

CBCS SCHEME

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15MAT11

First Semester B.E. Degree Examination, June/July 2018

Engineering Mathematics – I

Time: 3 hrs.

Max. Marks: 80

Note: Answer FIVE full questions, choosing one full question from each module.

Module-1

- 1 a. Find the n^{th} derivative of the $\sin^3 x \cos^2 x$. (06 Marks)
- b. Find angle between the pair of curves $r = 6\cos\theta$ and $r = 2(1 + \cos\theta)$. (05 Marks)
- c. Show that for the curve $r(1 - \cos\theta) = 2a$ the radius of curvature is $\frac{2}{\sqrt{a}} r^{3/2}$. (05 Marks)

OR

- 2 a. Show that $\left(\frac{2\rho}{a}\right)^2 = \left(\frac{x}{y}\right)^2 + \left(\frac{y}{x}\right)^2$ for the curve $y = \frac{ax}{a+x}$. (06 Marks)
- b. Find the Pedal equation of the curve $r^m = a^m(\cos m\theta + \sin m\theta)$. (05 Marks)
- c. If $y = \log(x + \sqrt{1+x^2})$ prove that $(1+x^2)y_{n+2} + (2n+1)xy_{n+1} + n^2y_n = 0$. (05 Marks)

Module-2

- 3 a. Expand $\text{Log}(1+\cos x)$ by Maclaurin's series upto the term containing x^4 . (06 Marks)
- b. Evaluate $\lim_{x \rightarrow \frac{\pi}{2}} (\sin x)^{\tan x}$. (05 Marks)
- c. If $u = \frac{yz}{x}$, $v = \frac{zx}{y}$, $w = \frac{xy}{z}$ show that $\frac{\partial(u, v, w)}{\partial(x, y, z)} = u$ (05 Marks)

OR

- 4 a. If $u = \tan^{-1}\left(\frac{x^3 + y^3}{x - y}\right)$ show that $xu_x + yu_y = \sin 2u$. (06 Marks)
- b. If $z = f(x, y)$, where $x = r\cos\theta$, $y = r\sin\theta$ show that $\left(\frac{\partial z}{\partial x}\right)^2 + \left(\frac{\partial z}{\partial y}\right)^2 = \left(\frac{\partial z}{\partial r}\right)^2 + \frac{1}{r^2}\left(\frac{\partial z}{\partial \theta}\right)^2$ (05 Marks)
- c. Expand $\tan x$ in Taylor's series upto three in powers of $\left(x - \frac{\pi}{4}\right)$. (05 Marks)

Module-3

- 5 a. A particle moves along the curve $x = 1 - t^3$, $y = 1 + t^2$ and $z = 2t - 5$, determine velocity and acceleration at $t = 1$. Also find the components of velocity and acceleration in the direction $2i + j + 2k$. (06 Marks)
- b. Find the angle between the surfaces $x^2 + y^2 + z^2 = 9$ and $z = x^2 + y^2 - 3$ at $(2, -1, 2)$. (05 Marks)
- c. Prove that $\text{Div}(\phi \vec{A}) = \phi(\text{div } \vec{A}) + \text{grad } \phi \cdot \vec{A}$ (05 Marks)

OR

- 6 a. Find the unit tangent vector and normal vector to the curve $\vec{r} = \cos 2t \hat{i} + \sin 2t \hat{j} + t \hat{k}$ at $x = \frac{1}{\sqrt{2}}$. (06 Marks)
- b. Find the $\text{curl}(\text{curl} \vec{A})$, where $\vec{A} = x^2 y \hat{i} - 2xz \hat{j} + 2yz \hat{k}$ at the point (1, 0, 2). (05 Marks)
- c. Show that $\vec{F} = (y+z)\hat{i} + (z+x)\hat{j} + (x+y)\hat{k}$ is irrotational. Also find a scalar function of ϕ such that $\vec{F} = \nabla\phi$. (05 Marks)

Module-4

- 7 a. Obtain the reduction formula for $\int_0^{\frac{\pi}{2}} \cos^n x \, dx$. (06 Marks)
- b. Solve $xy(1+xy^2) \frac{dy}{dx} = 1$. (05 Marks)
- c. Show that the family of the curves $y^2 = 4a(x+a)$ is self orthogonal. (05 Marks)

OR

- 8 a. Solve $\frac{dy}{dx} + \frac{y \cos x + \sin y + y}{\sin x + x \cos y + x} = 0$. (05 Marks)
- b. Evaluate $\int_0^{\pi} \frac{\sin^4 \theta}{(1 + \cos \theta)^2} d\theta$. (05 Marks)
- c. If the temperature of the air is 30°C and a metal ball cools from 100°C to 70°C in 15 minutes, find how long will it take for the metal ball to reach a temperature of 40°C . (06 Marks)

Module-5

- 9 a. Find the largest eigen value and the corresponding eigen vector of the matrix $A = \begin{pmatrix} 2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 2 \end{pmatrix}$, by using the power method by taking initial vector as $[1, 1, 1]^T$ (06 Marks)
- b. Find the rank of the matrix by reducing into the normal form, $\begin{bmatrix} -2 & -1 & -3 & -1 \\ 1 & 2 & 3 & 1 \\ 1 & 0 & 1 & 1 \\ 0 & 1 & 1 & 1 \end{bmatrix}$. (05 Marks)
- c. Solve the following system of equation by Gauss seidel method: $20x + y - 2z = 17$, $3x + 20y - z = -18$, $2x - 3y + 20z = 25$. (05 Marks)

OR

- 10 a. Diagonalize the matrix $\begin{bmatrix} -19 & 7 \\ -42 & 16 \end{bmatrix}$. (06 Marks)
- b. Solve by Gauss elimination method, $2x + y + 4z = 12$, $4x + 11y - z = 33$, $8x - 3y + 2z = 20$. (05 Marks)
- c. Reduce the quadratic form $8x^2 + 7y^2 + 3z^2 - 12xy + 4xz - 8yz$ into the canonical form. (05 Marks)

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15PHY12/22

First/Second Semester B.E. Degree Examination, June/July 2018 Engineering Physics

Time: 3 hrs.

Max. Marks: 80

- Note: 1.** Answer any FIVE full questions, choosing one full question from each module.
2. Physical constants: Plank's constant $h = 6.63 \times 10^{-34}$ JS, Mass of electron $M_e = 9.11 \times 10^{-31}$ kg
Boltzmann constant $K = 1.38 \times 10^{-23}$ J/K, Avogadro's number $N_A = 6.025 \times 10^{26}$ /Kmole,
Velocity of light $C = 3 \times 10^8$ m/s. mass of neutron $m_n = 1.678 \times 10^{-27}$ kg.

Module-1

- 1 a. Define Group velocity and phase velocity show that group velocity is less than phase velocity. (06 Marks)
b. Using Schrodinger's time independent wave equations arrive at the expression for eigen values. (06 Marks)
c. A particle of mass $\frac{0.65\text{MeV}}{C^2}$ has Kinetic energy 80eV. Find the de-Broglie wavelength, group velocity and phase velocity of de-Broglie (where C is velocity of light). (04 Marks)

OR

- 2 a. Set up dimensional time independent Schrödinger wave equation. (06 Marks)
b. What is a black body? Discuss why the Blackbody radiation spectrum could not be explained by the Wien's and Rayleigh Jean's theories. (05 Marks)
c. Compare the energy of a photon with that of a neutron when both are associated with wavelength of 1°A . (05 Marks)

Module-2

- 3 a. What are the assumptions of classical free electron theory? Define i) Mean free path ii) Drift velocity. (06 Marks)
b. What is Fermi factor? Discuss the dependence of Fermi factor on temperature and effect on occupancy of energy levels. (06 Marks)
c. Calculate the Fermi temperature (T_F) and Fermi Velocity (V_F) in case of copper metal with Fermi energy 6.8eV. (04 Marks)

OR

- 4 a. Explain the merits of Quantum free electron theory. (06 Marks)
b. Describe the types of superconductors. (05 Marks)
c. What is superconductivity? Explain the working of Maglev vehicles. (05 Marks)

Module-3

- 5 a. With suitable diagrams, explain the types of optical fibers. (06 Marks)
b. Describe construction and working of semiconductor laser with energy band diagram. (06 Marks)
c. A laser pulse with power per pulse of 1mW lasts 10ns. If the number of photons emitted per pulse is 3.491×10^7 . Calculate wavelength of laser. (04 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8=50, will be treated as malpractice.

OR

- 6 a. Explain the terms population inversion and metastable state. Discuss the requisites of a typical laser. (06 Marks)
- b. What is attenuation? Discuss various factors that contribute to loss of signal strength during propagation of light through optical fiber. (06 Marks)
- c. Numerical aperture of an optical fiber is 0.3 when surrounded by air. Determine the refractive index of its core given the refractive index of cladding is 1.59. Also find the acceptance angle when it is in a medium of refractive index 1.33. (04 Marks)

Module-4

- 7 a. Define Miller indices and obtain expression for inter-planar spacing in terms of Miller Indices in cubic structure. (06 Marks)
- b. What is polymorphism and Allotropy? Show that Atomic packing factor in SCC is 0.52 and in fcc is 0.74. (06 Marks)
- c. Draw the following crystal planes (132), (001), (101) and (OTO). (04 Marks)

OR

- 8 a. Define atomic packing factor and co-ordination number Determine the co-ordination number in BCC structure. (04Marks)
- b. Discuss briefly the seven crystal systems. Draw crystal structures for cubic system. (08 Marks)
- c. A monochromatic beam of electrons with Kinetic energy 235.2eV undergoes first order Bragg reflection in a crystal at a glancing angle of $9^{\circ}12'35''$. Calculate the interplanar spacing. (04Marks)

Module-5

- 9 a. What are nano-materials? Explain the Arc discharge method of manufacturing Carbon nanotubes. (06 Marks)
- b. Explain the principle construction working of scanning Electron microscope with neat sketch. (06 Marks)
- c. Define terms : i) Shock wave ii) Mach number iii) Subsonic iv) Supersonic waves. (04 Marks)

OR

- 10 a. Describe the hand operated Reddy shock tube with a neat diagram. (06 Marks)
- b. Explain the Sol-Gel method of manufacturing nanomaterials. (05 Marks)
- c. Discuss five important applications of shock waves. (05 Marks)

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15CHE12/22

First/Second Semester B.E. Degree Examination, June/July 2018 Engineering Chemistry

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing one full question from each module.

Module-1

- 1 a. Derive Nernst's equation for single electrode potential of an electrode considering reduction reaction. (05 Marks)
- b. Define electrolyte concentration cell. Calculate the e.m.f of the given concentration cell at 298 K
 $\text{Ag} | \text{AgNO}_3 (0.02 \text{ M}) || \text{AgNO}_3 (2 \text{ M}) | \text{Ag}$ (05 Marks)
- c. Describe construction, working and application of methanol-O₂ fuel cell using H₂SO₄ as electrolyte (06 Marks)

OR

- 2 a. Define reference electrode. Describe construction and working of Calomel electrode with reactions. (05 Marks)
- b. Describe construction and working of Zn-Air battery. Mention its application. (05 Marks)
- c. Explain the following battery characteristics : (06 Marks)
- (i) Capacity (ii) Cycle life (iii) Energy-efficiency

Module-2

- 3 a. Explain electrochemical theory of corrosion with its mechanism taking Iron as an example. (06 Marks)
- b. Describe the following factors which affects the rate of corrosion:
(i) Nature of corrosion product
(ii) Ratio of Anodic to cathodic area
(iii) pH of the medium. (06 Marks)
- c. Describe electroplating of Nickel by Watt's bath. Mention its applications. (04 Marks)

OR

- 4 a. Define Metal finishing. Describe the technological importance of metal finishing. (05 Marks)
- b. Describe electroless plating of copper on PCB's with plating reaction. Mention its application. (05 Marks)
- c. Explain Differential Aeration Corrosion with an example. (06 Marks)

Module-3

- 5 a. Describe Bomb calorimetric method for determination of calorific value of a fuel. (05 Marks)
- b. What do you mean by reforming of petroleum? Give any three reactions involved in reforming process. (05 Marks)
- c. Explain the production of solar grade silicon by Union carbide method. (06 Marks)

OR

- 6 a. Calculate the gross or net calorific value of a coal sample from the following data obtained from Bomb calorimetric experiment.
- (i) Weight of coal = 0.75 kg ; (ii) Weight of water taken in calorimeter = 1200 kg ;
 (iii) Water equivalent of calorimeter = 400 kg ; (iv) Rise in temperature = 1.8°C ;
 (v) Hydrogen in coal sample = 2% (vi) Latent heat of steam = 587×4.2 kJ/kg ;
 (vii) Specific heat of water = 4.187 kJ/kg/°C (06 Marks)
- b. Explain construction, working and application of photovoltaic cell. (06 Marks)
- c. Explain the purification of silicon by zone-refining technique. (04 Marks)

Module-4

- 7 a. Explain the free radical mechanism for addition polymerization taking Vinyl chloride as an example. (05 Marks)
- b. Explain the synthesis and application of the following :
- (i) Plexiglass (PMMA) (ii) Polyurethane (06 Marks)
- c. Define Glass transition temperature. Describe the following factors which affects T_g value.
- (i) Flexibility of polymer chain (ii) Intermolecular force of attraction. (05 Marks)

OR

- 8 a. Calculate number average and weight average mole wt. of a polymer in which 200 molecules of 1000 mole mass and 300 molecules of 2000 mole mass and 500 molecules of 3000 mole mass are present respectively. (06 Marks)
- b. Explain the synthesis, properties and application of silicon rubber. (05 Marks)
- c. What are polymer composites? Describe the synthesis and application of Kevlar fibre. (05 Marks)

Module-5

- 9 a. Explain scale and sludge formation in the boiler. Mention its ill effects. (05 Marks)
- b. Explain the softening of water by ion-exchange resin method. (05 Marks)
- c. Describe the Sol-Gel process for synthesis of Nanomaterial. (06 Marks)

OR

- 10 a. What is desalination of water? Explain the reverse-Osmosis process for desalination of water. (05 Marks)
- b. Write short notes on Fullerene and Dendrimers. (06 Marks)
- c. Explain the synthesis of Nanomaterial by chemical vapour condensation method. (05 Marks)

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15PCD13/23

First/Second Semester B.E. Degree Examination, June/July 2018 Programming in C and Data Structures

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing one full question from each module.

Module-1

- 1 a. What is pseudocode and what is the purpose of pseudocode? (06 Marks)
b. Explain the basic structure of a 'C' program and write a 'C' program to calculate the area of rectangle. (10 Marks)

OR

- 2 a. Which are 2 important point to declare variable? Explain with syntax. (06 Marks)
b. What is data type and explain all different data types with syntax and examples. (10 Marks)

Module-2

- 3 a. How many decision control statements are there in 'C' language? List out all types of control statements. (04 Marks)
b. Explain if-else control statement with syntax and flow chart. (06 Marks)
c. Explain else-if ladder control statement with syntax and flow chart. (06 Marks)

OR

- 4 a. Explain 'for' loop control statement with syntax and flow chart. (06 Marks)
b. What is the difference between while-do loop and do-while loop? Explain with syntax and example. (06 Marks)
c. Write a 'C' program to find the sum of 'N' natural numbers using 'for' loop. (04 Marks)

Module-3

- 5 a. Define array. Explain how one-dimensional array is declared and initialized with syntax. (06 Marks)
b. Write a 'C' program to read N integers (+Ve, -Ve and zero) into an array:
i) Find the sum of -Ve integers
ii) Find the sum of +Ve integers
iii) Find the average of all integers (10 Marks)

OR

- 6 a. Define string. List out all string manipulation functions. (06 Marks)
b. Write a 'C' program to read 2-strings and compare both the strings with specified number of characters and with case sensitive and without case sensitive. (10 Marks)

Module-4

- 7 a. What is structure? Write a 'C' program to read name, USN from main function and print the name, USN using structure. (06 Marks)
b. Explain type defining a structure with two different techniques and also with syntax. (06 Marks)
c. What are different operations that can be performed on the file? Explain fscanf operation with syntax? (04 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
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OR

- 8 a. Write a 'C' program to count the number of characters, number of lines and number of white spaces from a file. (10 Marks)
- b. What is meant by array of structure? How it can be created? (06 Marks)

Module-5

- 9 a. What is pointer? How pointers are declared and initialized? Explain with syntax. (06 Marks)
- b. Write a 'C' program to access the value of variable 'a' and 'b' through the pointer 'p' and 'q' by *p and *q respectively. (05 Marks)
- c. Write a 'C' program by using single pointer 'p' is made to point variable a, b and c respectively and display the value of a, b, and c through single pointer p. (05 Marks)

OR

- 10 a. What are preprocessors directives? Explain the advantages of preprocessor directives with examples. (08 Marks)
- b. Explain conditional compilation preprocessor directives with suitable program to find the area of circle, by giving the radius of circles. (08 Marks)

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15CIV13/23

First/Second Semester B.E. Degree Examination, June/July 2018

Elements of Civil Engineering and Engineering Mechanics

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing one full question from each module.

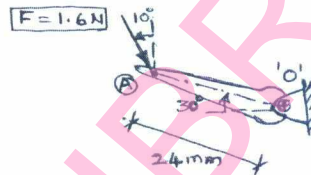
Module-1

1. a. Write a note on scope of water resources and irrigation engineering. (05 Marks)
 b. Write neat sketch with labels of a gravity dam and arch dam and explain their structural behaviour and functionality. (05 Marks)
 c. Explain with sketches, the principle of transmissibility and law of superposition. (06 Marks)

OR

2. a. Bring out comparison between flexible and rigid pavements highlighting their advantages and limitations. (05 Marks)
 b. What are different types of bridges? Explain any one type of bridge, with a neat sketch and label its parts. (05 Marks)
 c. Determine the moment of 1.6N force about the Pivot 'O' of the switch, shown in fig. Q2(c). (06 Marks)

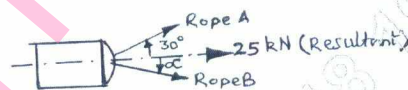
Fig.Q2(c)



Module-2

3. a. State and explain the laws of static friction. (06 Marks)
 b. A barge is pulled by two tug boats as shown in fig. Q3(b). If the resultant of the forces exerted by tug boats is 25kN directed along the axis of barge, determine i) Tension in each of ropes, knowing that $\alpha = 45^\circ$ ii) The value of α such that the tension is rope B is minimum. (10 Marks)

Fig.Q3(b)



OR

4. a. State the law of Parallelogram of forces. (02 Marks)
 b. Cable AB passes over a small frictionless pulley 'C' as shown in fig.Q4(b). What length of cable CD is required for static equilibrium in the position shown? Also find the tension T in cable CD. (06 Marks)

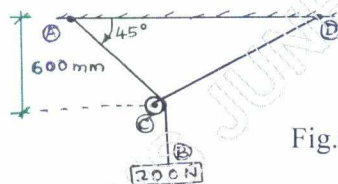


Fig.Q4(b)

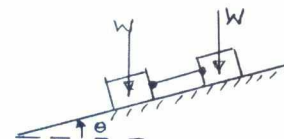


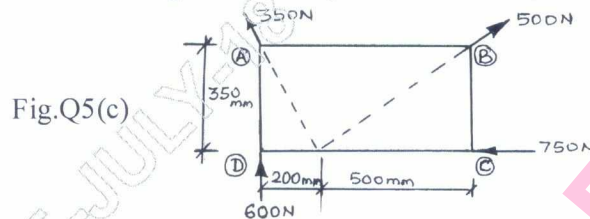
Fig.Q4(c)

- c. Two blocks of equal weight rest on an inclined plane as shown in fig.Q4(c) and are connected by a string as shown. If the coefficient of friction of left side block and incline is $\mu_1 = 0.2$ and that of other block and incline is $\mu_2 = 0.3$, find the angle of inclination of the plane for which sliding will be impending. Assume weight of each block $W = 22.25N$. (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
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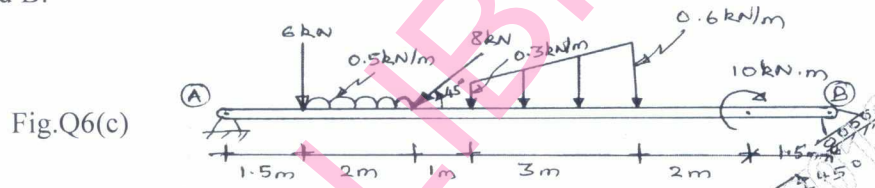
Module-3

- 5 a. Explain different types of reactions from various supports. (04 Marks)
 b. Explain and show how the moment of following loads are calculated with sketch :
 i) Uniformly distributed load and ii) Uniformly varying load. (04 Marks)
 c. Four forces act on a 700mm × 350mm plate
 i) Find the resultant of these forces ii) Locate the point of intersection of the line of action of resultant with edge AB of the plate shown in fig. Q5(c). (08 Marks)

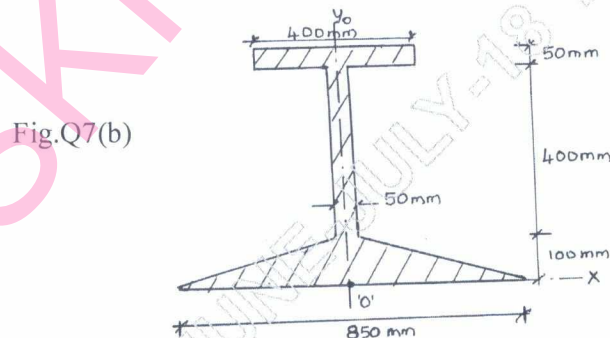


OR

- 6 a. State and prove Varignon's principle of Moments. (04 Marks)
 b. Explain the equilibrium conditions for Co-planar non-concurrent force system. (04 Marks)
 c. A beam AB 11m long is hinged at A and supported on rollers over a smooth inclined at 45° to horizontal at B. The beam is loaded as shown in fig. Q6(c). Determine the reactions at A and B. (08 Marks)

**Module-4**

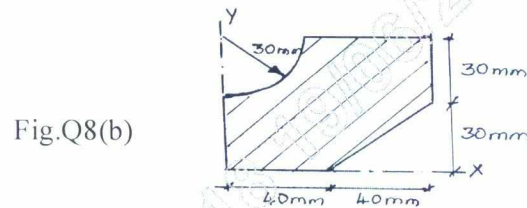
- 7 a. State and prove parallel axis theorem. (06 Marks)
 b. Determine the centroid for the shaded area shown in fig. Q7(b), with respect to 'O'. (10 Marks)



OR

- 8 a. Determine the centroid of the semi circular area of radius R with diametrical base placed along horizontal by first principle. (04 Marks)

- b. Determine moment of inertia of shaded area shown in fig. Q8(b) with respect to X & Y axis. Also determine radius of gyration. (12 Marks)



Module-5

- 9 a. State Newton's laws of motion. (03 Marks)
 b. Explain the term Super Elevation. (03 Marks)
 c. A stone is dropped into a well and falls vertical with constant acceleration of $g = 9.81 \text{ m/s}^2$. The sound of impact of stone on bottom of well is heard 6.5 seconds after it is dropped. If the velocity of sound is 336m/s, how deep is the well? (10 Marks)

OR

- 10 a. Explain the terms i) Displacement ii) Velocity iii) Acceleration. (06 Marks)
 b. Two adjacent guns having the same velocity $V_0 = 300 \text{ m/s}$ fire simultaneously at angles of elevation α_1 and α_2 with horizontal for the target at same range, $r = 4500 \text{ m}$. Calculate the time difference $t_2 - t_1$ between the two hits. (10 Marks)

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15EME14/24

First/Second Semester B.E. Degree Examination, June/July 2018 Elements of Mechanical Engineering

Time: 3 hrs.

Max. Marks: 80

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Draw neat sketch wherever required.

Module-1

- 1 a. Differentiate between conventional and non conventional energy sources (any five). (05 Marks)
b. With a schematic layout, explain the nuclear power plant. (05 Marks)
c. Explain the three processes of utilization of solar energy. (06 Marks)

OR

- 2 a. With a neat sketch, explain the BabCock and WilCock boiler. (10 Marks)
b. Explain the following : (06 Marks)
i) Dryness fraction
ii) Latent heat of vaporisation
iii) Enthalpy
iv) Location and function of an economizer.

Module-2

- 3 a. Explain the working of a Delaval turbine with neat sketch. (06 Marks)
b. Differentiate between open and closed cycle gas turbine (any four). (04 Marks)
c. With a neat sketch. Explain the Pelton wheel. (06 Marks)

OR

- 4 a. Explain the four stroke petrol engine with neat sketch and PV diagram. (08 Marks)
b. A single cylinder 4-stroke IC engine has a bore of 180mm, stroke of 200mm and a rated speed of 300 rpm. The mean effective pressure is 6 bar. At full load, the torsion on the brake drum was 200N-m and 4kg of fuel was consumed in one hour. If the calorific value of the fuel is 42,000 kJ/kg, calculate the BP, IP, mechanical efficiency, indicated thermal efficiency and brake thermal efficiency. (08 Marks)

Module-3

- 5 a. With a neat sketch, explain the taper turning by swiveling of compound rest. (06 Marks)
b. Explain the following with neat sketches i) counter boring ii) reaming. (04 Marks)
c. With neat sketches, explain slot and face milling. (06 Marks)

OR

- 6 a. Define robot. Explain the classification of robots with neat sketches. (10 Marks)
b. Enumerate applications, advantages and disadvantages. (2 each). (06 Marks)

Module-4

- 7 a. Explain the applications of ferrous and non ferrous metals (three each). (06 Marks)
b. Define composites. Enumerate the classification of composites. (06 Marks)
c. Enumerate the applications of composites in automotive and air craft industries (two each). (04 Marks)

OR

- 8 a. Enumerate the differences between soldering and brazing (any six). (06 Marks)
b. Explain the different flames of welding with sketches. (06 Marks)
c. List the applications of welding and soldering (two each). (04 Marks)

Module-5

- 9 a. List the desirable properties of a good refrigerant (any six). (06 Marks)
b. Enumerate the uses of refrigerations (any 4). (04 Marks)
c. Explain : i) COP ii) Ton of refrigeration iii) Types of refrigerant (any four). (06 Marks)

OR

- 10 a. With a neat sketch explain vapour absorption refrigeration. (08 Marks)
b. Explain the construction and working of room air conditioner with neat sketch. (08 Marks)

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15ELE15/25

First/Second Semester B.E. Degree Examination, June/July 2018 Basic Electrical Engineering

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing one full question from each module.

Module-1

- 1 a. State and explain ohm's law, mention its limitations. (05 Marks)
b. Define the coefficient of coupling and find its relation with L_1 , L_2 and M . (05 Marks)
c. A current of 30A flows through two ammeters A_1 and A_2 connected in series. The potential differences across the two ammeters are 0.3V and 0.6V respectively. Find how the same current will divide when they are connected in parallel. (06 Marks)

OR

- 2 a. Derive an expression for energy stored in the magnetic field. (05 Marks)
b. State and explain Kirchhoff's Laws. (05 Marks)
c. A coil of 1000 turns is wound on a silicon steel ring having μ_r of 1200. The ring has a mean diameter of 10cm and cross sectional area of 12 Sq.cm. when a current of 4A flows through the coil find :
i) Flux in the core
ii) Inductance of the coil
iii) The e.m.f induced in the coil. If the flux falls to zero in 15ms and
iv) Now, if another similar coil is placed such that 70% magnetic coupling exists between the coils, find the mutual inductance. (06 Marks)

Module-2

- 3 a. Explain with neat sketch the constructional features of a D.C. Generator and mention the function of each part. (05 Marks)
b. With the help of neat diagram, explain the construction and working principles of dynamometer type wattmeter. (05 Marks)
c. A 4 pole shunt motor takes 22.5 amperes from a 250V supply. $R_a = 0.5\Omega$ and $R_{sh} = 125\Omega$. The armature is wave wound with 300 conductors if the flux per pole is 0.02 wb, calculate :
i) Speed
ii) Torque developed
iii) Power developed. (06 Marks)

OR

- 4 a. Derive an expression for the armature torque developed in a d.c motor. (05 Marks)
b. Sketch and explain :
i) Torque – armature current characteristics
ii) Speed – armature current characteristic for a d.c shunt motor. (05 Marks)
c. With a neat diagram, explain the working of an induction type of energy meter. (06 Marks)

Module-3

- 5 a. With the help of circuit diagram and phasor diagram, find the phase angle, impedance and power in case of R-L series circuit. (05 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

- b. With a neat diagram, explain the pipe earthing. (05 Marks)
- c. A circuit consists of a resistance of 10Ω , an inductance of 16mH and a capacitance of $150\mu\text{F}$ connected in series. A supply of 100V at 50Hz is given to the circuit. Find the current, p.f and power consumed by the circuit. Draw the vector diagram. (06 Marks)

OR

- 6 a. Prove that the current in a purely inductive circuit lags behind the applied voltage by 90° . (05 Marks)
- b. With relevant circuit diagrams and switching table, explain three way controls of Lamps. (05 Marks)
- c. Two circuits A and B are connected in parallel across 200V , 50Hz supply circuit A consists of 10Ω resistance and 0.12H inductance in series while circuit B consists of 20Ω resistance in series with $40\mu\text{F}$ capacitor. Calculate :
 i) Current in each branch
 ii) Supply current
 iii) Total power factor. (06 Marks)

Module-4

- 7 a. For a three phase star connection, find the relation between line and phase values of current and voltages. Also derive the equation for the three phase power. (05 Marks)
- b. Obtain the expression for emf of an alternator and give the significance of the winding factor. (05 Marks)
- c. Two wattmeter's connected to measure the power in a 3 phase circuit read 5kW and 1kW . The latter being read after reversing the current coil. Calculate the power, power factor, total volt-amperes and reactive volt amperes. (06 Marks)

OR

- 8 a. With necessary sketches distinguish between salient pole and cylindrical pole type synchronous generator. (05 Marks)
- b. Show that two wattmeter's are sufficient to measure power in 3-phase balanced star connected circuit with neat circuit and phasor diagram. (05 Marks)
- c. A 6 pole 3 phase, 50Hz alternator 12 slot per pole and 4 conductor per slot. The winding is $\frac{5}{6}$ full pitched. A flux of 25 mwb per pole is sinusoidally distributed along the air gap. Determine the line e.m.f if the alternator is star connected. (06 Marks)

Module-5

- 9 a. Explain the various losses that occur in a transformer. (05 Marks)
- b. Define slip. Derive an expression for frequency of rotor current. (05 Marks)
- c. A 10KVA , $400/200\text{V}$, 50Hz single phase transformer has a full load copper loss of 200W and has a full load efficiency of 96% at 0.8pf lagging. Determine the iron loss. What would be the efficiency at half of the full load and unity p.f? (06 Marks)

OR

- 10 a. Explain the principle of operation of a 3 phase Induction motor and give reason for an induction motor cannot run at synchronous speed. (05 Marks)
- b. Derive the EMF equation of a transformer. (05 Marks)
- c. A 4 pole 3ϕ 50Hz induction motor runs at a speed of 1470 rpm . Find the synchronous speed, the slip and frequency of the induced emf in the rotor under this condition. (06 Marks)

CBCS Scheme

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15ELN15/25

First/Second Semester B.E. Degree Examination, June/July 2018 Basic Electronics

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing one full question from each module.

Module-1

- 1 a. Explain the i) Ideal-diode approximation ii) Practical diode approximation
iii) Piece-wise linear approximation of diode. (06 Marks)
- b. Draw the circuit of full-wave rectifier and derive the expression for average dc current I_{DC} , RMS load current I_{RMS} . (08 Marks)
- c. Calculate the output voltage V_0 in the following circuit:

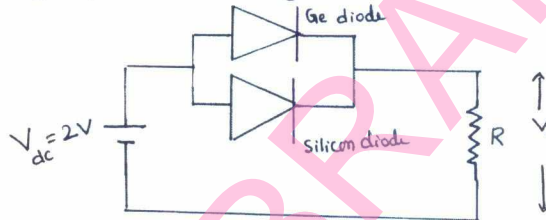


Fig.Q.1(c)

Assume V_r (breakdown V_g of G_e) = 0.7V

Assume V_r (breakdown V_g of silicon) = 0.3V.

(02 Marks)

OR

- 2 a. Draw the common Emitter circuit and sketch the output characteristics, explain active region, cut off region and saturation region by indicating them on the characteristic curve. (08 Marks)
- b. A transistor has $I_B = 100\mu A$ and $I_C = 2mA$. Find: i) β of the transistor ii) α of the transistor
iii) Emitter current I_E iv) If I_B changes by $+2s\mu A$ and I_C changes by $+0.6mA$. Find the new value of β . (08 Marks)

Module-2

- 3 a. Sketch a base-bias circuit and write equations for I_B , I_C and V_{CE} . (04 Marks)
- b. A voltage divider bias circuit with a 25V supply has $R_C = 4.7 K\Omega$, $R_E = 3.3 K\Omega$, $R_1 = 33K\Omega$, $R_2 = 12K\Omega$ and $h_{FE} = 50$. Use the approximate analysis method to calculate the V_{CE} level. (08 Marks)
- c. Derive the output equation for non-inverting amplifier using op-amp. (04 Marks)

OR

- 4 a. Define the terms: i) Slew rate ii) CMRR iii) Common mode gain A_C . (06 Marks)
- b. Design an adder circuit using op-amp to obtain an output expression $V_0 = -(0.1V_1 + 0.5V_2 + 20V_3)$ where V_1 , V_2 and V_3 are the inputs select $R_f = 10K\Omega$. (06 Marks)
- c. Write any four Ideal-opamp characteristics. (04 Marks)

Module-3

- 5 a. Convert the following binary numbers to octal number system:
 i) 1011.1111 ii) 111100111110001. (04 Marks)
 b. With a neat diagram, explain the concept of digital waveform. (06 Marks)
 c. Subtract $(1000.01)_2$ from $(1011.10)_2$ using 1's and 2's complement method. (06 Marks)

OR

- 6 a. State and prove De-Morgan's theorem. (04 Marks)
 b. Simplify the following Boolean expressions:
 i) $AB + \overline{AC} + ABC(AB + C)$
 ii) $\overline{\overline{AB} + ABC + A(B + \overline{AB})}$ (06 Marks)
 c. Realize full adder circuit using NAND gate. (06 Marks)

Module-4

- 7 a. Explain the working of clocked R-S flip flop with a suitable circuit, symbol, truth-table, input-output waveforms considering positive edge triggered RS flip-flop. (08 Marks)
 b. With a neat block diagram, explain how stepper motor is interfaced to 8051 microcontroller. (08 Marks)

OR

- 8 a. With a neat diagram, explain flag register of 8051 microcontroller. (06 Marks)
 b. Differentiate between latches and flip-flops. (04 Marks)
 c. Draw the TMOD register and explain how it control the modes of operation of a timer in 8051 microcontroller. (06 Marks)

Module-5

- 9 a. Define amplitude modulation and derive the expression for standard amplitude modulation. Also define modulation index. (06 Marks)
 b. A broadcast transmitter radiates 20kW when the modulation percentage is 75. How much of this is carrier power? Also calculate the power of each sideband. (06 Marks)
 c. Distinguish between frequency modulation and amplitude modulation. (04 Marks)

OR

- 10 a. With a neat diagram, explain the construction and operation of LVDT. Also mention its advantages and disadvantages. (10 Marks)
 b. An FM signal is given as $V = 12 \sin(5 \times 10^3 t + 5 \sin 1250t)$. Calculate: i) Carrier frequency
 ii) Modulating frequency iii) Frequency deviation. (06 Marks)

CBCS Scheme

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15CPH18/28

First/Second Semester B.E Degree Examination, June/July 2018

Constitution of India, Professional Ethics & Human Rights

(COMMON TO ALL BRANCHES)

Time: 2 hrs.]

[Max. Marks: 40

INSTRUCTIONS TO THE CANDIDATES

1. Answer all the forty questions, each question carries **ONE mark**.
2. Use only **Black ball point pen** for writing / darkening the circles.
3. For each question, after selecting your answer, darken the appropriate circle corresponding to the same question number on the OMR sheet.
4. Darkening two circles for the same question makes the answer invalid.
5. **Damaging/overwriting, using whiteners** on the **OMR** sheets are strictly prohibited.

-
1. The famous Dandi March done by Gandhiji was against
a) British Rule b) Salt Tax c) Sati system d) Untouchability
 2. The name of Dr. B. R. Ambedkar is associated with which of the following?
a) Chairman-Drafting committee b) Chairman Constituent Assembly
c) Lahore session d) Indian National Congress
 3. The beginning word "WE" in the preamble refers to the
a) British rulers b) Members of Constituent Assembly
c) Citizens of India d) All of these
 4. In our constitution, what justice is not given to the citizens?
a) Social b) Economic c) Political d) Technical
 5. India borrowed the idea of incorporating fundamental rights in the constitution from
a) USA b) France c) China d) Great Britain
 6. Which of the following is not a fundamental right? (Right to)
a) Assemble peacefully b) Move freely
c) Property d) Constitutional Remedies

7. This is not a Writ.
a) Habeas Corpus b) Mandamus c) Certiorari d) Prevention
8. Conflict of interest may be
a) false b) potential c) created d) imaginary
9. The directive principles of state policy are _____ rights.
a) social b) political c) constitutional d) legal
10. Which part of the constitution aims at establishing a welfare state in the country?
a) Preamble b) Fundamental rights
c) Fundamental duties d) directive principles
11. Respecting our National Flag is a
a) fundamental right b) directive principles
c) fundamental duty d) none of these
12. The obligation of the parents/guardian to provide opportunities for the education to their children between 6 to 14 years of age is
a) fundamental duty b) fundamental right
c) directive principle d) none of these
13. Which of the following is considered as the 'Fourth Estate'?
a) Assembly b) Press c) Council d) Parliament
14. The President of India is
a) selected b) nominated c) appointed d) elected
15. The commander-in-chief of all the Armed Forces is the
a) President b) Vice President c) Prime Minister d) Field Marshall
16. Which Budget will be proposed first in the parliament house?
a) general budget b) financial c) railway d) vote of credit
17. Who acts as the channel of communication between the president and council of ministers?
a) Speaker of Lok Sabha b) Prime Minister
c) Deputy Prime Minister d) Senior-most minister
18. Who interprets the Indian Constitution?
a) President b) Parliament c) Founding fathers d) Supreme court
19. What is the minimum age in years for becoming the MLC and MLA in the state?
a) 30 and 25 b) 35 & 30 c) 40 & 35 d) 45 & 40
20. 'Bicameral' means 'presence of' _____ in the state.
a) half house b) one house c) two houses d) no house

21. Salaries and other emoluments of the high court judges shall be determined by the
a) state legislative b) parliament c) governor d) chief minister
22. Constitution empowers state governments to make special law for
a) women and children b) workers working in mines
c) farmers d) unemployed youth
23. What is the minimum gap permissible between the two sessions of the legislature?
a) six weeks b) two months c) three months d) six months
24. Who is competent to declare the elections to the Lok Sabha?
a) Election Commissioner b) President
c) Prime Minister d) Union Cabinet
25. Election disputes shall be decided by
a) parliament b) supreme court c) election commission d) president
26. Regional Election commissioners may be appointed by the president with the consultation of
a) election commission b) governor
c) Prime Minister d) Vice President
27. Village Panchayats are the best examples for India's _____ form of Government.
a) republican b) sovereign c) secular d) democratic
28. In which one of the following states is it constitutionally obligatory for the state to have a separate minister for Tribal Welfare?
a) Bihar b) Madhya Pradesh c) Odisha d) all of these
29. _____ is empowered to declare an emergency.
a) Supreme court b) President
c) Prime minister d) Council of minister
30. This is not a ground to declare state emergency.
a) No clear majority
b) Failure to maintain law and order in state
c) Disobeying the direction given by the supreme court
d) Not complying with the direction given by the union government
31. 'Panchayati Raj' literally means that the governance by _____ individuals.
a) three b) four c) five d) six
32. Every year, Human Rights Day will be observed on
a) 10th September b) 10th October
c) 10th November d) 10th December

33. The slogan adopted for 50th Anniversary of Universal Declaration of Human Rights is
a) all human rights for all b) all rights for all
c) all fundamental rights for all d) none of these
34. The formula of a soft drink is an example of
a) patent b) trade secret c) copyright d) trade mark
35. This is not a kind of trade mark.
a) symbol b) sound c) design d) goodwill
36. Which of the following does not depict the attitude towards responsibility?
a) protest b) minimalist c) reasonable care d) good works
37. Tendency of shifting responsibility will logically come down if there is
a) microscopic vision b) fear
c) group thinking d) none of these
38. The owner of 'Patent right' retains his/her patent right for _____ years.
a) 100 b) 75 c) 50 d) 20
39. Which of the following is not preserved as an intellectual property?
a) copy right b) government regulation
c) patent d) trade secret
40. This is not the aim of studying engineering ethics.
a) crimping b) cooking c) forging d) plagiarism

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CBCS Scheme

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15CIV18/28

First/Second Semester B.E Degree Examination, June/July 2018

Environmental Studies

(COMMON TO ALL BRANCHES)

Time: 2 hrs.]

[Max. Marks: 40

INSTRUCTIONS TO THE CANDIDATES

1. Answer all the forty questions, each question carries **ONE mark**.
2. Use only **Black ball point pen** for writing / darkening the circles.
3. For each question, after selecting your answer, darken the appropriate circle corresponding to the same question number on the OMR sheet.
4. Darkening two circles for the same question makes the answer invalid.
5. **Damaging/overwriting, using whiteners** on the **OMR** sheets are strictly prohibited.

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1. Which of the following is not a prominent chemical responsible for a good habitat
a) O₂ b) CO₂ c) SO₂ d) Nutrients
 2. Which of the following is a biotic component of an Ecosystem
a) Fungi b) Sunlight c) Temperature d) Humidity
 3. The Flow of energy in an Ecosystem is
a) Bidirectional b) Cyclic c) Unidirectional d) Multidirectional
 4. Alternative Eco – friendly fuel for automobiles is
a) Petrol b) Diesel c) CNG d) Kerosene
 5. The uppermost layer of atmosphere is
a) Thermosphere b) Exosphere c) Mesosphere d) None
 6. Primary consumer is
a) Herbivores b) Carnivores c) Macro consumers d) Omnivores
 7. World Environment day is on
a) 5th May b) 5th June c) 9th August d) 9th June

8. Which of the following is not a part of Hydrological cycle
 a) Precipitation b) Infiltration c) Transpiration d) Perspiration
9. The life zone of the earth is
 a) Atmosphere b) Hydrosphere c) Biosphere d) None
10. E.I.A can be expanded as
 a) Environment and Industrial Act b) Environment and Impact Activities
 c) Environmental Impact Assessment d) Environmentally important Activity
11. Eutrophication is
 a) An improved water quality b) Process in Carbon Cycle
 c) Accumulation of plant nutrients in water d) None of these
12. Effect of modern agriculture on soil is due to
 a) Erosion b) Acidification c) Salinization d) All of these
13. Minamata episode of Japan is due to the poisoning of
 a) Lead b) Nickel c) Mercury d) Cadmium
14. Percentage of Fresh water available on the earth is
 a) 2.8% b) 2.2% c) 0.6% d) 2.15%
15. Which of the following sector uses maximum quantity of water
 a) Agriculture b) Domestic
 c) Recreation d) Animal Husbandry
16. Maximum total hardness allowed in the drinking water
 a) 600 mg/Ltr b) 1000 mg/Ltr c) 1500 mg/Ltr d) 750 mg/Ltr
17. Excessive concentration of Fluoride in water causes
 a) Dental and skeletal fluorosis b) Tooth decay
 c) Mathemoglobinemia d) None of these
18. Mineral is
 a) Organic matter b) Synthetic compound
 c) Naturally occurring inorganic substance d) None of these
19. India is the world leading producer of
 a) Mica b) Iron c) Coal d) Copper
20. Which of the following is not the renewable source of energy
 a) Solar energy b) Biomass c) Nuclear energy d) Bio - gas
21. Hydrogen can be produced commercially by
 a) Ammonia cracking b) Electrolysis of water
 c) Both 'a' and 'b' d) Gasification.

22. The liquid wastewater from baths and kitchen, etc... is called
 a) Sullage b) Domestic sewage c) Storm water d) Run - off
23. The Air pollution control device suitable for removing the finest dust from the air is
 a) Cyclone separator b) Fabric filter
 c) Settling chamber d) Electrostatic precipitator
24. The noise level human can hear without discomfort is
 a) 140 dB b) 110 dB c) 80 dB d) 190 dB
25. Smog is
 a) Natural Phenomenon b) Combination of smoke and fog
 c) Colourless d) All of the above
26. Demography is the study of
 a) Animal behaviour b) Population growth c) Rivers d) None of these
27. The major cause for the global population increase in 19th century was due to
 a) Decrease in birth rate b) Industrial revolution
 c) Decrease in death rate d) Green revolution
28. Which of the following is not a greenhouse gas
 a) O₂ b) CO₂ c) CH₄ d) CFC's
29. Use of CNG came into effect from
 a) Dec 2002 b) Dec 2004 c) Jan 2000 d) Sept 2003
30. Ozone layer is present in
 a) Troposphere b) Mesosphere c) Stratosphere d) Thermosphere
31. The Environmental (Protection) Act of India was enacted in the year
 a) 1986 b) 1992 c) 1984 d) 1974
32. GIS stands of
 a) Graphical Interface system b) Geographical Information system
 c) Geospatial Impact system d) None of these
33. The Chipko movement is
 a) Conservation of trees b) Hugging animals
 c) Protection of Birds d) All of these
34. Which of the following is an NGO
 a) Narmada Bachao Andolan b) Bombay Natural History society
 c) Centre for Science and Environment d) All of these
35. Environmental Education is targeted to
 a) General public b) Professionals
 c) Technicians & Scientists d) All of these

36. GILO stands for
a) Girls improved Learning outcomes
b) Girls in Legal organisations
c) Girls impact on Literacy outcome
d) None of these
37. Environmental Pollution is
a) States problem b) Global problem c) Countries issue d) Regional problem
38. There are provisions for protection of our Environment under
a) Indian Penal code b) Police Act
c) Municipal Act d) All of these.
39. The overall Environmental protection and management can be achieved by
a) The role of state government b) Role of central government
c) NGO's d) All the above
40. Sustainable resource management means
a) Over Exploitation b) Keep the resource for next generation
c) Unequality in resource management d) All of these

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CBCS SCHEME

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15MAT21

Second Semester B.E. Degree Examination, June/July 2018 Engineering Mathematics – II

Time: 3 hrs.

Max. Marks: 80

Note: 1. Answer any FIVE full questions, choosing one full question from each module.

Module-1

- 1 a. Solve : $\frac{d^3y}{dx^3} - 3\frac{d^2y}{dx^2} + 3\frac{dy}{dx} - y = 0$ (05 Marks)
- b. Solve : $\frac{d^2y}{dx^2} + \frac{dy}{dx} + y = (1 - e^x)^2$ (05 Marks)
- c. Solve $\frac{d^2y}{dx^2} + y = \sec x \cdot \tan x$ by the method of variation of parameters. (06 Marks)

OR

- 2 a. Solve $\frac{d^2y}{dx^2} + 3\frac{dy}{dx} + 2y = x^2$, using inverse differential operator method. (05 Marks)
- b. Solve $\frac{d^2y}{dx^2} - 4y = x \cdot \sin 2x$, using inverse differential operator method. (05 Marks)
- c. Solve by the method of undetermined coefficients
 $\frac{d^2y}{dx^2} - 5\frac{dy}{dx} + 6y = e^{3x} + \sin x$ (06 Marks)

Module-2

- 3 a. Solve : $x^2 \frac{d^2y}{dx^2} + 3x \frac{dy}{dx} + y = \frac{1}{(1-x)^2}$ (05 Marks)
- b. Solve : $p^2 + p(x+y) + xy = 0$ (05 Marks)
- c. Solve : $x - yp = ap^2$ by solving for x (06 Marks)

OR

- 4 a. Solve : $(3x+2)^2 \frac{d^2y}{dx^2} + 5(3x+2) \frac{dy}{dx} - 3y = x^2 + x + 1$ (06 Marks)
- b. Solve : $p^2 + 2py \cot x - y^2$ by solving for p. (05 Marks)
- c. Solve the equation $(px - y)(x - py) = 2p$ by reducing it into Clairaut's form by taking a substitution $x^2 = u$ and $y^2 = v$. (05 Marks)

Module-3

- 5 a. Form a partial differential equation by eliminating arbitrary constants
 $(x-a)^2 + (y-b)^2 = z^2 \cot^2 \alpha$, where ' α ' is the parameter. (06 Marks)
- b. Solve $\frac{\partial^2 z}{\partial x \partial y} = \sin x \cdot \sin y$ for which $\frac{\partial z}{\partial y} = -2 \sin y$, when $x = 0$ and $z = 0$ when y is an odd multiple of $\pi/2$. (05 Marks)

- c. Derive the one-dimensional wave equation in the form $\frac{\partial^2 y}{\partial t^2} = c^2 \frac{\partial^2 y}{\partial x^2}$. (05 Marks)

OR

- 6 a. Form a partial differential equation by eliminating the arbitrary function from $z = f(x + at) + g(x - at)$ (06 Marks)
- b. Solve $\frac{\partial^2 z}{\partial x^2} + 3 \frac{\partial z}{\partial x} - 4z = 0$ subject to the conditions that $z = 1$ and $\frac{\partial z}{\partial x} = y$ when $x = 0$. (06 Marks)
- c. Derive the one dimensional heat equation in the form $\frac{\partial u}{\partial t} = c^2 \frac{\partial^2 u}{\partial x^2}$. (04 Marks)

Module-4

- 7 a. Evaluate $\int_1^2 \int_3^4 (xy + e^x) dy dx$ (05 Marks)
- b. Evaluate $\int_0^{\infty} \int_x^{\infty} \frac{e^{-y}}{y} dx dy$ by changing the order of integration. (05 Marks)
- c. Obtain the relation between beta and gamma function in the form $\beta(m, n) = \frac{\Gamma(m) \cdot \Gamma(n)}{\Gamma(m+n)}$ (06 Marks)

OR

- 8 a. Evaluate $\int_0^{2a} \int_0^{\sqrt{2ax-x^2}} x^2 dy dx$ by changing to polar coordinate. (05 Marks)
- b. Evaluate $\int_{-1}^1 \int_0^z \int_{x-z}^{x+y} (x+y+z) dy dx dz$ (05 Marks)
- c. Evaluate $\int_0^{\pi/2} \sqrt{\tan \theta} \cdot d\theta$ (06 Marks)

Module-5

- 9 a. Evaluate (i) $L \{t^3 + 4t^2 - 3t + 5\}$ (ii) $L \{\cos t \cdot \cos 2t \cdot \cos 3t\}$ (06 Marks)
- b. Find the Laplace transform of $L \{e^{3t} \cdot \sin 5t \cdot \sin 3t\}$ (05 Marks)
- c. Solve the equation $\frac{d^2 y}{dt^2} + 3 \frac{dy}{dt} + 2y = 0$ under the conditions $y(0) = 1, y'(0) = 0$. (05 Marks)

OR

- 10 a. Evaluate : $L^{-1} \left\{ \frac{4s+5}{(s+1)^2(s+2)} \right\}$ (06 Marks)
- b. Find $L^{-1} \left\{ \frac{1}{(s+1)(s^2+1)} \right\}$ by using convolution theorem. (05 Marks)
- c. Express the function in terms of unit step function and hence find their Laplace transform
- $$f(t) = \begin{cases} 1, & 0 \leq t \leq 1 \\ t, & 0 < t \leq 2 \\ t^2, & t > 2 \end{cases} \quad (05 \text{ Marks})$$
