

INSTITUTE OF ADVANCED STUDIES IN
EDUCATION (DEEMED UNIVERSITY)
GANDHI VIDYA MANDIR
SARDARSHAHR

Detailed Syllabus

Of

**DIPLOMA IN MECHANICAL
ENGINEERING**

FIRST SEMESTER

COURSE TITLE	PAPER CODE	MARKS		
		THEORY	PRACTICAL	TOTAL
APPLIED MATHEMATICS-I	DME-110	100	00	100
APPLIED PHYSICS	DME-120 DME-120P	50	50	100
APPLIED CHEMISTRY	DME-130 DME-130P	50	50	100
INTRODUCTION TO IT	DME-140	100	00	100

SECOND SEMESTER

COURSE TITLE	PAPER CODE	MARKS		
		THEORY	PRACTICAL	TOTAL
COMMUNICATION SKILLS-I	DME-210 DME-210P	50	50	100
APPLIED MATHEMATICS-II	DME-220	100	00	100
APPLIED PHYSICS	DME-230 DME-230P	50	50	100
ENGINEERING DRAWING	DME-240 DME-240P	50	50	100
WORKSHOP PRACTICE	DME-250P	00	100	100

THIRD SEMESTER

COURSE TITLE	PAPER CODE	MARKS		
		THEORY	PRACTICAL	TOTAL
COMPUTER APPLICATION-1	DME-310 DME-310P	50	50	100
APPLIED MACHINES	DME-320 DME-320P	50	50	100
ELECTRICAL AND ELECTRONICS ENGINEERING	DME-330 DME-330P	50	50	100
MECHANICAL ENGINEERING DRAWING –I	DME-340	100	00	100
MATERIAL SCIENCE	DME-350 DME-350P	50	50	100

FOURTH SEMESTER

COURSE TITLE	PAPER CODE	MARKS		
		THEORY	PRACTICAL	TOTAL
COMPUTER APPLICATION-II	DME-410 DME-410P	50	50	100
THERMODYNAMICS-I	DME-420 DME-420P	50	50	100
STRENGTH OF MATERIALS	DME-430 DME-430P	50	50	100
WORKSHOP TECHNOLOGY-I	DME-440 DME-440P	50	50	100
MECHANICAL ENGINEERING DRAWING	DME-450P	00	100	100

FIFTH SEMESTER

COURSE TITLE	PAPER CODE	MARKS		
		THEORY	PRACTICAL	TOTAL
FLUID MACHINES	DME-510 DME-510P	50	50	100
THERMODYNAMICS-II	DME-520 DME-520P	50	50	100
INDUSTRIAL ECONOMY & PRINCIPALS OF MANAGEMENT	DME-530	100	00	100
AUTOMOBILE ENGINEERING	DME-540 DME-540P	50	50	100
PRODUCTION MANAGEMENT	DME-550	100	00	100

SIXTH SEMESTER

COURSE TITLE	PAPER CODE	MARKS		
		THEORY	PRACTICAL	TOTAL
INDUSTRIAL MANAGEMENT	DME-610	100	00	100
THEORY OF MACHINES	DME-620	100	00	100
MACHINE DESIGN	DME-630	100	00	100
PROJECT WORK	DME-640	00	200	200

Note:

Theory Paper: 30% Continuous Internal Assessment and 70 % University examination.

Practical Paper: 30 % Continuous Internal Assessment and 70 % University examination.

Continuous Internal Assessment:

- 1) Two or three tests out of which minimum
Two will be considered for Assessment **60% of Continuous Internal Assessment**
- 2) Seminars/Assignments/Quizzes **30% of Continuous Internal Assessment**
- 3) Attendance, class participation
And behavior **10% of Continuous Internal Assessment**

SEMESTER-I

DME-110 APPLIED MATHEMATICS-1

Maximum Time :3 Hrs.

University Examination :70 Marks

Total Marks :100

Continuous Internal Assessment : 30 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 10-15 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 non-programmable scientific calculator is allowed.

SECTION A

1. ALGEBRA

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. TRIGONOMETRY

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), T-Ratios of Allied angles (without proof), Sum, difference formulae and their applications (without proof).

Product formulae (Transformation of product to sum, difference and vice versa). T-Ratios of multiple angles, sub-multiple 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. CO-ORDINATE 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) Co-ordinates 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

DME-120 APPLIED PHYSICS-I

Maximum Time :3 Hrs.

University Examination : 35 Marks

Total Marks :50

Continuous Internal Assessment : 15 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 10-15 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 non-programmable 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.

DME-120P APPLIED PHYSICS-I

Maximum Time :3 Hrs.

University Examination : 35 Marks

Total Marks :50

Continuous Internal Assessment : 15 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.

DME-130 APPLIED CHEMISTRY-I

Maximum Time :	3 Hrs.	
University Examination : 35 Marks		
Total Marks :	50	Continuous
Internal Assessment : 15 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 10-15 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 non-programmable 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.

Afbau Energy ranking rule.

Orbital concept types of bonds co-valency, formation of s-s, s-p, p-p, 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 EQUILIBIRIUM

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 (electro-metallurgy, electroplating & electro-refining)

SECTION D

6. WATER

Hard and soft water, removal of hardness by :

- Soda lime process.
- Permutit's process.
- 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)

- Clark's degree
- O'Hener;s method

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

- Soap titration method :
- 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.

DME-130P

APPLIED CHEMISTRY-I

Maximum Time :3 Hrs.

Total Marks :50

Minimum Pass Marks :40%

University Examination : 35 Marks

Continuous Internal Assessment : 15 Marks

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

DME-140 INTRODUCTION TO IT

Maximum Time :3 Hrs.

University Examination : 70 Marks

Total Marks :100

Continuous Internal Assessment : 30 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 10-15 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 non-programmable 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, e-mail, ISP, e-commerce, 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

DME-210 COMMUNICATION SKILLS-1

Maximum Time :3 Hrs.

Total Marks :50

Minimum Pass Marks :40%

University Examination : 35 Marks

Continuous Internal Assessment : 15 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 10-15 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 non-programmable 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.

DME-210P COMMUNICATION SKILLS-1

Maximum Time :	3 Hrs.	
University Examination : 35 Marks		
Total Marks :	50	Continuous
Internal Assessment : 15 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.

DME-220 APPLIED MATHEMATICS-II

Maximum Time :	3 Hrs.	
University Examination : 70 Marks		
Total Marks :	100	Continuous
Internal Assessment : 30Marks		
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 10-15 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 non-programmable scientific calculator is allowed

SECTION A

1. Differential Calculus

Concept of limits. Four standard limits	$\lim_{x \rightarrow a} \frac{x^n - a^n}{x - a}$	$\lim_{x \rightarrow a} \frac{\sin x}{x}$	$\lim_{x \rightarrow 0} \frac{1}{x}$	$\lim_{x \rightarrow 0} \frac{e^x - 1}{x}$
	$\lim_{x \rightarrow a} \frac{x^n - a^n}{x - a}$	$\lim_{x \rightarrow 0} \frac{\sin x}{x}$	$\lim_{x \rightarrow 0} \frac{1}{x}$	$\lim_{x \rightarrow 0} \frac{e^x - 1}{x}$
	$\lim_{x \rightarrow 0} \frac{x^n - 0^n}{x - 0}$	$\lim_{x \rightarrow 0} \frac{\sin x}{x}$	$\lim_{x \rightarrow 0} \frac{1}{x}$	$\lim_{x \rightarrow 0} \frac{e^x - 1}{x}$
	$\lim_{x \rightarrow 0} \frac{x^n - 0^n}{x - 0}$	$\lim_{x \rightarrow 0} \frac{\sin x}{x}$	$\lim_{x \rightarrow 0} \frac{1}{x}$	$\lim_{x \rightarrow 0} \frac{e^x - 1}{x}$

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) gama 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

DME-230 APPLIED PHYSICS

Maximum Time :3 Hrs.

Total Marks :50

Minimum Pass Marks :40%

University Examination : 35 Marks

Continuous Internal Assessment : 15 Marks

A) Instructions for paper-setter

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3. Section E will comprise of 10-15 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 non-programmable 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 reverberation.

3. Applications of Light

Refraction and refractive index.

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

4. Electrostatics

Coulomb'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, E-mail, Internet etc.

DME-230P

APPLIED PHYSICS

Maximum Time :3 Hrs.

Total Marks :50

Minimum Pass Marks :40%

University Examination : 35 Marks

Continuous Internal Assessment : 15 Marks

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.

DME-240P ENGINEERING DRAWING-I

Maximum Time :

3 Hrs.

University Examination : 35 Marks

Total Marks :

50

Continuous

Internal Assessment : 15 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.

Maximum Time :3 Hrs.**University Examination : 35 Marks****Total Marks :50****Continuous Internal Assessment : 15 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 10-15 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 non-programmable 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.

DME-250P WORKSHOP PRACTICE

Maximum Time :3 Hrs.

Total Marks :100

Minimum Pass Marks :40%

University Examination : 70 Marks

Continuous Internal Assessment : 30 Marks

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 filling on non-ferrous 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 T-Union, 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, multi-cored insulated screened pour, Audio video, general purpose wires/cables.
- b) Various types of plugs, sockets connectors suitable for general purpose audio video use. Some of such connectors area: 2 and 3 pin mains plug and sockets.
Banana-plugs, and sockets, BNG, 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 plano 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 beakers, 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 borads, chassis, tape strips

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

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

DME-310

COMPUTER APPLICATIONS-I

Maximum Time :3 Hrs.

University Examination : 35 Marks

Total Marks :50

Continuous Internal Assessment : 15 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 10-15 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 non-programmable 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 -2-3)

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

DME-310P COMPUTER APPLICATIONS-I

Maximum Time :3 Hrs.

University Examination : 35 Marks

Total Marks :50

Continuous Internal Assessment : 15 Marks

Minimum Pass Marks :40%

Simple exercises based upon theory syllabus.

DME-320 APPLIED MECHANICS

Maximum Time :3 Hr

University Examination : 35 Marks

Total Marks :50

Continuous Internal Assessment : 15 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 10-15 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 non-programmable 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 non-concurrent 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).

DME-320P APPLIED MECHANICS

Maximum Time :3 Hrs.

Total Marks :50

Minimum Pass Marks :40%

University Examination : 35 Marks

Continuous Internal Assessment : 15 Marks

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 Crab-Single 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.

DME-330 ELECTRICAL AND ELECTRONICS ENGINEERING

Maximum Time :3 Hrs.

University Examination : 35 Marks

Total Marks :50

Continuous Internal Assessment : 15 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 10-15 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 non-programmable scientific calculator is allowed

SECTION A

1. General Introduction

? Electric Induction-Faraday's Laws, Lenz Law; Fleming's rules.

? Principles of A.C. Circuits.

? Alternating and Definition of cycle, frequency, amplitude and time period.

? Instantaneous, average, rms and maximum value of sinusoidal wave; form factor and Peak Factor.

? Concept of Phase and Phase difference.

? Concept of resistance, inductance and capacitance in simple A.C. circuit.

? Power factor and improvement of power factor by use of capacitors.

? Concept of 3 phase system; star and delta connections; voltage and current relationship (No derivation).

2. Measuring Instruments

? Principle and construction of instruments used for measuring current, voltage, Power and energy.

SECTION B

3. D.C. Machines

? Working, Principle and construction of D.C. machines (D.C. motor and generator).

? Performance and characteristics of different types of D.C. machines (Speed-load, Torque-load and speed torque characteristics).

? Application of D.C. Machines.

4. Transformers

? Working, Principle and construction of single phase transformer.

? Transformation ratio, emf equation, losses and efficiency.

? Cooling of transformers.

? Isolation of transformer.

? CVT.

? Audio transformer (brief idea).

? Applications.

SECTION C

5. Synchronous machines.

- ? Alternators- Working Principle, type and constructional details.
- ? Synchronous motors-Working principle and its application as synchronous condenser.

6. Induction Machines

- ? Working, principle and construction of 3-phase induction motors.
- ? Types of induction motors- slip ring and squirrel cage.
- ? Slip and torque-speed characteristics of induction motor.
- ? Operation of induction machine as induction generator.
- ? Application of 3-phase induction machines.
- ? Concept of single phase induction motors and its applications.

SECTION D

7. Basic Electronics

- ? Basic idea of semiconductors-p and N-type.
- ? Diodes, Zener diodes and their applications.
- ? Transistor-PNP and NPN; their characteristics and uses.
- ? Characteristic and application of thyristor.
- ? Characteristics and applications of servo motors.

DME-330P ELECTRICAL AND ELECTRONICS ENGINEERING

Maximum Time :3 Hrs.

Total Marks :50

Minimum Pass Marks :40%

University Examination : 35 Marks

Continuous Internal Assessment : 15 Marks

1. To verify Lenz's law.
2. Measurement of power, current and voltage taken by a motor at various levels.
3. To determine the transformation ratio of a given transformer by measuring the voltage and current and efficiency of a transformer by direct loading method.
4. Study and testing of common electrical appliances e.g. ceiling fan, water heater, mixer etc.
5. To find form factor and peak factor of single phase A.C. supply.
6. Demonstrate the function of diode as a rectifier.
7. Demonstrate the function of transistor as an amplifier.
8. To start and change the direction of rotation of 3-phase induction motor.
9. To draw characteristics of SCR.
10. To measure power and power factor in 3 phase AC circuit by two wattmeter method.
11. To measure terminal voltage with variations of load current of DC shunt generator.

DME-340 MECHANICAL ENGINEERING DRAWING-I

Maximum Time :3 Hrs. University Examination : 70 Marks
Total Marks :100 Continuous Internal Assessment : 30 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 10-15 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 non-programmable scientific calculator is allowed

SECTION A

1. Intersection of the following:

- a) Cylinder with cylinder (equal and different diameters) axis at right angle.
- b) Cylinder with cylinder (axis inclined).
- c) Cylinder with cone (Axis at right angle and inclined).
- d) Practice exercises on intersection of different surfaces such as cylinder, cone & prism.

SECTION B

2. Detail drawing of the following with complete dimensioning, tolerances, material and surface finish specifications.

? **ARBOR** 1 sheet

? **UNIVERSAL COUPLINGS** 1 sheet

SECTION C

? **BEARINGS** 5 sheets

Simple bushed bearing.

Ball bearing and roll bearing.

Plumber block (detailed drawing).

Foot step bearing.

? **BRACKET** 1 sheet

Wall Bracket.

? **PULLEYS** 2 sheets

Fast and loose pulley.

Stepped and V-belt pulley.

SECTION D

? **PIPE JOINTS** 3 sheets

Flanged Pipe joints, right angle bend.

Hydraulic Pipe joints, Spigot and Socket joint.

Expansion Pipe joint.

Practice of blue print reading on brackets, pulleys and pipe joints.

? **LATHE PARTS**

Tool Post.

Tail Stock.

? **Screw Jack** 1 sheet

DME-350 MATERIAL SCIENCE

Maximum Time :3 Hrs.

University Examination : 35 Marks

Total Marks :50

Continuous Internal Assessment : 15 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 10-15 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 non-programmable scientific calculator is allowed

SECTION A

1. General

- ? Introduction to engineering materials.
- ? Classification of materials.
- ? Thermal, chemical, electrical, mechanical properties of various materials.
- ? Selection criteria for use in industry.

SECTION B

2. Structure of Metals and their Deformation

- ? Metal Structure
- Relation of metal structure to its properties.
- ? Arrangement of atoms in metals (Basic idea).
- ? Crystalline structure of metals.
- ? Crystal imperfections.
- ? Deformation of metal.
- ? Impact of cold and hot working on metal structure.
- ? Corrosion, its cause and prevention.

3. Ferrous Metals

- ? Classification of iron and steel.
- ? Sources of iron ore and its availability.
- ? Manufacture of pig iron, wrought iron, Cast iron and steel (Flow Diagrams only).
- ? Types of Cast iron, White, malleable, grey, mottled, modular and alloy and their usage.
- ? Steels and alloy steels.
- Classification of steels.
- Different manufacturing methods of steel-open hearth, Bessemer, electric arc.
- Availability, Properties and usage of steels.
- Specification as per BIS and equivalent standards.
- Effect of various alloying element like Cr, Ni, Co, Va, W, Mo, Si, Mn, S on mechanical properties of steel.
- ? Use of alloy steels (high speed steel, stainless steel, spring steel, silicon steel)

4. Non Ferrous Materials

- ? Important ores and properties of aluminium, copper, zinc, tin, lead.
- ? Properties and uses of Al alloys, Copper alloys, Bearing metals, solders.

SECTION C

5. Engineering Plastics and fibres.

- ? Important sources of plastics.
- ? Classification- thermoplastic and thermoset.
- ? Various trade names of engg. plastics
- ? Plastic Coating.
- ? Fibres and their classification, Inorganic and Organic fibres.
- ? Usage of fibres.

SECTION D

6. Insulating Materials

- ? Various heat insulating material and their usage like asbestos, glass wool, thermocole, cork, puf, china clay.
- ? Various electrical insulating material and their use like China Clay, leather, bakelite, ebonite, glass wool, rubber, felt.

7. Testing of Metals and Alloys

- ? Identification tests: appearance, sound, spark, weight, magnetic, band microstructure, filling.

8. Fundamentals of Heat Treatment

- ? Purpose of heat treatment.
- ? Theory of solid solution.
- ? Iron-carbon diagram.
- ? TTT curve in steels and its importance.
- ? Basic idea about martenistic transformation.
- ? Various heat treatment processes- hardening, tempering, annealing, normalizing, case hardening (elementary idea).
- ? Types of heat treatment furnaces.

DME-350P MATERIAL SCIENCE

Maximum Time :

3 Hrs.

University Examination : 35 Marks

Total Marks :

50

Continuous

Internal Assessment : 15 Marks

Minimum Pass Marks :40%

1. Classification of about 25 specimens of materials into
 - i) Metals and non metals.
 - ii) Metals and alloys.
 - iii) Ferrous and non ferrous metals.
 - iv) Ferrous and non ferrous alloys.
2. Given set of specimen of metals and alloys (copper, brass, aluminium, cast iron, HSS, Gun metal); identify and indicate the various properties possessed by them.
3. a) Study of heat treatment furnace.
b) Study of a thermocouple / pyrometer.
4. Study of a metallurgical microscope and a diamond polishing machine.
5. To prepare specimens of following materials for microscopic examination and to examine the microstructure of the specimens of following materials :
 - i) Brass ii) Copper iii) Grey CI iv) Malleable CI v) Low carbon steel.
6. To anneal a given specimen and find out difference in hardness as a result of annealing
7. To normalize a given specimen and to find out the difference in hardness as a result of normalizing.
8. To temper a specimen and to find out the difference in hardness and tensile strength due to tempering.

SEMESTER-IV

DME-410 COMPUTER APPLICATIONS-II

Maximum Time :3 Hrs.

Total Marks :50

Minimum Pass Marks :40%

University Examination : 35 Marks

Continuous Internal Assessment : 15 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 10-15 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 non-programmable 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 Input-Output 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 do-while and for statements.
- ? Arrays-one 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 Viva-voice.

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

Maximum Time :	3 Hrs.	
University Examination : 35 Marks		
Total Marks :	50	Continuous
Internal Assessment : 15 Marks		
Minimum Pass Marks :40%		

1. Creating database.
2. Querying the database.
3. Report generation.
4. Programming in dbase
5. Use of spread sheets/Matlan/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 go to 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.

DME-420**THERMODYNAMICS-I****Maximum Time :3 Hrs.****University Examination : 35 Marks****Total Marks :50****Continuous Internal Assessment : 15 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 10-15 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 non-programmable scientific calculator is allowed

SECTION A**1. Basic Concepts and Gas Laws**

? Gas laws: Boyle's laws, Charle's law.

? Characteristics equation, Gas Constant, Universal Gas constant.

? Thermodynamics property, system (open and closed), surroundings, Heat and work, specific heat.

2. Laws of Thermodynamics and Processes

? Explanation of the zeroth law of thermodynamics.

? Explanation of first law of thermodynamics.

? Concept of enthalpy, internal energy, specific heat, work and heat.

? Clausius and Kelvin Plank statements of second law of thermodynamics.

? Concept of Entropy.

? Constant volume, Constant pressure, isothermial, adiabatic and polytropic processes, throttling and free Expansion, work done under these processes.

SECTION B**3. Formation of steam and its properties.**

? Steam formation.

? Wet steam, dry steam and saturated steam; dryness fraction.

? Super heated steam; degree of super heat.

? Latent heat of vaporisation.

? Entropy; entropy increase during evaporation.

? Temperature Entropy diagram.

? Mollier Diagram (H-S diagram).

4. Steam Generator

? Uses of steam.

? Classification of boilers.

? Comparison of fire tube and water tube boilers.

? Constructional features of Lancashire boiler, Nestler boiler, Babcock and Wilcox boiler.

? Introduction to modern boilers.

SECTION C**5. Power Cycles**

? Concept of reversibility, Carnot cycle.

- ? Rankine cycle and its efficiency.
- ? Brayton Cycle.
- ? Otto, Diesel and Dual Combustion Cycle.

SECTION D

6. Non Conventional Sources of Energy.

- ? Need of non conventional energy sources.
- ? Solar Energy.
Sun and solar radiation.
Solar constant.
Solar collectors-flat plate collectors and focusing collectors.
Solar heating-solar cooker, solar cooker, solar power generation.
Solar cooling.
Industrial and agricultural application of solar energy.
Photo voltaic cells.
Economic consideration for use of solar energy.
- ? Other Non Conventional Energy sources.
Wind Power.
Geothermal energy.

7. Elements of Heat Transfer

- ? Conduction.
 - ? Convection.
 - ? Radiation.
? Stefan Boltzman's law.
? Simple problems of heat transfer on conduction and radiation only.
- Note :** - An expert may be arranged from an industry to deliver the lecture.
- An industrial visit to show the relevant things.
- An industrial visit may be planned to show the relevant things.

DME-420P THERMODYNAMICS-I

Maximum Time :3 Hrs. University Examination : 35 Marks
Total Marks :50 Continuous Internal Assessment : 15 Marks
Minimum Pass Marks :40%

1. Determination of Temperature by:
Thermocouple.
Pyrometer.
2. Study of constructional details and specifications of fire tube boiler and sketch.
3. Demonstration of mountings and accessories on a boiler for study and sketch.
4. Performance testing of steam boiler.

DME-430 STRENGTH OF MATERIALS

Maximum Time :3 Hrs. University Examination : 35 Marks
Total Marks : 50 Continuous Internal Assessment : 15 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 10-15 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 non-programmable scientific calculator is allowed

SECTION A

1. Stresses and strains

- ? Concept of load, stresses and strain.
- ? Tensile compressive and shear stresses and strains.
- ? Concept of Elasticity, Elastic Limit and limit of proportionality.
- Hook's Law
- Young Modulus of Elasticity.
- Nominal stress.
- Yield point, plastic stage.
- Strain hardening.
- Ultimate strength and breaking stress.
- Percentage elongation.
- Proof stress and working stress.
- Factor of safety.
- Shear modulus.
- Strain energy due to direct stresses
- Proof resilience and modulus of resilience.
- Stresses due to gradual, sudden and failing load.
- ? Longitudinal and circumferential stresses in seamless thin walled Cylindrical shells (derivation of these formulae not required).

SECTION B

2. Moment of Inertia.

- ? Concept of moment of Inertia and second moment of area.
- ? Radius of gyration.
- ? Second moment of area of common geometrical sections : Rectangle, Triangle, Circle (without derivation) Second moment of area for L,T and I section
- ? Section modulus.

SECTION C

3. Beams and Bending Stress

- ? **Bending and shearing force.**
- Concept of beam and form of loading.

Concept of end supports, Roller, hinged and fixed.

Concept of bending moment and shearing force.

B.M. and S.F. Diagram for cantilever and simply supported beams with and without overhang subjected to concentrated and U.D.L.

? **Bending Stresses**

Concept of Bending stresses.

Theory of simple bending.

Use of the equation $f/y = M/I + E/R$.

Concept of moment of resistance.

Bending stress diagram.

Calculation of maximum bending stress in beams of rectangular, circular, I and T section.

Permissible bending stress Section modulus for rectangular, circular and Symmetrical I section.

? **Laminated Spring (Semi elliptical type only)**

Determination of number of plates.

Maximum bending stress and deflection.

? **Combined direct and bending stresses**

Simple cases of short columns of uniform section subject to eccentric loading with stress diagram.

SECTION D

4. Columns

? Concept of column, modes of failure.

? Types of Columns.

? Buckling load, crushing load.

? Factors effecting strength of a column.

? End restraints.

? Strength of column by Euler Formula without derivation.

? Rankine Gourdau formula (without derivation).

5. Torsion

? Concept of torsion-difference between torque and torsion.

? Use of torque equation for circular shaft.

? Comparison between solid and hollow shaft with regard to their strength and weight.

? Power of transmitted by shaft.

? Concept of mean and maximum torque.

6. Helical Springs

? Closed coil helical springs subjected to axial load and impact load.

? Stress deformation.

? Stiffness and angle of twist and strain energy.

? Proof resilience.

DME-430P STRENGTH OF MATERIALS

Maximum Time :3 Hrs. University Examination : 35 Marks
Total Marks : 50 Continuous Internal Assessment : 15 Marks
Minimum Pass Marks :40%

1. Tensile test on bars of Mild steel and Aluminium.
2. Shear test on specimen of two different metals.
3. Bending tests on a steel bar or a wooden beam.
4. Impact test on metals
 - a) Izod test.
 - b) Charpy test.
5. Torsion test on specimens of different metals for determining the angle of twist for a given torque.
6. To determine the stiffness of a helical spring and to plot a graph between load and extension.
7. Hardness test on metal and finding the Brinell, Rockwell hardness.

DME-440 WORKSHOP TECHNOLOGY-I

Maximum Time :3 Hrs. University Examination : 35 Marks
Total Marks : 50 Continuous Internal Assessment : 15 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 10-15 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 non-programmable scientific calculator is allowed

SECTION A

1. Turning

- ? Principles of turning.
- ? Description and function of main parts of lathe.
- ? Specification of lathe.
- ? Drives and transmission.
- ? Work holding tools.
- ? Lathe tools.
- ? Lathe operations-plain and step turning, facing, parting off, taper turning, eccentric turning, drilling, reaming, boring, threading and knurling.
- ? Cutting parameters-speed, feed and depth of cut.
- ? Speed ratio, preferred numbers of speed selection.
- ? Cutting fluid-its purpose and types.
- ? Lathe accessories(Steady rest, taper turning attachment, tool post grinder).

? Types of lathes

a) Brief description of capstan and turret lathes.

b) High performance lathes.

2. Drilling

? Principle of drilling.

? Classification of drilling machines and their description.

? Operations performed on drilling machines-drilling, reaming, counter boring, counter sinking, hole milling, tapping.

? Speeds and feeds during drilling.

? Types of drills and their features.

? Drill holding devices.

SECTION B

3. Boring

? Principle of boring.

? Classification of boring machines and their description.

? Specification of boring machine.

? Boring tools.

? Boring bars and boring heads.

? Alignment of bores and its importance.

4. Shaping, Planing and Slotting

? Working principle of shaper, planer and slotter.

? Quick return mechanism applied to them.

? Types of tools used and their geometry.

? Specifications of shaper, planer and slotting machine.

? Speeds and feeds in above processes.

SECTION C

5. Foundry Practices

? Pattern making

? Types of patterns.

? Pattern material.

? Pattern allowances.

? Colouring of patterns.

? Introduction to cores.

? Core materials and types of cores.

? Moulding

? Introduction to moulding.

? Types of moulding sand and their properties.

? Sand mixing and mould preparation.

? Moulding defects.

SECTION D

? Melting and pouring

? Types of melting furnaces(pit, titing , cupola) used

? Closing and pouring of mould.

? Special casting methods

? Introduction to die casting, investment, centrifugal casting.

Note : - An expert may be invited from the industry to deliver the lecture.

- An industrial visit may be planned to explain and shoe.

DME-440P WORKSHOP TECHNOLOGY-I

Maximum Time :3 Hrs. University Examination : 35 Marks
Total Marks :50 Continuous Internal Assessment : 15 Marks
Minimum Pass Marks :40%

1. Two exercises on simple turning/Step turning
2. Two exercises on composite job involving turning, taper turning, thread cutting and knurling.
3. Exercises in internal turning and threading.
4. Advanced exercises in the use of different types of tools on the lathe.
5. Making and drilling practice on mild steel pieces.
6. Practice in drilling, reaming, counter boring and counter sinking.
7. Practice in grinding of drills to correct angles.
8. Exercise in boring with the help of a boring bar.
9. To prepare a rectangular block to required accuracy on a shaper.
10. To cut a T slot on the job made under Exercise 9.
11. To cut a bevel surface / V groove on one of the faces for Exercise 9.
12. To cut a curved surface on the Clrectangualr clock.
13. Exercise in cutting a Kewway slot.
14. Exercise in cutting splines.
15. Exercise in making a square hole.
16. Preparation of a job on a planning machine.
17. Preparation pattern for open floor and split pattern.
18. Prepare a floor mould of a solid pattern using cope.
19. Prepare a mould of a split pattern in cope and drag.
20. Pouring a mould with Aluminium.
21. Preparing the mould of loose piece pattern and preparing Aluminium casting.
22. Preparing the mould of a step pulley and also preparing the core for the same.
23. Prepare the cast iron casting of above mould.
24. Prepare a mould in three moulding boxes prepare the casting by charging the cupola and obtaining the molten metal.

DME-450P MECHANICAL ENGINEERING DRAWING

Maximum Time :3 Hrs. University Examination : 70 Marks
Total Marks :100 Continuous Internal Assessment : 30 Marks
Minimum Pass Marks :40%

SECTION A

1. Introduction to drawing office equipment and drawing office practice through visit to modern drawing office.
2. Introduction to the principles of working drawings, reading and interpretation of working drawings specific to industry.

SECTION B

3. Boiler Parts 2 sheets
? Steam stop valve.
? Blow off cock.
4. I.C. Engine Parts 2 sheets
? Piston with connecting rod assembly.
? Crankshaft and fly wheel assembly (Car engine).

SECTION C

5. Lathe Tool Holder. 1 sheet
6. Vices 2 sheets
? Bench Vice (details/assembly).
? Machine vice (details/assembly).

SECTION D

7. Single Plate Clutch Assembly. 1 sheet
8. Drill Jig (Details and Assembly). 1 sheet
9. Fixture (Details and Assembly). 1 sheet
10. Cams and Followers 2 sheets
? Profile of cams for imparting following motions with knife edge and roller followers:
? (a) Uniform motion.
? (b) Simple harmonic motion.
11. Gears 1 sheet
? Use of different types of gears.
? Spur gears with actual profile of involute teeth.
? Conventional representation of bevel gear, worm and worm wheel.

Remarks :

- All the sheets should be working drawings complete with tolerances, types of fits and surface finish symbols.
 - An expert from an industry may be invited to deliver expert lecture.
 -

SEMESTER-V

DME-510 FLUID MECHANICS

Maximum Time :3 Hrs. University Examination : 35Marks
Total Marks :50 Continuous Internal Assessment : 15 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 10-15 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 non-programmable scientific calculator is allowed

SECTION A

1. Introduction

- ? Concept of fluid, fluid mechanics, hydraulics.
- ? Properties of fluid (viscosity, specific weight, specific volume, specific gravity) with their units.

SECTION B

2. Static Pressure

- ? Pascal's law.
- ? Concept of static pressure, intensity of pressure and pressure head.
- ? Total pressure on a plane surface and center of pressure (without proof).

3. Measurement of Pressure

- ? Concept of atmospheric pressure, gauge pressure, absolute pressure, vacuum and differential pressure.
- ? Gauges : Piezometer tube, simple manometer, differential manometer (U-tube, inverted U tube, micro manometer and Bourdon pressure gauge).

SECTION C

4. Flow of Liquids

- ? Types of flow (laminar and turbulent).
- ? Rate of discharge.
- ? Law of continuity.
- ? Energy of fluid- potential, pressure and kinetic.
- ? Bernoulli's theorem (without proof) and its applications.
- ? Discharge measurement by venturimeter and orifices.
- ? Pitot tube and pitot static tube.

5. Flow Through Pipes

- ? Concept of general problem of flow through pipes.
- ? Loss of energy due to friction.
- ? Factors influencing the loss due to friction.
- ? Darcy's equation for loss of energy and Chezy's equation (without proof).
- ? Application of flow through pipes.

SECTION D

6. Hydraulic Devices

- ? Working Principles, description and application of :
- ? Hydraulic accumulator.
- ? Intensifier.
- ? Hydraulic jack
- ? Hydraulic press.
- ? Hydraulic ram.

7. Hydraulic Turbines

- ? Concept of a turbine.
- ? Types of Turbines- Impulse and Reaction type (concept only).
- ? Brief construction and working of pelton wheel, Francis turbine and Kaplan turbine.

8. Pumps

- ? Concept of hydraulic pump.
- ? Single acting reciprocating pump (construction and operation only).
- ? Vane, screw and gear pumps.
- ? Construction, working and operation of centrifugal pump.
- ? Work done, efficiencies and specifications of a centrifugal pump.
- ? Characteristics curves of a single stage centrifugal pump.
- ? Common defects in centrifugal pump and its remedial measures.

Note : - An expert may be invited from the industry to deliver the lecture.

- An industrial visit may be arranged to explain and show the relevant things.

DME-510P

FLUID MECHANICS

Maximum Time :3 Hrs. University Examination : 35 Marks

Total Marks :50 Continuous Internal Assessment : 15 Marks

Minimum Pass Marks :40%

1. Measure the pressure head of water in 4 hrs. a pipe line by :
 - ? Piezometer tube.
 - ? U-tube or double column manometer.
 - ? Inverted U tube .
 - ? Bourdan Guage.
2. To find the value of the coefficient of discharge for a venturimeter.
3. To determine the coefficient of friction (Darcy's 'f') for commercial pipes.
4. To dismantle a single stage centrifugal pump with a view to study its constructional details.
5. To study a single-stage, centrifugal pump with a view to acquaint the students with the common troubles and their remedial measures.
6. To plot the following characteristics curves for a single stage centrifugal pump running at a constant speed.
 - ? Discharge v/s Head.
 - ? Discharge v/s Horse Power.
 - ? Discharge v/s Efficiency.
7. To study the pneumatic hydraulic circuit of any available machine.
8. To study the working models of
 - ? Pelton wheel.

- ? Francis turbine.
- 9. To determine maximum head developed by a centrifugal pump.
- 10. Operation and maintenance of centrifugal pump.

DME-520 THERMODYNAMICS-II

Maximum Time :3 Hrs.

University Examination : 35 Marks

Total Marks :50

Continuous Internal Assessment : 15 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 10-15 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 non-programmable scientific calculator is allowed

SECTION A

1. Principles of I.C. Engines

- ? Introduction and classification of I.C. Engines
- ? Working principle of four stroke and two stroke cycles.
- ? Petrol and diesel engines, their comparison and applications
- ? Location and functions of various parts of I.C. engines and materials used for them
- ? Concept of IC engine terms: Bore stroke, dead centers, crank-throw, compression ratio, clearance volume, piston displacement and piston speed. Familiarity with ISI specification for I.C. Engine parts.

SECTION B

2. Carburation and Ignition Systems of Petrol Engine

- ? Concept of carburetion
- ? Airfuel ratio
- ? Simple carburettor and its limitations
- ? Various circuits of solex and carburetor
- ? Description of a battery coil and magneto ignition system

3. Fuel System in Diesel Engines

- ? Components of fuel system.
- ? Description and working of fuel feed pump
- ? Fuel Injection pump
- ? Injector

SECTION C

4. Cooling and Lubrication

- ? Necessity of Engine Cooling
- ? Cooling systems: their main features
- ? Thermostat

- ? Defects in cooling systems and their rectification
- ? Function of lubrication
- ? Types and properties of Engine lubricants
- ? Lubrication systems of I.C. Engine
- ? ISI specification and brand names of Engine lubricants.

5. I.C. Engine testing

- ? Engine power-indicated and brake power
- ? Efficiency-Mechanical, Thermal, Relative and volumetric.
- ? Morse Test
- ? Heat balance sheet

SECTION D

6. Air Compressors

- ? Industrial uses of compressed air
- ? Classification-description of reciprocating and rotary air compressors
- ? Fans, Blowers and supercharger
- ? Working principle of reciprocating single and two stage compressors.
- ? Inter cooling, volumetric efficiency.
- ? Operation and maintenance of reciprocating compressors.

7. Nozzles and Steam Turbines

- ? Energy equation as applied to a nozzle
- ? Description of various types of turbines
- ? Methods of reducing rotor speed in impulse turbines
- ? Governing of steam turbines

Note : An expert from some industry may be invited to deliver the lecture.

DME-520P THERMODYNAMICS-II

Maximum Time :3 Hrs. University Examination : 35 Marks

Total Marks :50 Continuous Internal Assessment : 15 Marks

Minimum Pass Marks :40%

1. Dismantle a two stroke engine. Note the function and material of each part. Reassemble.
2. Dismantle a single cylinder diesel engine. Note the function of each part. Reassemble
3. Dismantle solex and amal carburettors. Locate and note down the functions of various parts. Reassemble.
4. Battery ignition system of a multi cylinder petrol engine, stressing on ignition timings, setting fixing order and contact breaker gap adjustment.
5. Cooling system of I.C. Engine
6. Lubricating system of I.C. Engine
7. Determination of BHP by dynamometer
8. Morse test on multi cylinder petrol engine
9. To prepare heat balance sheet for diesel/petrol engine
10. Determination of volumetric efficiency of air compressor
11. Local visit to Roadways or Private automobile workshops.
12. Study of steam turbines through models and visits

DME-530 INDUSTRIAL ECONOMY AND PRINCIPLES OF MANAGEMENT

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

University Examination : 70Marks
Continuous Internal Assessment : 30Marks

SECTION A

Introduction

Nature and significance of economics, meaning of science,, engineering & technology and their relation ship with economic development.

SECTION B

Basic concepts

The concepts of demand and supply, elasticity of demand and supply, indifference, curve, analysis, price effect, income effect, and substitution effect.

SECTION C

Money & Banking

function of money, value of money, inflation and measure to control its brief data of function of banking system.

SECTION D

Introduction to management

Definition, nature and significance of management, evolution of management thought, contribution of max Waber Taylor, Taylor and Fayol.

human behavior: factors of individual behavior , perception, learning and personality development, inter personnel relation ship, group behavior.

DME-540 AUTOMOBILE ENGINEERING

Maximum Time :3 Hrs.
Total Marks :50
Minimum Pass Marks :40%

University Examination : 35 Marks
Continuous Internal Assessment : 15 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 10-15 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 non-programmable scientific calculator is allowed

SECTION A

1. Introduction

? Components of an automobile

- ? Classification of automobiles
- ? Layout of chassis
- ? Types of drives-front wheel, rear wheel, four wheel, left hand, right hand

2. Transmission System

Clutch

- ? Function
- ? Constructional details of single plate and multiplate friction clutches
- ? Centrifugal and semi centrifugal clutch

Gear Box

- ? Function
- ? Working of slide mesh, constant mesh and synchromesh gear box
- ? Torque convertor and overdrive

Propeller shaft and rear axle

- ? Function
- ? Universal joint
- ? Differential
- ? Rear axle drives and different types of rear axles

Wheels and Tyres

- ? Types of wheels- disc wheels and wire wheel
- ? Types of tyre used in Indian vehicles
- ? Causes of tyre wear
- ? Toe in, Toe out, Chamber, Caster, Kingpin inclination
- ? Tube less tyres

SECTION B

3. Steering System

- ? Function and principle
- ? Ackerman and Davis steering gears
- ? Types of steering gears- worm and nut, worm and wheel, worm and roller, Rack and pinion type

4. Braking System

- ? Constructional detail and working of mechanical, hydraulic and vacuum brake.
- ? Details of master cylinder, wheel cylinder
- ? Concept of brake drum, brake lining and brake equipment
- ? Bleeding of brakes

5. Suspension System

- ? Function
- ? Types
- ? Working of coil spring, leaf spring
- ? Shock absorber

SECTION C

6. Battery

- ? Constructional details of lead and cell battery
- ? Specific gravity of electrolyte
- ? Effect of temperatures, charging and discharging on specific gravity
- ? Capacity and efficiency of battery
- ? Battery charging
- ? Maintenance of batteries
- ? Checking of batteries for voltage and specific gravity

7. Dynamo and Alternator

- Dynamo
- ? Function and details
- ? Regulators-voltage, current and compensated type
- ? Cutout-Construction, working and their adjustment
- Alternator
- ? Construction and working
- ? Charging of battery from alternator

SECTION D

8. Diagram of a Typical Wiring system

9. Lighting System and Accessories

- ? Lighting system
- ? Wiring circuit
- ? Headlight, aiming of headlights
- ? Lighting switches
- ? Direction indicators
- ? Windscreen Wipers
- ? Horn
- ? Speedometer
- ? Heater
- ? Air-conditioning

DME-540P AUTOMOBILE ENGINEERING

Maximum Time :3 Hrs. University Examination : 35 Marks
Total Marks :50 Continuous Internal Assessment : 15 Marks
Minimum Pass Marks :40%

1. Fault and their remedies in
 - i) Battery ignition system
 - ii) Magnetic Ignition system
2. Study and sketch of
 - i) Heat Light Model
 - ii) Wiper & indicators
3. Study and sketch of
 - i) A.C. Pump
 - ii) S.U. Pump
 - iii) Master Cylinders
4. Study and sketch of
 - i) Rear Axle
 - ii) Differential
 - iii) Steering system
5. Fault finding practices on an automobile- Four Wheelers (Petrol and Diesel vehicles)
6. Assembly and deassembly of petrol and diesel engine of an automobile
7. Engine tuning of an automobile engine
8. Driving practice of four wheeler
9. Charging of automobile battery and measuring cell voltage and specific gravity of electrolyte
10. Determination of I.H.P. of a multi cylinder automobile engine
11. Phasing and calibration of fuel injection pump

12. Checking and adjusting of clutch pedal play and brake pedal play, tightness of fan belt plate and brake shoe
13. Changing of wheels and inflation of tyres alignment of wheels.
14. Measuring spark gap, valve clearance and ring clearance, Cleaning, grinding and lapping operations for adjustment
15. Cleaning and adjusting a carburetor
16. Nozzle cleaning, testing and adjustment.

DME-550 PRODUCTION MANAGEMENT

Maximum Time :3 Hrs.

University Examination : 70 Marks

Total Marks :100

Continuous Internal Assessment : 30 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 10-15 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 non-programmable scientific calculator is allowed

SECTION A

1. Work Study

- ? Method study-Process chart, Flow process chart, Flow diagram, Man and machine chart and two handed chart.
- ? Work measurement- Time study, Tools and in time study, Performance rating, Allowances and use of some time standards, time and motion study.
- ? Principles of human motion economy (introduction to ergonomics)

2. Plant Layout and Material Handling

- ? Concept of plant layout
- ? Types of layout (Process, Product and Combination type); their Characteristics; Merits and demerits
- ? Factors affecting plant layout
- ? Work station design; Factors considered in designing a work station I
- ? Introduction and functions of material handling
- ? Selection of material handling equipment for different equipment

SECTION B

3. Production Planning and Control

- ? Types of production : Job, batch and mass production
- ? Material planning and allocation
- ? Process planning and process sheet
- ? Inventory control: Need and advantages of inventory control.

4. Inspection and Quality Control

- ? Inspection
- ? Need and planning for Inspection
- ? Types of inspection
- ? Role of operator and inspector in inspection
- ? Quality control and quality assurance
- ? Meaning and need for quality control
- ? Statistical quality control
- ? Acceptance Sampling (Single sampling and sequential sampling plans)
- ? Control charts for variables and attributes, Interpretation of patterns in control charts, O.C. curves.
- ? Concept of TQM
- ? Machine capability studies

SECTION C

5. Standards and Codes

- ? National and International codes
- ? ISO- 9000, concept and its evolution and implications.

6. Repair and Maintenance

- ? Objectives and importance of maintenance
- ? Different types of maintenance
- ? Nature of maintenance problem
- ? Range of maintenance activities
- ? Schedules of preventive maintenance
- ? Advantages of preventive maintenance

SECTION D

7. Cost Estimation

- ? Introduction and functions of cost estimation
- ? Estimation procedure
- ? Elements of costs and ladder of costs
- ? Depreciation, Methods of calculating depreciation]
- ? Overhead expenses and distribution of overhead expenses
- ? Calculation of cost of machining and metal

8. Value Engineering

- ? Concept of value engineering and techniques
- Note :** - An expert from industry may be invited to deliver the lecture
 - Industrial visit may be planned.

SEMESTER-VI

DME-610 INDUSTRIAL MANAGEMENT

Maximum Time :3 Hrs.

University Examination : 70 Marks

Total Marks :100

Continuous Internal Assessment : 30 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 10-15 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 non-programmable 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.

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.

SECTION B

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, Prudent 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.
- ? Accidents-prone 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 management.
- ? 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.

DME-620 THEORY OF MACHINES

Maximum Time :3 Hrs.

University Examination : 70 Marks

Total Marks :100

Continuous Internal Assessment : 30 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 10-15 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 non-programmable scientific calculator is allowed

SECTION A

1. Simple Machines

- ? Introduction to link, kinematic pair, lower and higher pair, kinematic chain, mechanism, Inversions.
- ? Different types of mechanisms(with examples)
- ? Mechanical advantage of a linkage
- ? Cams and followers: Terminology and classification

2. Friction

- ? Definition and its necessity
- ? Horizontal force required to move a body on an inclined plane both upward and downward
- ? Frictional torque in screws, both for square and V threads
- ? Screw jack (Simple numericals only)
- ? Frictional clutches bearing
- ? Friction in journal bearing
- ? Different types of bearings and their application

SECTION B

3. Power Transmission

- ? Transmission screw : power transmitted and frequency
- ? Flat and V belt drive: ratio of tensions; H.P. transmitted, centrifugal tension, Condition for maximum horse power
- ? Power transmitted by chains: different types of chains and their terminology
- ? Gear terminology, types of gears and their applications; simple and compound gear trains; power transmitted by simple spur gear

SECTION C

4. Flywheel

- ? Principles and applications of flywheel
- ? Turning-moment diagram of flywheel for different engine (No numerical)
- ? Fluctuation of speed and fluctuation of energy

5. Governor

- ? Principal of Governor
- ? Simple description and working of Watt, Porter and Hartnel governor (No numerical)

SECTION D

6. Balancing

- ? Concept of balancing
- ? Introduction to balancing

7. Vibrations

- ? Causes of vibrations in machines, their harmful effects and remedies
- Note :** - An expert from some industry may be invited to deliver these lectures.

DME-630 MACHINE DESIGN

Maximum Time :3 Hrs.

University Examination : 70 Marks

Total Marks :100

Continuous Internal Assessment : 30 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 10-15 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 non-programmable scientific calculator is allowed

SECTION A

1. Introduction to Design

- ? Basic requirements for machine elements
- ? General design process
- ? Mechanical properties
- ? General design considerations like fatigue, creep, fabrication methods, economic considerations for strength
- ? Designing for strength

SECTION B

2. Rivetted and Welded Joints

- ? Types of riveted joints
- ? Possible failure of riveted joints
- ? Strength and efficiency of riveted joints
- ? Common types of welded joints
- ? Simple design for V butt welded joint
- ? Transverse fillet and parallel fillet welded joint

3. Screwed Joints

- ? Introduction to term screw and various definitions of screw threads
- ? Advantages and disadvantages of screwed joints
- ? Form of screw threads
- ? Common types of screw fastening; through bolt, tap bolt, stud, cap screw, machine screw and set screws
- ? Designation of screw threads
- ? Stresses in screw fastening
- ? Design of bolts for cylinder cover

SECTION C

4. Keys and Couplings

- ? Definition of term key; its various types
- ? Splines
- ? Forces acting on sunk keys
- ? Shaft couplings and its various types
- ? Design of flange coupling

5. Shafts

- ? Various types of shafts
- ? Stresses in shafts
- ? Design of shafts (solid and hollow) subjected to torque and bending moment

SECTION D

6. Design of Cotter Joint for Round Rod

- ? Design of cotter
- ? Design of socket
- ? Design of spigot

7. Design of Knuckle Joint

- ? Design of rod
- ? Design of pin

Note : - An expert from some industry may be invited to deliver the lectures.

DME-640P MAJOR PROJECT WORK

Maximum Time :3 Hrs.

University Examination :140 Marks

Total Marks :200

Continuous Internal Assessment : 60 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 10-15 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 non-programmable scientific calculator is allowed
-
1. Projects connected with repair and maintenance of machine parts
 2. Estimating and costing projects
 3. Design of components/parts/jigs/fixtures
 4. Projects related to quality control
 5. Project work related to increasing productivity.
 6. Project connected with work study
 7. Projects related to erection, installation, calibration and testing
 8. Projects related to wastage reduction.