimum Wages Act 1948, Workmen's Compensation Act 1923. Industrial Dispute Act 1947, Employee's state Insurance Act 1948, Provident fund Act.

- ? Various types of Taxes Production Tax, Local Tax, Sales Tax, Excise duty, Income Tax.

- ? Labour Welfare schemes.

10. Accidents and Safety

- ? Classification of accidents; According to nature of injuries i.e. fatal, temporary, According to event and According to place.
- ? Causes of accidents – psychological, physiological and other industrial hazards.
- ? Effects of accidents.
- ? Accidentsprone workers.
- ? Action to be taken in case of accidents with machines, electric shock, road accident, fibres and erection and correction accidents.
- ? Safety consciousness.
- ? Safety procedures.

- ? Safety measures Do's and Don't's.
- ? Safety publicity.
- ? Safety measures during executions of Engineering works.

SECTION D

11. Environmental Engineering.

- ? Ecology.
- ? Factors causing pollution.
- ? Effects of Pollution on Human Health.
- ? Air pollution and control act.
- ? Water Pollution and control act.
- ? Pollution control equipment.
- ? Solid waste mangement.
- ? Noise pollution and its control.

12. Entrepreneurship Development

- ? Concept of Entrepreneurship.
- ? Need of Entrepreneurship in the context of prevailing employment conditions of the country.
- ? Successful entrepreneurship.
- ? Preparation of project report.
- ? Training for entrepreneurship development.

DEE/S/520

ELECTRICAL MACHINESII

Maximum Time : 3 Hrs.

University Examination : 60 Marks

Total Marks : 100

Continuous Internal Assessment : 40 Marks

Minimum Pass Marks :40%

A) Instructions for paper setter

1. The question paper will consist five sections namely A, B, C, D and E.
2. Each of the sections A, B, C and D will contain two questions and candidates have to attempt at least one question compulsorily from each section. Each section carry 15% of the total marks
3. Section E will comprise of 1015 short answers type questions, which will cover the entire syllabus and will carry 40% of the total marks.

B) Instructions for candidates

1. Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.
2. Use of nonprogrammable scientific calculator is allowed

SECTION A

1. Synchronous Machines

- ? Main Constructional features
- ? Generation of emf
- ? Generation of three phase emf
- ? Three phase winding
- ? Production of rotating magnetic field in a three phase winding

- ? Concept of distribution factor and coil span factor and emf equation
- ? Armature reaction
- ? Operation of single synchronous machine independently supplying a load
- Voltage regulation by synch impedance method
- ? Operating a single synchronous machines when connected to infinite bus bars
- Effect of change of excitation
- Effect of change of torque
- ? Parallel operation of two alternators
- ? Synchronising an alternator
- ? Starting and operation of synchronous machines with different excitations
- ? Concept of Hunting
- ? Rating and cooling of synchronous machines
- ? Application of synchronous machines
- ? Maintenance suitable of alternators and synchronous motors

SECTION B

2. Induction motors

- ? Salient constructional features of squirrelCage and SlipRing Induction motor
- ? Principle of operation
- ? Locking of rotor and stator fields
- ? Rotor current
- ? Rotor torque²
- ? Relationship between the rotor I R loss and the motor slip
- ? Factors determining the torque
- ? Effect of rotor resistance upon the torqueSlip relationship
- ? Double cage rotor motor and its characteristics
- ? Starters of induction motors, DOL, stardelta, auto transformer and rotor resistance starter
- ? Cause of low power factor of induction motors
- ? Induction machine working as a Generator
- ? Testing of 3phase induction motors as per Indian Standards
- ? Installation and maintenance of induction motors

SECTION C

3. Fractional K.W. (FKW) Motors

Single phase induction motors: Construction, characteristics and applications

- ? Nature of field produced in single phase induction motor
- ? Split phase induction motor
- ? Capacitors start and run motor
- ? Shaded pole motor
- ? Reluctance start motor

Alternating current series motor and universal motors

Single phase synchronous motor

- ? Relucatanance motor
- ? Hysterisis motor

Servo Motors

SECTION D

4. Special Purpose Machines

- ? Construction and working principle of brushless generator and three brush generator
- ? Construction and working principle of Eddy drives for variable speed operations
- ? Construction and working principle of Scharage Motor

DEE/S/520P

ELECTRICAL MACHINESII

Maximum Time : 3 Hrs.

University Examination : 60 Marks

Total Marks : 100

Continuous Internal Assessment : 40 Marks

Minimum Pass Marks :40%

1. Synchronous Machines

- ? Determination of the magnetization curve of an alternator at rated speed and (ii) half rated speed
- ? Determination of Excitation required to maintain constant voltage in an alternator at varying load
- ? Determination of the relationship between the voltage and load current of an alternator keeping excitation and speed constant
- ? Determination of the regulation and efficiency of alternator from the open circuit and short circuit test
- ? Parallel operation of polyphase alternators and load sharing
- ? Determination of the effect of excitation on a synchronous motor

2. Induction Machines

- ? Determination of efficiency by (a) no load test and blocked rotor test on an induction motor (b) direct loading of an induction motor
- ? Determination of effect of rotor resistance on torquespeed curve of an induction motor

3. Fractional Kilowatt (FKW) Motors

- ? Determination of the effect of various capacitors on the starting and running of a single phase induction motor. Methods of reversal of rotation.

DEE/S/530

ELECTRONIC DEVICES AND CIRCUITS

Maximum Time : 3 Hrs.

University Examination : 60 Marks

Total Marks : 100

Continuous Internal Assessment : 40 Marks

Minimum Pass Marks :40%

A) Instructions for paper setter

1. The question paper will consist five sections namely A, B, C, D and E.
2. Each of the sections A, B, C and D will contain two questions and candidates have to attempt at least one question compulsorily from each section. Each section carry 15% of the total marks
3. Section E will comprise of 1015 short answers type questions, which will cover the entire syllabus and will carry 40% of the total marks.

B) Instructions for candidates

1. Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.
2. Use of nonprogrammable scientific calculator is allowed

SECTION A

1. Multistage Transistor Amplifier

- ? Review of singlestage transistor amplifier
- ? Need of multistage transistor amplifier different types of couplings and their Purpose and applications
- ? Important terms in amplifiers: gain, frequency response, decibel gain and band width
- ? RC coupled amplifier: circuit details, working, frequency response, applications
- ? Loading effect in multistage amplifier
- ? Elementary about direct coupled amplifier, its limitations and applications
- ? Voltage gain at mid frequency response (physical idea). Upper and lower cutoff frequencies

2. Transistor Audio Power Amplifier

- ? Difference between voltage and power amplifier
- ? Important terms in Power Amplifier: Collector efficiency, distortion and dissipation capability
- ? Classification of power amplifier, class A, B and C
- ? Class A single ended power amplifier, its working and collector efficiency
- ? Impedance matching in a power amplifier through transformer
- ? Heat sinks in power amplifiers
- ? Push pull amplifiers: circuit details, working and advantages (No mathematical Derivation)
- ? Principles of the Working of complementary symmetry push pull amplifier

SECTION B

3. Tuned Voltage Amplifiers (No Mathematical Derivation)

- ? Brief idea of tuned voltage amplifiers

4. Feedback in Amplifiers

- ? Feedback, its importance, positive and negative feedback, and their need
- ? Voltage gain of an amplifier with negative feedback $A_m = A/(1 + AB)$
- ? Effect of negative feedback on voltage gain, stability distortion, band width, output and input impedance of an amplifier (No mathematical derivation)
- ? Typical feedback circuits:
 - a) Effect of removing the emitter bypass capacitor on an ordinary CE transistor amplifier
 - b) Emitter follower and its applications

SECTION C

5. Sinusoidal Oscillators

- ? Sinusoidal Oscillators positive feedback in amplifiers
- ? Difference between an oscillator and an alternator
- ? Essentials of an oscillator
- ? Circuit details and working of LC oscillators viz Tuned Collector, Hartley and Colpitt's oscillators
- ? RC oscillator circuits: phase shift and Wein bridge oscillator circuits
- ? Introduction to Piezoelectric crystal and crystal oscillator circuit

6. Wave Shaping And Switching Circuits

- ? **Concept of Wave shaping**

? **Waveshaping circuits:**

- RC differentiating and integrating circuits
- Diode clipping circuits
- Diode clamping circuits
- Application of waveshaping circuits

? Transistor Multivibrator circuits

Transistor as a switch (explanation using CE transistor characteristics) Collector coupled a stable, monostable, bistable multivibrator circuits (explanation using wave shapes). Brief mention of uses of multivibrators Working and applications of transistor inverter circuit using power transistors

7. Working principles of different types of power supplies viz CVT's, UPS, Stabilizers etc.

8. introduction of TLC

9. introduction of microprocessor.

DEE/S/530P

ELECTRONIC DEVICES AND CIRCUITS

Maximum Time :3 Hrs.

Total Marks :100

Minimum Pass Marks :40%

University Examination : 60 Marks

Continuous Internal Assessment : 40 Marks

1. Familiarity with different electronic components e.g. capacitors, coils, transformers, microswitches, proximity switches heat sinks, IC bars, PCBs etc.
2. To measure voltage gain of first stage and voltage gain of combined two stages of RC coupled amplifier working at a particular operating point
3. To plot frequency response curve of RC coupled amplifier and compare its band width with that of singlestage amplifier
4. To measure the effect of the change in the value of coupling capacitor on lower cut off frequency in two stage singlestage amplifier
5. To measure (a) optimum load (b) output power in Class A single –ended transistor amplifier
6. To measure (a) optimum load (b) output power (c) signal handling capacity in a pushpull amplifier.
7. To measure the voltage gain and plot the frequency response curve of singlestage feedback amplifier when bypass capacitor is removed
8. To measure (a) Voltage gain, (b) input and output impedance for an emitter follower circuit
9. To measure frequency generated in (a) Hartley (b) Colpitt and (c) Wein bridge oscillators
10. To measure the differentiated and integrated square wave on a CRO for different values or RC time constant
11. i) Clipping of one portion of sinewave using diode
ii) Clipping of both portion of sine wave using:
a) diode and dc source
b) zener diodes
iii) Clamping a sinewave to:
a) negative dc voltage
b) positive dc voltage
12. To generate a squarewave using an astable multivibrator and to observe the wave form on a CRO
13. To observe inggering and working of bistable multivibrator circuit and observe its output wave forms on a CRO

DEE/S/540

**ELECTRICAL POWER I
(TRANSMISSION AND DISTRIBUTION)**

Maximum Time : 3 Hrs.

University Examination : 60 Marks

Total Marks : 100

Continuous Internal Assessment : 40 Marks

Minimum Pass Marks :40%

A) Instructions for paper setter

1. The question paper will consist five sections namely A, B, C, D and E.
2. Each of the sections A, B, C and D will contain two questions and candidates have to attempt at least one question compulsorily from each section. Each section carry 15% of the total marks
3. Section E will comprise of 1015 short answers type questions, which will cover the entire syllabus and will carry 40% of the total marks.

B) Instructions for candidates

1. Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.
2. Use of nonprogrammable scientific calculator is allowed

SECTION A

1. Transmission Systems

- ? Layout of transmission system; Effect of increase of voltage on (a) weight of copper (b) efficiency of line and (c) line drop; practical working voltage for generation transmission and distribution
- ? Comparison between: (a) three phase and single phase system (b) Overhead and underground transmission system, (c) hvac and hvdc transmission system
- ? Constructional features of transmission lines: Types of supports, Types of insulators, Selection of insulators, conductors, earth wire and their accessories, Transportation and stringing of lines
- ? Mechanical features of line: Importance of sag, calculation of sag at level supports, effects of wind and ice, simple problems; Indian electricity rules pertaining to clearance
- ? Electrical features of line: Concept of resistance, inductance and capacitance in a.c. transmission line (single phase, three phase); simple problems on efficiency and regulation of short lines; physical concept of corona. Effects of corona and remedial measures; concept of string insulators and voltage distribution are the string
- ? HVDC transmission lines: salient features, advantages, description of system to block diagram, ground return.

SECTION B

2. Distribution System

- ? Lay out of HT and LT distribution system: Constructional feature of distribution line and their erection, LT feeder, distributor and service mains; Simple problems on AC distributor fed at once end, both ends and determination of size of conductor
- ? Construction of LT and HT underground power cables, Insulation resistance of cables, laying of cables, different methods, comparison of overhead and underground distribution systems
- ? Estimation of LT and HT overhead distribution lines.

SECTION C

3. Sub Stations

- ? Brief idea of substations; grid substation 220/132 KV, outdoor power substations, indoor and pole mounted substations
- ? Layout of 33/11 KV distribution substation and various accessories and equipments
- ? Estimation of 11 KV/440 V pole mounted substation

4. Faults

- ? Common type of faults in lines(i.e. overhead and underground)
- ? Location and testing of faults in underground lines
- ? Maintenance schedule of lines

SECTION D

5. Power Factor

- ? Concept of power factor
- ? Causes and disadvantages of power factor
- ? Economic of Power factor improvement, Methods of improvement using static and synchronous condensers and simple problems

6. Various Types of Tarrifs

- ? Types of tariffs
- ? Block rate, flat rate, maximum demand and two part tariffs
- ? Simple problems

7. Earthing

- ? purpose, significance and methods of earthing

DEE/S/540P

ELECTRICAL POWER I (TRANSMISSION AND DISTRIBUTION)

Maximum Time : 3 Hrs.

University Examination : 60 Marks

Total Marks : 100

Continuous Internal Assessment : 40 Marks

Minimum Pass Marks :40%

1. Visit to nearby and grid station / substation
2. Viva

DEE/S/550

ELECTRICAL ENGINEERING DRAWINGII

Maximum Time : 3 Hrs.

University Examination : 60 Marks

Total Marks : 100

Continuous Internal Assessment : 40 Marks

Minimum Pass Marks :40%

A) Instructions for paper setter

1. The question paper will consist five sections namely A, B, C, D and E.
2. Each of the sections A, B, C and D will contain two questions and candidates have to attempt at least one question compulsorily from each section. Each section carry 15% of the total marks
3. Section E will comprise of 1015 short answers type questions, which will cover the entire syllabus and will carry 40% of the total marks.

B) Instructions for candidates

1. Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.
2. Use of nonprogrammable scientific calculator is allowed

SECTION A

1. House Wiring

? Installation plan, single line wiring diagram, selection and rating of necessary equipment and to prepare a list of material required for electrical wiring of a small house (In batten/concealed conduit system). Determination of sizes of distribution boards for multistoried buildings. Introduction to concept of rate schedules

2. Service Line Connection

? Layout diagram (from supply pole to building) and to prepare a list of material required for giving service line connection (For single phase and threephase small loads)

SECTION B

3. Power Wiring For a Small Workshop

? Installation plan, single line wiring diagram, selection and rating of necessary equipment and to prepare a list of material required for a small workshop.
Determination of sizes of panels for given loads. Introduction to concept of rate schedule.

SECTION C

4. Contractor Control Circuits

Schematic diagram of control circuit and complete wiring diagram of the following:

- ? DOL starting of 3phase induction motor
- ? Remote control of 3phase induction motor
- ? 3phase induction motor getting supply from selected feeder
- ? Reversing of a 3phase induction motor
- ? Two speed control of 3phase induction motor
- ? Sequential operating of two motors using time delay relay
- ? Automatic star delta starter for 3phase induction motor

SECTION D

5. SubStations

- ? Single line circuit and layout plan of 11/0 KV indoor Substation (i.e. Key diagram)
- ? Single line circuit and layout plan of 66/11/0.4 KV indoor Substation with 11 KV indoor switchgear (Key diagram)

SEMESTER VI

DEE/S/610

POWER ELECTRONICS I

Maximum Time : 3 Hrs.

University Examination : 60 Marks

Total Marks : 100

Continuous Internal Assessment : 40 Marks

Minimum Pass Marks : 40%

A) Instructions for paper setter

1. The question paper will consist five sections namely A, B, C, D and E.
2. Each of the sections A, B, C and D will contain two questions and candidates have to attempt at least one question compulsorily from each section. Each section carry 15% of the total marks
3. Section E will comprise of 1015 short answers type questions, which will cover the entire syllabus and will carry 40% of the total marks.

B) Instructions for candidates

1. Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.
2. Use of nonprogrammable scientific calculator is allowed

SECTION A

1. Basic Power Control Devices

- ? Introduction to thyristor family, Construction and working principle of an SCR, two transistor equivalent circuit of SCR, VI characteristics of SCR
- ? SCR specifications
- ? Construction and working principles of diacs and triacs and their VI characteristics
- ? Basic ideas about the selection of heat sinks for SCR and Triac

SECTION B

- ? SCR triggering mechanisms
 - (i) UJT, its construction
 - (ii) Working of UJT relaxation oscillator, idea of pulse triggering
 - (iii) Triggering of SCRs by UJT and diac
 - (iv) Resistance and RC triggering circuits
- ? Commutation of SCRs
 - (i) Natural Commutation
 - (ii) Forced Commutation and Various Commutation circuits
- ? Series and parallel configuration of SCRs
- ? Working principle of a single phase, full wave, SCR controlled rectifier (explanation using wave shapes) for resistive and inductive loads (concept of free wheeling diode)
- ? Relationship for output dc and RMS value, simple problems.
- ? Applications of SCRs and Triacs such as converter, inverter, dc/ac choppers, cycloconvertors

SECTION C

2. Introduction To Integrated Circuits, Operational Amplifiers And Their Applications

- ? Principle of Different amplifiers
- ? Brief description of commonly used ICs such as 7806, 7906, 555, 741 and 810 etc
- ? Explanation of comparators, inverting and noninverting type amplifiers using OP Amp IC.
- ? Explanation of comparators, inverting and noninverting type amplifiers using OP AMP IC.

SECTION D

3. Introduction to Digital Electronics

- ? Number system
- ? Logic gates and truth tables
- ? Boolean Algebra, kmap
- ? Combinational circuits, half adder, full adder, encoder, decoder, multipliers, dividers
- ? A/D and D/A converters
- ? Introduction to Micro Processors

DEE/S/610P

POWER ELECTRONICS I

Maximum Time : 3 Hrs.

Total Marks : 100

Minimum Pass Marks :40%

University Examination : 60 Marks

Continuous Internal Assessment : 40 Marks

1. Study and plotting of the VI characteristics of an SCR
2. Study and plotting of the VI characteristics of an Triac
3. Observing the wave shapes of a UJT relaxation oscillator and use of UJT relaxation oscillator for firing an SCR
4. Observing the wave shapes of a gate controlled half wave and full wave rectifiers using SCR for resistive and inductive loads
5. Observing the wave shape across the load terminals of any two of the following circuits:
 - a) Light intensity control using SCR
 - b) Speed control of DC and/or universal motor using SCR
 - c) Fan speed regulator using TRIAC and DIAC
6. Study of an LDR and Triac operated switching circuit
7. Study of OP AMP as comparator, inverter, inverted and noninverted amplifiers and their applications
8. Verification of truth table of various types of gates
9. Study of a 8085 up kit and to execute simple programmes

Maximum Time : 3 Hrs.
Total Marks : 100
Minimum Pass Marks :40%

University Examination : 60 Marks
Continuous Internal Assessment : 40 Marks

A) Instructions for paper setter

1. The question paper will consist five sections namely A, B, C, D and E.
2. Each of the sections A, B, C and D will contain two questions and candidates have to attempt at least one question compulsorily from each section. Each section carry 15% of the total marks
3. Section E will comprise of 1015 short answers type questions, which will cover the entire syllabus and will carry 40% of the total marks.

B) Instructions for candidates

1. Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.
2. Use of nonprogrammable scientific calculator is allowed

SECTION A

1. Generation

- ? Growth and development of Electrical power in country. Main sources of energy: Conventional and nonconventional
- ? Different types of power stations thermal, hydro, diesel and nuclear power stations. Their layout, flow diagram and brief explanation of operation, comparison of power stations on the basis of capital cost, running cost, efficiency, space, maintenance and availability of the resources
- ? Load estimation, load curves. Demand factor, load factor, Diversity factor, Simple problems there on.
- ? Base and peak load power stations. Interconnection of power station and its advantages. Concept of regional and national grid

2. Various Faults

- ? Types of faults, short circuit fault, simple problems for calculating short circuit currents for symmetrical fault. Concept of a fault level.

SECTION B

3. SwitchGear System

- ? Purpose of protective gear. Difference between switch, isolator and circuit breakers. Function of isolator and circuit breaker. Breaking capacity of a circuit breaker.
- ? Circuit breakers. Types of circuit breakers, oil circuit breakers, air blast circuit breakers. Principles of Arc extinction by OCB and ACB. Constructional features of OCB, ACB, and their working. Rating of circuit breakers and their maintenance schedule
- ? Introduction to sulphur hexafluoride (SF₆) and vacuum circuit breaker
- ? Miniature circuit breakers and RCCB, ACB, ELCB, MCB. VCB for distribution system and transmission (Descriptive)

SECTION C

4. Protection Devices

- ? Fuses; function of fuse Classification of fuses, HV and LV fuses, their characteristics. Types, rewirable, cartridge, HRC types

? Earthing, purpose of earthing: System earthing, Equipment earthing, Substation earthing, system earthing as per Indian Electricity rules.

? Relays:

- a) Function, use in protection system. Types of relays. Introduction. Electromagnetic and thermal relays. Their construction and working
- b) Induction type overcurrent, earth leakage relays
- c) Directional overcurrent, differential overcurrent relays. Their characteristics. Time and current setting
- d) Idea of static relays

SECTION D

5. Protection Scheme

? Protection of alternator; Merz Price protection

? Protection of transformers; Merz Price protection. Buchholz relay protection

? Protection of feeders and bus bars. Over current and earth leakage protection

6. OverVoltage protection

? Protection of system against over voltage; causes of over voltage, function of ground wire

? Lightning arrestors, Rod gap, horn gap, thyrite arrestors. Surge absorbers

7. Carrier Communication

? Principle and purpose of carrier communication over power lines

? Brief description of equipments with block diagram

DEE/S/620P

ELECTRICAL POWERII

Maximum Time : 3 Hrs.

University Examination : 60 Marks

Total Marks : 100

Continuous Internal Assessment : 40 Marks

Minimum Pass Marks :40%

Visit to power station/substations for the conduct of following practicals.

1. Testing of the dielectric strength of transformer oil
2. Working of different types of circuit breakers and isolators.
3. Working of different types of protective relays.
4. Working of CTs and PTs.
5. Earthing of different equipment.
6. Working of carrier communication system.
7. Study of power transformer protection scheme
8. Working of lightning arresters
9. Study of static excitation of the generator.
10. Study of transformer and alternator protection

Maximum Time : 3 Hrs.**University Examination : 60 Marks****Total Marks : 100****Continuous Internal Assessment : 40 Marks****Minimum Pass Marks :40%****A) Instructions for paper setter**

1. The question paper will consist five sections namely A, B, C, D and E.
2. Each of the sections A, B, C and D will contain two questions and candidates have to attempt at least one question compulsorily from each section. Each section carry 15% of the total marks
3. Section E will comprise of 1015 short answers type questions, which will cover the entire syllabus and will carry 40% of the total marks.

B) Instructions for candidates

1. Candidates are required to attempt one question each from sections A, B, C and D of the question paper and the entire section E.
2. Use of nonprogrammable scientific calculator is allowed

SECTION A**1. Illumination**

- ? Nature of light, curve of relative sensitivity of human eye and wave length
- ? Definition, flux, solid angle, luminous intensity, illumination, illumination efficiency, depreciation factor, coefficient of utilization, space to height ratio also, reflection factor, laws of illumination factor
- ? Calculation of number of light points for interior illumination, Calculation of illumination at different points; considerations, involved in simple design problems and illumination schemes; indoor and outdoor illumination level
- ? Different sources of light : Different Incandescent and discharge lamps – their construction and characteristics, fittings required for filament lamp, mercury lamp, fluorescent lamp, sodium lamp, neon lamp, halogen lamps, contact fluorescent lamp
- ? Main requirements of proper lighting; absence of glare, contrast and shadow
- ? Principles of street lighting

SECTION B**2. Electric Heating**

- ? Introduction
- ? Advantages of electrical heating
- ? Heating methods
 - Resistance heating (direct resistance heating, indirect resistance heating, electric ovens, their temperature range) properties of heating elements, domestic water heaters and other heating appliances Induction heating; principle; core type and coreless induction furnace Electric arc heating, direct and indirect arc heating; arc furnace

Dielectric heating. Applications in various industrial fields

- ? Simple design problems of Resistance heating element

3. Electric Welding

- ? Welding methods, Principles of resistance welding, welding equipment

- ? Principle of arc production, electric arc welding principle, characteristics of arc; carbon and metallic arc welding, power supply, advantages of coated electrode, comparison of AC and DC arc welding, welding control and welding control circuits

SECTION C

4. Electrochemical Processes

- ? Need of electrodeposition
- ? Applications of Faraday's laws in electrodeposition
- ? Objectives of electroplating
- ? Factors governing electro deposition
- ? Equipments and accessories for electroplating plant
- ? Principle of anodizing and its applications
- ? Electroplating on nonconducting materials

5. Electrical Circuits Used in Refrigeration and Air Conditioning and Water Coolers

- ? Brief description of vapour compression refrigeration cycle
- ? Description of Electrical circuit used in
 - a) refrigerator
 - b) air conditioner, and
 - c) water cooler

SECTION D

6. Electric Drives

- ? Advantages of Electric Drives
- ? Characteristics of different mechanical loads
- ? Types of motors used in electric drive
- ? Electric braking:
 - a) Plugging
 - b) Rheostatic breaking
 - c) Regenerative breaking
- ? Methods of power transfer by devices like belt drive, gears, pulley
- ? Examples of selection of motors for particular loads
- ? Applications such as general workshop, textile mill, paper mill, steel mill, printing press, crane and lift
- ? Applications of commonly used motors (squirrel cage induction motors, slip ring induction motors, AC series motors)

7. Electric Traction

- ? Advantages of electric traction
- ? Different systems of electric traction, DC and AC system
- ? Different systems for track electrification; such as overhead wires, conductor rail system, current and collector contact system
- ? Electrical block diagram of an electrical locomotive with description of various equipments and accessories
- ? Breaking of traction motors

DEE/S/630P

UTILISATION OF ELECTRICAL ENERGY

Maximum Time : 3 Hrs.
Total Marks : 100
Minimum Pass Marks :40%

University Examination : 60 Marks
Continuous Internal Assessment : 40 Marks

1. Study of different types of sources of light and make connections, and to measure intensity of light with flux meter:
Flourescent lamp
Hp mercury vapour lamp
Hp sodium vapour lamp
Compact Fluorescent lamp (CFL)
2. Study of induction furnace by visiting a factory and to prepare a report
3. Study of welding equipment and its accessories
4. Sudy of the electroplating plant and its accessories
5. Study of the refrigerator/ airconditioner and to prepare a report of its electrical circuit
6. Power factor improvement of a single phase load using capacitor bank

DEE/S/640P

ELECTRICAL WORKSHOPII

Maximum Time : 3 Hrs.
Total Marks : 100
Minimum Pass Marks :40%

University Examination : 60 Marks
Continuous Internal Assessment : 40 Marks

1. Wiring, testing and fault detecting of the following contactor circuits operating on 3 phase supply
 - (i) Remote control circuits
 - (ii) Time delay circuits
 - (iii) Interlocking circuits
 - (iv) Sequential operation control circuits
2. To carry out pipe earthing for a small house or a small 3 phase motor
3. Installation of 3phase motor with main switch and starter
4. Dismantling, assembling and repairing of DOL starter and star delta starter
5. Winding / rewinding of fan and choke
6. Fault finding in 3 phase motors and their rectification
7. Three phase motor winding
8. Power cable jointing
9. Laying of underground cables

Maximum Time : 3 Hrs.**University Examination : 60 Marks****Total Marks : 100****Continuous Internal Assessment : 40 Marks****Minimum Pass Marks :40%****1. Electrical Machines and Equipment**

- ? Construction of small transformer
- ? Construction of phase sequence indicator
- ? Hot air drier
- ? Simple loop generator
- ? Automatic curtain operator
- ? Construction of Automatic Star Delta starter
- ? Construction of Automatic Water level control
- ? Balancing load as an indoor transformer
- ? Construction of chokes for fluorescent tubes
- ? Design and construction of fan regulators (inductance type)
- ? Design and construction of fan regulators (Resistance type)
- ? Design and construction of loading rheostats
- ? Design and construction of Desert coolers
- ? Fabrication of electric motor
- ? Rewinding of motors upto 5 HP
- ? Design and construction of Geyser
- ? Electroplating of small domestic gadgets
- ? Erection/installation and commissioning of rotating electrical machine
- ? Fault detection and repair of electrical/ electronic instruments
- ? Design and assembly of contractor control circuit for various applications

2. Electrical Power

- ? Drawing, estimating and costing of electrical installation of the institution from supplier's pole to the institution sub circuit distribution board
- ? Drawing, estimating and costing of electrical installation of a workshop having a given number of electrically operated appliances machines
- ? To lay underground distribution cable for small colony from main distribution pole
- ? To erect a 5 pole overhead line for a small distance for distribution of given electrical energy. To energise it and prepare list of material and cost required
- ? To provide a service connection to a consumers premises for domestic purpose
- ? To survey the load of given area in village, small colony, calculate the effective load and find out the sizes of the cables conductors for the proposed distribution system
- ? Designing of Light and Fan wiring installation for a Institution/commercial building
- ? Augmentation of nearby pole mounted Sub stations
- ? To carry out energy audit of given organization and to suggest ways and means to limit the energy bill

3. Electronics

Fabrication of :

- ? Voltage Stabilizer
- ? Emergency Light using SCR
- ? Power amplifier
- ? Low cost intercom for home

- ? Analog computer
- ? Regulated power supply (+ 12V and + ^V) using 1812, 7912 and 7806, 7906
- ? Automatic battery charger using SCR
- ? Battery operated tube light
- ? Solid state fan regulator
- ? Burglar Alarm
- ? Hearing aid
- ? Automatic street light/dressing table light
- ? Mosquito Repeller
- ? Inverter circuit 500 watt.

4. Fabrication and Testing OF

- ? Inverter/ Emergency light circuit using power transistors
- ? SCR based automatic battery charger
- ? SCR operated illumination controller
- ? SCR operated automated water level controller
- ? Three phase full wave rectifier using power diodes
- ? Timer circuit 555IC
- ? SCR controlled rectified circuit
- ? Sped control circuit of DC shunt motor using SCR
- ? Inverting and noninverting amplifiers using OP AMP (741)
- ? Comparator circuits using)P AMP (741)

Note : The evaluation of the project should be based on end product and process adopted by students in execution of this.