CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations July/August-2024

Course Name: Strength of Materials-I

(Civil Engineering)

| Date: 15.07.2024 AN | Time: 3 hours | Max.Marks: 70 |

(Note: Assume suitable data if necessary)

PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks. 10x2=20M

1.	What is the relationship between three elastic constants (E, G & K)?	2 M
2.	Illustrate stress-strain curve for Mild steel specimen indicating its salient features	2 M
3.	Define point of Contraflexure (POC)? How many POC are there for a cantilever beam subjected to UDL?	2 M
4.	Draw the Shear force and bending moment for a cantilever of a length 'L' carrying a point load 'W' at the free end.	2 M
5.	What are the assumptions made in simple theory of bending?	2 M
6.	Recall the Shear stress Formulae for beams.	2 M
7.	Inference the limitations of Macaulay's method	2 M
8.	Distinguish between conjugate beam and real beam	2 M
9.	Rephrase Mohr's circle of stresses	2 M
10.	What is the state of pure shear? Represent it graphically.	2 M

PART-B
**Answer the following. Each question carries TEN Marks.** 5x10=50M

11.A). A bar of 30 mm diameter is subjected to a pull of 60 KN. The measured extension on a gauge length of 200 mm is 0.09 mm and the change in diameter is 0.0039 mm. Determine i) Poisson's ratio ii) Modulus of Elasticity iii) Modulus of Rigidity iv) Bulk Modulus. — 10M

OR

11. B). A load of 100N falls to a height of 2cm collar rigidly attached to the lower end of the vertical rod 1.5m long and of 1.5 cm² cross-sectional area. The upper end of the vertical bar is fixed. Determine i) stress ii) Elongation iii) strain energy stored in the vertical rod. Take E = 2 X 10⁵ N/mm². — 10M

12. A). Draw the shear force and bending moment diagrams for a beam as shown in figure. — 10M
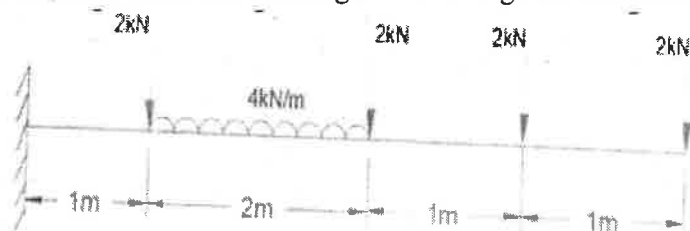
OR

12. B). A simply supported beam of span 10 m carry as UDL of 10 KN/m over a length of 3 m from left support and also from right support. Draw SF and BM diagram. — 10M

(P.T.O..)

13. A). A cast iron beam is of I-section with the following dimensions top flange 80mm x 20mm, web 20mm x 200mm, and bottom flange 160mm x 20mm. it is simply supported on a span of 5 meters. If the tensile stress is not to exceed 20N/mm². Estimate the safe uniform load beam can carry. Find also maximum compressive stress.   10M

OR

13. B). A beam of rectangular cross-section 200 mm x 300 mm is subjected to a shear force of 20 kN. Determine the average shear stress and man shear stress. Also, draw the shear stress distribution diagram.   10M

14. A). A cantilever of length 2m carries a point load of 20kN at the free end and another load 20kN at its center. If $E=10^5 N/mm^2$ and $I=10^8 mm^4$. Determine the slope and deflection at the free end.   10M

OR

14. B). Derive the equation for slope and deflection of a simply supported beam carrying a point load at the centre of the beam. With near sketches.   10M

15. A). A point in a strained material is subjected to stresses as shown in figure below. Using Mohr's circle method, determine the normal, tangential and resultant stresses across the oblique plane.   10M
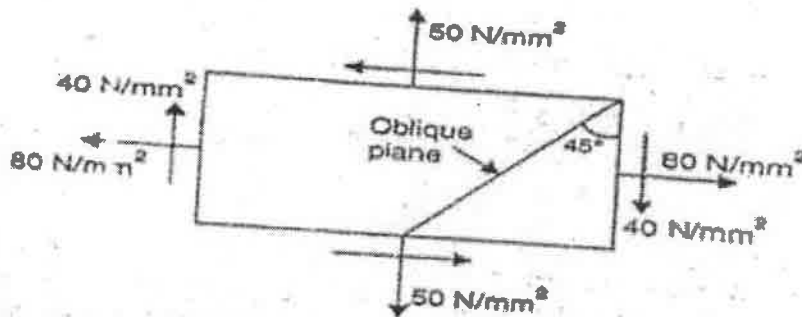
OR

15. B). Explain i) Maximum principal stress theory
ii) Maximum strain energy theory   10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations July/August-2024

Course Name: Fluid Mechanics

(Civil Engineering)

Date: 18.07.2024 AN	Time: 3 hours	Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks.   **10x2=20M**

1.	Outline the concept of Pascal's law.	2 M
2.	List various types of manometers.	2 M
3.	Define flow net and draw flow net.	2 M
4.	Classify various types of flow.	2 M
5.	Compare notch and weir.	2 M
6.	What are the limitations of Bernoulli's equation.	2 M
7.	Define boundary layer with a sketch.	2 M
8.	Interpret the concept of drag and lift forces.	2 M
9.	Define compound pipe and write its equation.	2 M
10.	Explain the characteristics of turbulent flow.	2 M

PART-B

Answer the following. Each question carries TEN Marks.   **5x10=50M**

11.A). i) Find the total pressure and centre of pressure on an isosceles triangular plate of base 4 m and altitude 4 m when it is immersed vertically in an oil of specific gravity 0.9. The base of the plate coincides with the free surface of oil.   **5M**

ii) Explain Bulk Modulus, compressibility and vapor pressure.   **5M**

OR

11. B). i) What is the statement of Pascal's law and derive it?   **5M**

ii) A vertical cylinder of diameter 180mm rotates concentrically inside another cylinder of diameter 181.2mm. Both the cylinders are of 300mm height. The space between the cylinders is filled with a liquid whose viscosity is unknown. Find the viscosity of the fluid if torque of 20N-m is required to rotate the inner cylinder at 120rpm.   **5M**

12. A). i) Explain law of conservation of mass and derive its associated equation in 3-D flow.   **5M**

ii) Determine the velocity potential function when the stream function for a two-dimensional flow is given by $\Psi = 2xy$, also calculate the velocity at the point P(2, 3).   **5M**

OR

12. B). Define stream line and potential line and show that they are perpendicular to each other.   **10M**

13. A). i) What is Venturi-meter and derive the equation of discharge for horizontal Venturi-meter.   **5M**

ii). A 45^0 reducing bend is connected in a pipe line, the diameters at the inlet and outlet of the bend being 600mm and 300mm respectively. Estimate the force exerted by water on the bend if the intensity of pressure at inlet to bend is 8.829 N/ cm^2 and rate of flow of water is 600 liters/sec.   **5M**

(P.T.O..)

13. B). Develop an equation of discharge through triangular notch. 10M

14. A). i) Explain the separation of boundary layer with a neat sketch. 5M
ii) Analyze displacement thickness and momentum thickness when velocity distribution 5M
is given by $u / U = (2 y / \delta) - (y^2 / \delta^2)$.

OR

14. B). i) List various characteristics of boundary layer over a flat plate. 5M
ii) Analyze the friction drag on a plate 15cm wide and 45cm long placed longitudinally in 5M
a stream of oil (specific gravity = 0.925 and kinematic viscosity of 0.9 stokes) flowing
with a free stream velocity of 6m/s. Also analyze the thickness of the boundary layer and
shear stress at the trailing edge.

15. A). i) Explain sudden contraction entry loss and exit losses of pipe concepts with diagrams. 5M
ii) Two pipes of diameter 50mm and 100mm each 100m long are connected in parallel 5M
between two reservoirs, which have a difference of water level of 10m. If the coefficient
of friction of each pipe is 0.008, Estimate the rate of flow for each pipe and also the
diameter of a single pipe 100m long to convey the same total discharge in place of two
pipes laid in parallel. Ignore minor losses.

OR

15. B). i). Develop the relation between maximum and mean velocity when laminar flow takes 5M
place in a horizontal circular pipe.
ii). Estimate the loss of head and power due to sudden enlargement of the horizontal pipe 5M
carrying water from a diameter of 240mm to 490mm. The flow is 0.4m³/s and pressure in
smaller pipe is 145kN/m². What is the pressure in larger pipe.

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations July/August-2024
Course Name: Surveying & Geomatics
(Civil Engineering)

| Date: 20.07.2024 AN | Time: 3 hours | Max.Marks: 70 |

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.   **10x2=20M**

1.	Define Surveying.	2 M
2.	Define Bearing	2 M
3.	What is meant by Bench mark?	2 M
4.	Define Contour.	2 M
5.	What are the different methods to determine the field area?	2 M
6.	Draw a Two level section for cutting.	2 M
7.	What is the difference between transit and non- transit?	2 M
8.	Define Traversing.	2 M
9.	What is the difference between tacheometer and theodolite?	2 M
10.	What is a simple curve?	2 M

PART-B
Answer the following. Each question carries TEN Marks.   **5x10=50M**

11.A). Explain briefly about Principles of surveying.   10M

OR

11. B). Determine the value of included angles in a closed compass traverse ABCD conducted in   10M
clockwise direction, given the following fore bearings of the respective lines.

Line	F.B.
AB	40^0
BC	70^0
CD	210^0
DA	280^0

12. A). The following consecutive readings were taken with a level and 4.0m staff on a   10M
continuously sloping ground at a common interval of 30m: 0.780, 1.535, 1.955, 2.430,
2.985, 3.480, 1.155, 1.960, 2.365, 3.640, 0.935, 1.045, 1.630 and 2.545.
The reduced level of the first point A was 180.750m. Calculate the reduced levels of the
points by the collimation system.

OR

12. B). Explain the characteristics of the contours with sketches.   10M

13. A). Derive Mid- ordinate and Trapezoidal rule for finding the area from the offsets.   10M

(P.T.O..)

OR

13. B). A railway embankment is 12m wide. The ground is level in a direction transverse to the centre line. Calculate the volume contained in a 100m length by trapezoidal rule and prismoidal rule, if the side slope is 1.5:1. The centre heights at 20m interval are 3.7m, 2.6m, 4.0m, 3.4m, 2.8m, 3.0m and 2.2m. **10M**

14. A). Explain briefly about temporary and permanent adjustments of a theodolite. **10M**

OR

14. B). Discuss briefly about Electronic theodolite. **10M**

15. A). What are the methods employed in tacheometric survey? Explain the method most commonly used. **10M**

OR

15. B). What are the types of curves? Explain the Elements of a simple curve. **10M**

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations July/August-2024
Course Name: Engineering Materials & Geology
(Civil Engineering)

Date: 23.07.2024 AN | Time: 3 hours | Max.Marks: 70

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.   10x2=20M

1.	Explain the process of blasting rocks.	2 M
2.	Write the importance of civil engineering.	2 M
3.	Extend a short notes on the following. a) Muscovite Scale of Hardness b) Calcite	2 M
4.	Write any two names of the sedimentary rocks.	2 M
5.	Identify different parts of faults with a neat sketch.	2 M
6.	Illustrate Hydrological Cycle.	2 M
7.	Explain the effects of earthquakes.	2 M
8.	Illustrate dam and reservoir with suitable diagram?	2 M
9.	Define over break and Lining in tunneling.	2 M
10.	Identify various types of tunnels.	2 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A).	Explain the failures of Civil engineering constructions in the past due to geological drawbacks.	10M

OR

11. B).	Explain briefly classification of bricks.	10M

12. A).	i) Explain the merits and demerits of various methods of mineral identification.	5M
	ii) Illustrate the structure of silicates with neat sketches.	5M

OR

12. B).	Summarize short notes on the following: i) Lava and Magma ii) Sills and dykes iii) Plutonic and volcanic rocks.	10M

13. A).	Develop short notes on the following: i) Folds ii) Faults iii) Unconformities iv) Joints	10M

OR

13. B).	Explain the classification of geophysical method.	10M

14. A).	Choose and explain the different geological considerations in the selection of a dam site.	10M

(P.T.O..)

OR

14. B). Identify various types of dams and bearing of geology of site in their selection.   10M

15. A). Summarize short note on: 10M
    (i) Tunnels in faulted strata
    (ii) Tunnels in folded strata
    (iii) Over break

OR

15. B). Explain the role of Geological considerations for the construction of tunnels in detail.   10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations July/August-2024
Course Name: Basic Electrical and Electronics Engineering
(Common for CE & ME)

Date: 25.07.2024 AN	Time: 3 hours	Max.Marks: 70

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks. 10x2=20M

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1.	List out the applications of network theorems.	2 M
2.	Define Ohm's law.	2 M
3.	What is the principle of DC motor?	2 M
4.	List out the applications of DC machines.	2 M
5.	What is the principle of transformer?	2 M
6.	List out the applications of induction motor.	2 M
7.	Explain about forward biasing of a diode.	2 M
8.	Draw the VI characteristics of a diode.	2 M
9.	Explain about sensitivity in CRO.	2 M
10.	What is the importance of CRO?	2 M

PART-B
Answer the following. Each question carries TEN Marks. 5x10=50M

11.A). Obtain the equivalent resistance between the terminals AB in the figure shown below. 10M
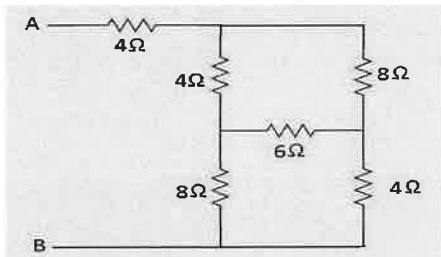
OR

11. B). State and explain maximum power transfer theorem. 10M

12. A). Elaborate the Operation of DC generator and derive its emf equation. 10M

OR

12. B). Derive the torque equation of DC motor. 10M

13. A). Derive the emf equation of a transformer. 10M

OR

13. B). Elaborate the calculation of regulation by synchronous impedance method in an alternator. 10M

14. A). Discuss full wave rectifier operation with a neat diagram. 10M

OR

14. B). Explain the SCR characteristics with neat diagram. 10M

15. A). Explain principle of operation of cathode ray oscilloscope with neat sketch. 10M

OR

15. B). Explain any two measurements of CRO in detail. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations July/August-2024
Course Name: Building Construction, Planning and Drawing
(Civil Engineering)

Date: 31.07.2024 AN   Time: 3 hours   Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.   10x2=20M

1.	What is meant by dressing of stones?	2 M
2.	Define the term tempering of bricks.	2 M
3.	Enumerate the characteristics of good paint.	2 M
4.	Explain the term shallow foundation.	2 M
5.	Define a residential building.	2 M
6.	What are the considerations to ensure proper ventilation in a house?	2 M
7.	What are the minimum standards for various rooms in a residential building?	2 M
8.	List the objectives of building byelaws.	2 M
9.	Define the terms: Rise and Thread of a stair.	2 M
10.	Classify different types of roof trusses.	2 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A). i) Explain in detail the causes of decay of wood and their preservation methods.   5M
ii) Describe the characteristics of a good building stone. State the uses of stone as a building material.   5M

OR

11. B). Draw a neat sketch of Flemish bond of one and half wall thickness up to two courses. Draw Plan, Elevation and section.   10M

12. A). i) Define Paint. What are the various functions of paint?   5M
ii) Elaborate in detail the various constituents of paint   5M

OR

12. B). Classify the various types of shallow foundations. Explain in detail Raft footing with neat sketch.   10M

13. A). Explain the building byelaws with reference to   10M
i) Open Space requirements
ii) Area limitations
iii) Height of buildings
iv) Wall thickness

(P.T.O..)

13. B). An isolated footing is to be provided for a column of section 400 mm x 400 mm. The 10M
following details are given:
Height of the column =3m
Main reinforcement in column = 4 Nos. 16 mm diameter.
Transverse reinforcement = 6 mm at 220 mm c/c
Plan size of footing = 2.7 m x 2.7 m
Depth of footing at column face = 500 mm
Depth of footing at edge = 150 mm
Depth of foundation = 1000 mm
Footing reinforcement = a mesh of 20 mm diameter steel at 200 mm c/c.
Grade of concrete= M20
Grade of steel = Fe 415
Draw to a suitable scale the following:
i) Plan   ii) Sectional Elevation.

14. A). Explain in detail the characteristics of various types of residential buildings. 10M

OR

14. B). Draw the Elevation of a residential building from the given line diagram. Assume suitable 10M
data wherever required.
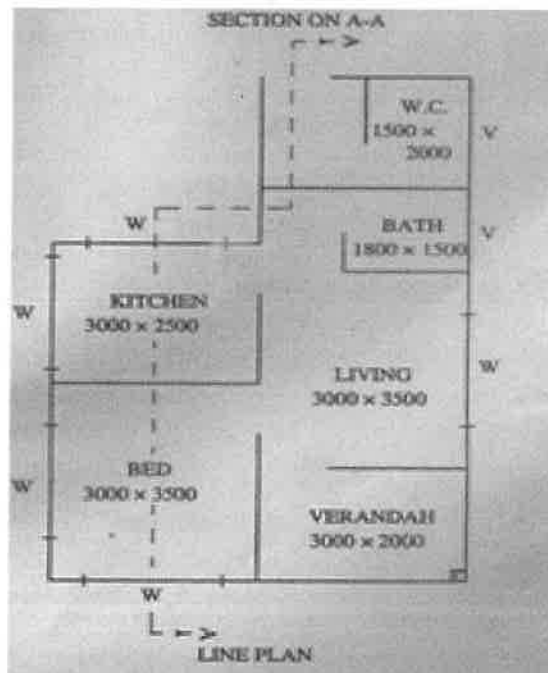
15. A). A dog legged stair case has to be provided for a public building with the staircase room 10M
size 2.6 m x 5.4 m (internal). The following details are given:
Vertical distance between the floors = 3.6 m
Waist slab thickness=160mm
Wall thickness =230
Main reinforcement= 12mm dia @ 120 mm c/c
Distribution steel = 8 mm dia @ 150 mm c/c
Grade of concrete used =M20
Grade of steel used =Fe415
Draw to a suitable scale the following
i) Plan of staircase ii) Sectional elevation of first flight.

OR

15. B). Distinguish between king post and queen post also draw with neat sketch (Assume scale 10M
relevant data).

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations July/August-2024
Course Name: Numerical Methods & Complex Variables
(Common for EEE & ECE)

Date: 15.07.2024 AN   Time: 3 hours   Max.Marks: 70

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.   **10x2=20M**

1.	State Change of Scale Property in Laplace transform.	2 M
2.	Find $L^{-1}\left\{\frac{1}{s^2+2s+3}\right\}$	2 M
3.	If $f(x)=x^3-x-4$ by using Bisection method find the first approximation.	2 M
4.	Prove $E^{1/2}=\mu+\frac{1}{2}\delta$	2 M
5.	$\frac{dy}{dx}=2x-y$, $y(1)=3$,using Picard's method find First approximation.	2 M
6.	Formula for Trapezoidal rule.	2 M
7.	Write C-R equations in Polar form.	2 M
8.	Is $u(x,y)=x^2-y^2$ is harmonic?	2 M
9.	Taylor's series of $sinhz$ at $z=0$	2 M
10.	State Maximum -Modulus theorem.	2 M

PART-B
Answer the following. Each question carries TEN Marks.   **5x10=50M**

11.A).
i) Find $L\left\{\int_0^t \frac{e^t sint}{t}\right\}$.   5M

ii) Solve the D.E using L.T method $(D^2+3D+2)x=e^{-t}$;   5M
$$x(0)=0, x'(0)=1 .$$

OR

11. B). Using Convolution theorem, Evaluate $L^{-1}\left\{\frac{s^2}{(s^2+9)(s^2+4)}\right\}$.   10M

12. A). Find the root of the equation $x\log_{10}x=1.2$ using Newton-Raphson method. Correct up to five decimals places.   10M

OR

12. B). i) Find the Interpolating polynomial $f(x)$ from the table   5M

x	0	1	4	5
f(x)	4	3	24	39

ii) Find $f(2.5)$ using Newton's formula from the table   5M

x	0	1	2	3	4	5
y	0	1	16	81	256	625

(P.T.O..)

13. A). i) Using Simpson's 3/8th rule, Evaluate $\int_0^6 \frac{dx}{1+x^2}$. 5M

ii) Using R-K method of order 4, compute $y(2.5)$ for the equation $\frac{dy}{dx} = \frac{x+y}{x}$, $y(2) = 2$, taking $h = 0.5$ 5M

<div align="center">OR</div>

13. B). Given $\frac{dy}{dx} = \frac{y-x}{y+x}$, $y(0) = 1$.Compute $y(0.8)$ in steps of 0.02 using Modified Euler's method. 10M

14. A). Show that the function $u(x,y) = e^{x^2-y^2}cos2xy$ is harmonic. Construct the corresponding analytic function $f(z) = u + iv$ interms of z. 10M

<div align="center">OR</div>

14. B). i) Determine $'p'$ such that the function $f(z) = \frac{1}{2}log(x^2 + y^2) + itan^{-1}\left(\frac{px}{y}\right)$, be an analytic function. 5M

ii) Find all the values of z which satisfy $sinz = 2$ 5M

15. A). i) Evaluate $\int(2y + x^2)dx + (3x - y)dy$ along the parabola $x = 2t$, $y = t^2 + 3$ joining from (0,3) &(2,4). 5M

ii) Expand $f(z) = \frac{z-1}{z^2}$ in a Taylor's series about in powers of $(z - 1)$. 5M

<div align="center">OR</div>

15. B). Find the Laurent expansion of $f(z) = \frac{1}{z^2-4z+3}$ in the range $1 < |z| < 3$. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations July/August-2024
Course Name: Network Theory-I
(Electrical & Electronics Engineering)

Date: 18.07.2024 AN	Time: 3 hours	Max.Marks: 70

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.   10x2=20M

1. Show equivalent current source using source transformation.   2 M
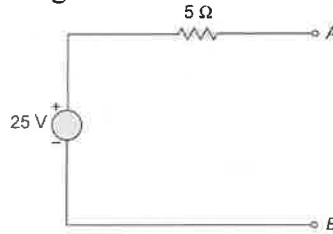
2. Explain voltage division principle.   2 M
3. What is meant by phase difference?   2 M
4. illustrate Power triangle.   2 M
5. Write the relation between Band width, quality factor and resonant frequency.   2 M
6. Outline the formula for equivalent inductance, when the two coils are connected in series magnetically.   2 M
7. Define twig & link.   2 M
8. What is meant by Co-Tree?   2 M
9. Interpret maximum power transfer theorem.   2 M
10. Explain millman's theorem.   2 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A). Apply mesh analysis to determine mesh currents.   10M
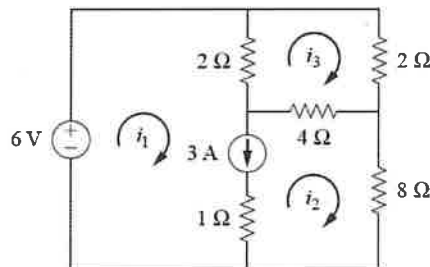
OR

11. B). Simplify equivalent resistance across the terminals A & B.   10M
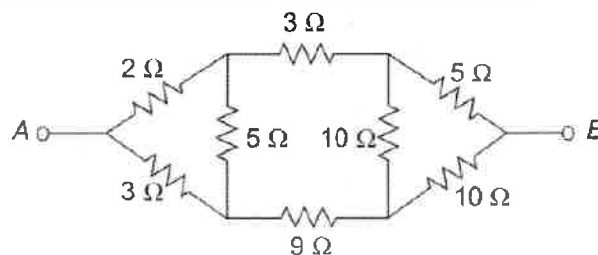
(P.T.O..)

12. A). Determine the rms value, average value, form factor and peak factor of the current 10M
waveform shown in Fig.
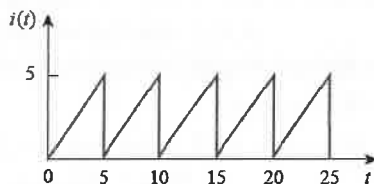
OR

12. B). The voltage across a load is $v(t) = 60 \cos (\omega t - 10^0)$ V and the current through the element 10M
in the direction of the voltage drop is $i(t) = 1.5 \cos (\omega t + 50^0)$ A. Determine a) the
complex power and apparent powers b) real and reactive powers c) the power factor and
the load impedance d) resistance and reactance values.

13. A). Define i) self-inductance ii) mutual inductance iii) coefficient of coupling. And Develop 10M
the Expression for coefficient coupling between pair of magnetically coupled coils.

OR

13. B). Develop an expression for resonant frequency of a series RLC circuit. For series RLC 10M
circuit with $v(t) = 110 \cos(50t)$, R = 1 KΩ L = 100 mH C = 0.1µF determine the
resonant frequency, half power frequencies, band width ,Q-factor.

14. A). Clearly explain Duality and Dual network. Illustrate the procedure for drawing the dual of 10M
a network with an example.

OR

14. B). Describe the cut-set matrix and analyze the basic cut-set matrix for the oriented graph 10M
given in figure. Where the elements 1, 2, 3 and 4 are tree branches.
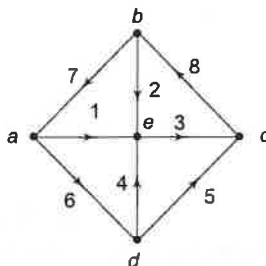
15. A). For the circuit shown in figure, Apply superposition theorem to determine current i. 10M
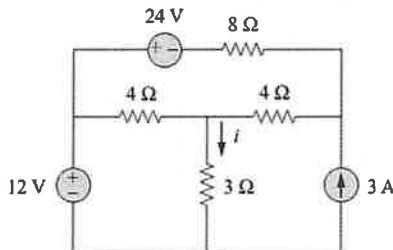
OR

15. B). Simplify Thevenin's equivalent circuit across the terminals a-b. Then find current through 10M
R_L if $R_L = 6$ Ω, 16 Ω and 36 Ω.
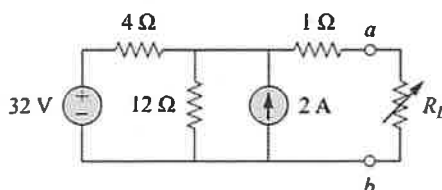
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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations July/August-2024
Course Name: Electromagnetic Fields
(Electrical & Electronics Engineering)

Date: 20.07.2024 AN   Time: 3 hours   Max.Marks: 70

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.   **10x2=20M**

1. What is the physical significance of divergence of a vector field?   2 M
2. What are the properties of a conductor?   2 M
3. Outline Coulomb's Law and mention its limitations   2 M
4. Construct Laplace's equation in cylindrical coordinates.   2 M
5. Illustrate Ohms Law in Point Form.   2 M
6. Compare between Laplace and Poisson equation.   2 M
7. Differentiate between conduction current and displacement current.   2 M
8. Illustrate Ampere's Circuital Law.   2 M
9. Develop the Maxwell's equation in free space.   2 M
10. Outline Faraday Law.   2 M

PART-B
Answer the following. Each question carries TEN Marks.   **5x10=50M**

11.A). Demonstrate the gradient, divergence and curl theorems along with their implications.   10M

OR

11. B). Determine the divergence for the function $F = xya_x + 2yza_y + 3zxa_z$.   10M

12. A). State Coulomb's law. Four like charges of $30\mu C$ each are located at the four corners of a square, the diagonal measures 8m. Find the force on a $100\mu C$ located 3m above the center of the square.   10M

OR

12. B). State and explain the Gauss law. Applying the Gauss law, find out the field intensity due to an infinite plane sheet charge.   10M

13. A). Derive the expression for capacitance of a spherical capacitor   10M

OR

13. B). What are the boundary conditions. Explain the boundary condition between two dielectric media.   10M

14. A). What is Lorentz force equation? Derive the equation for force acting on a moving charge due to electric and magnetic fields.   10M

OR

14. B). State and explain the Biot - savart law and derive the expression for magnetic field intensity due to surface currents.   10M

(P.T.O..)

15. A). Write Maxwell's equations for time varying fields and make their word statements. 10M

OR

15. B). In a material for which $\sigma = 5$ S/m and $\varepsilon r = 1.0$, the electric field intensity, is given by $E = 250$ Sin 10^{10} t V/m. Find the conduction and displacement current densities? 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations July/August-2024
Course Name: Fluid Mechanics & Hydraulic Machinery
(Electrical & Electronics Engineering)

Date: 23.07.2024 AN   Time: 3 hours   Max.Marks: 70

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.   10x2=20M

1.	Define Pressure and writes its units.	2 M
2.	Describe the relationship between the absolute, gauge and vacuum pressure.	2 M
3.	What is meant by stream line of fluid flow and writes its equation?	2 M
4.	Write the equation to find the flow rate through orifice meter?	2 M
5.	Distinguish between the HGL and TEL.	2 M
6.	Designate the characteristics of the boundary layer of the fluid flow.	2 M
7.	Elaborate the importance of the draft tube in the turbine.	2 M
8.	Differentiate between the impulse and rection turbine.	2 M
9.	What is the uses of specific quantities?	2 M
10.	Define the slip of the reciprocating pump and write its equation.	2 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A). How do you measure the fluid Pressure? Explain the working of a U-tube differential manometer.   10M

OR

11. B). The dynamic viscosity of an oil, used for lubrication between a shaft and sleeve is 6 poise. The shaft is of diameter 0.4m and rotates at 190 rpm. Calculate the power lost in the bearing for a sleeve length of 90 mm. The thickness of the oil film is 1.5mm.   10M

12. A). Derive the equation for discharge through an orifice meter with a neat sketch.   10M

OR

12. B). Derive the continuity equation for one dimensional flow.   10M

13. A). The difference in water surface levels in two tanks, which are connected by three pipes in series of length 300 m, 170m and 210m and of diameters 300mm, 200mm and 400mm respectively, is 12 m. Determine the rate of flow of water if co-efficient of friction are 0.005, 0.0052 and 0.0048 respectively, considering (i) minor losses (ii) neglecting minor losses.   10M

OR

13. B). Define the terms (i) Boundary layer (ii) Laminar boundary layer (iii) Turbulent boundary layer (iv) Laminar sub layer.   10M

14. A). Estimate the work done in flow over radial vanes with help of velocity triangles.   10M

(P.T.O..)

14. B). A jet of water of diameter 85 mm moving with a velocity of 35 m/s strikes a fixed plate in   10M
          such a way that the angle between the jet and plate is 450. Find the force exerted by the jet
          on the plate (i) in the direction normal to the plate and (ii) in the direction of the jet.

15. A). Explain in detail the design of Franci's turbine with help of velocity triangles.   10M

OR

15. B). What is a drat tube? Write down the draft tube theory with help of neat sketch?   10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations July/August-2024
Course Name: Electronic Devices & Circuits
(Common for EEE & ECE)

Date: 25.07.2024 AN   Time: 3 hours   Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.   10x2=20M

1.	What is the effect of temperature on PN junction diode?	2 M
2.	What is a photo diode? Draw the symbol and mention its applications.	2 M
3.	What is a filter? Draw the circuit diagram of a pi section filter.	2 M
4.	What is the ripple factor? Specify the ripple factor for HWR and FWR?	2 M
5.	What is UJT? Mention the applications of UJT?	2 M
6.	Draw the input and output characteristics of a CE configured BJT.	2 M
7.	Define stability factor.	2 M
8.	What is thermal run away in BJT?	2 M
9.	What are the differences between pMOS and nMOS devices?	2 M
10.	Define pinch off voltage.	2 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A).	Derive the current equation of PN junction diode.	10M
	OR	
11. B).	Explain tunneling in a tunnel diode with the help of an energy band diagram.	10M
12. A).	Define rectification. Explain the operation of bridge rectifier with neat sketch.	10M
	OR	
12. B).	Explain the working of i) inductor filter ii) capacitor filter.	10M
13. A).	Explain the working of CE BJT and current components in it with neat sketch.	10M
	OR	
13. B).	Derive and explain the h parameter analysis of a CB BJT.	10M
14. A).	Explain i) Q point, ii) AC load line and iii) DC load line.	10M
	OR	
14. B).	Explain i) stability and stabilization factor.	4M
	ii) voltage divider bias.	6M
15. A).	Explain i) the biasing concept in a FET.	5M
	ii) CS amplifier with neat sketch.	5M
	OR	
15. B).	Explain the regions of operation of a MOSFET by discussing the characteristics.	10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations July/August-2024

Course Name: Electrical Machines-I

(Electrical & Electronics Engineering)

Date: 31.07.2024 AN   Time: 3 hours   Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks.   **10x2=20M**

1. Why most practical energy conversion devices use magnetic field as the coupling medium between electrical and mechanical systems? — 2 M
2. Discuss briefly the principle of energy conversion. — 2 M
3. List out the advantages of multiplex windings. — 2 M
4. Define armature reaction and list out the effects of it. — 2 M
5. Define critical speed of DC machine. — 2 M
6. Explain the additional protection in 3-point starter in addition to limiting high inrush currents. — 2 M
7. Explain why parallel operation of transformer is necessary. — 2 M
8. Why is the core of a transformer laminated? — 2 M
9. What are the uses of Scott connection? — 2 M
10. What are the features of on load tap changers? — 2 M

PART-B

Answer the following. Each question carries TEN Marks.   **5x10=50M**

11.A). Derive expressions of field energy, co energy and magnetic force in a singly excited electromechanical unit. — 10M

OR

11. B). For a doubly excited magnetic system, derive the expression for the magnetic energy stored. — 10M

12. A). Derive the expression for demagnetizing Armature Ampere Turns per pole of DC Machine. — 10M

OR

12. B). Derive the e.m.f equation of DC machine with fundamentals. — 10M

13. A). Describe the brake test on DC motor to determine the performance characteristics of DC motor. — 10M

OR

13. B). A dc shunt generator has the following open circuit magnetization curve running at 800 rpm — 10M

Field current (A) : 0   0.5   1.0   2.0   3.0   4.0   5.0
EMF (V)   : 10   50   100   175   220   245   262

Find graphically the critical resistance of shunt field circuit. If the field resistance is changed to 75 ohms, what will be the critical speed for the machine to build up.

(P.T.O..)

14. A). With the help of neat sketch, explain in detail about parallel operation of single phase   10M
transformers.

OR

14. B). What is voltage regulation of a transformer? Derive the conditions for maximum and zero   10M
voltage regulation in a transformer.

15. A). Explain the operation of auto transformer with neat sketch. Explain effect of non-linear B-   10M
H curve of magnetic core material of auto Transformer.

OR

15. B). A balanced 3-phase, 100 kW load at 400V and 0.8 p.f. lag is to be obtained from a   10M
balanced 2-phase, 1100V lines. Determine the kVA rating of each unit of the Scott-
connected transformer.

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations July/August-2024
Course Name: **Materials Engineering**
(Mechanical Engineering)

Date: 15.07.2024 AN	Time: 3 hours	Max.Marks: 70

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.   **10x2=20M**

1.	Illustrate unit cell.	2 M
2.	What is the significance of Young's Modulus in terms of material property?	2 M
3.	Differentiate the ductility and brittle nature of materials.	2 M
4.	Mention the advantages of non-destructive testing.	2 M
5.	What is leduburite?	2 M
6.	Mention the objectives of the phase diagram.	2 M
7.	What is the importance of recrystallization temperature in the heat treatment of materials?	2 M
8.	Describe the objectives of microstructure.	2 M
9.	List out the applications of Al alloys.	2 M
10.	Describe the applications of metal matrix composites.	2 M

PART-B
Answer the following. Each question carries TEN Marks.   **5x10=50M**

11.A).	Draw and mention the salient features of stress–strain diagram for engineering applications. Brief out.	10M
	OR	
11. B).	Illustrate the working principle of the Rockwell hardness test.	10M
12. A).	Mention the effects of mean stress using a modified Goodman diagram.	10M
	OR	
12. B).	Brief out non-destructive testing methods and their applications.	10M
13. A).	Define phase and Construct the phase diagram for two metals completely soluble in a liquid state and partially insoluble in a solid state.	10M
	OR	
13. B).	Illustrate the structural changes that occur when a eutectic alloy is cooled from liquid state to room temperature.	10M
14. A).	Examine the mechanisms of recovery, recrystallization, and grain growth in materials.	10M
	OR	
14. B).	What is carburizing? Describe its advantages and limitations.	10M
15. A).	What is the effect of carbon percentage in steel? Explain.	10M
	OR	
15. B).	Explain the properties of Nickel based super alloys and Titanium Alloys.	10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations July/August-2024
Course Name: Thermodynamics
(Mechanical Engineering)

Date: 18.07.2024 AN   Time: 3 hours   Max.Marks: 70

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.   **10x2=20M**

1.	Define the thermometric property.	2 M
2.	What do you understand by classical and statistical approach of thermodynamics?	2 M
3.	Differentiate between the work transfer and heat transfer.	2 M
4.	List the various thermodynamic process	2 M
5.	Write the Kelvin-Planck statement of second law of thermodynamics.	2 M
6.	Write the equation for Helmholtz and Gibbs function.	2 M
7.	Compare the critical point and triple point?	2 M
8.	Label the Maxwell relations.	2 M
9.	Outline the P-V and T-S diagram of Lenoir cycle.	2 M
10.	Compare Otto, Diesel and Dual cycle for the same maximum pressure and Temperature.	2 M

PART-B
Answer the following. Each question carries TEN Marks.   **5x10=50M**

11.A). i) Explain the concept of ideal gas temperature scale.   5M

ii) A milk chilling unit can remove heat from the milk at a rate of 41.87 MJ/h. Heat leaking into milk from surroundings at an average rate of 4.187 MJ/h. Find the time required for cooling a batch of 500 kg of milk from 45^0C to 5^0C. Take the C_P of milk to be 4.187 kJ/kg K.   5M

OR

11. B). i) Explain what do you understand by concept of continuum? How will you define density and pressure using this concept?   5M

ii) A balloon is filled with air (200kPa and 300K) such that it becomes as sphere of diameter 1m. It is then gradually heated till the pressure rises to 500 kPa. Determine the amount of work done during the process, assuming that the pressure inside the balloon is proportional to the diameter of the balloon.   5M

12. A). i) Give the differential form of S.F.E.E. Under what condition the S.F.E.E. does reduces to Euler's equation.   5M

ii) A mass of 8 kg gas expands in a flexible container so that the p-v relationship is in the form of $pv^{1.2}$=const. the initial pressure is 1000 kPa and the initial volume is 1 m^3. The final pressure is 5 kPa. If the specific internal energy of the gas is decreases by 40 kJ/kg, find the heat transfer in magnitude and direction.   5M

(P.T.O..)

OR

12. B). i) Discuss about first law of thermodynamics.   5M

ii) A system consists of a cylinder and piston in engine. The external normal load applied   5M
to the piston is given by F= (-150+100x) KN. Where x is the distance (meter) from the
closed end of the cylinder to the piston. Compute how much work is achieved when the
piston moves from the positions x = 2 to x = 4meter.

13. A). i) Prove that the COP of the reversible refrigerator operating between two given   5M
temperatures is the maximum.

ii) Water is heated at a constant pressure of 0.7 MPa. The boiling point is 164.97^0 C. The   5M
initial temperature of water is 0^0 C. The latent heat of evaporation is 2066.3kJ/kg.
Analyze the increase of entropy of water if the final temperature is steam.

OR

13. B). i) Discuss the significance of Second law of thermodynamics.   5M

ii) A heat pump working on a reversed Carnot cycle takes in energy from a reservoir   5M
maintained at 3^0C and delivers it to another reservoir where temperature is 77^0C. The heat
pump drives power for its operation from a reversible engine operating within the higher
and lower temperature limits of 1077^0C and 77^0C. For 100 kJ/sec of energy supplied to
the reservoir at 77^0C, estimate the energy taken from the reservoir at 1077^0C.

14. A). i) Steam initially at 0.3 MPa, 250^0C is cooled at constant volume. a) At what temperature   5M
will steam become superheated vapour? b) What is the quality of steam at 80^0C?
c) What is the heat transferred per kg of steam in cooling from 250^0C to 80^0C.

ii) Prove that the equation $C_p - C_v = R$ 5M

OR

14. B). i) What do you understand by triple point? Give the pressure and Temperature of water at   5M
its triple point.

ii) Water at 40^0C is continuously sprayed into a pipeline carrying 5 tonnes of steam at 5   5M
bar, 300^0C per hour. At a section downstream where the pressure is 3 bar, the quality is to
be 95%. Find the rate of water spray in kg/hr.

15. A). i) Draw the variation of thermal efficiency against compression ratio of an Otto-cycle.   5M

ii) An air standard diesel cycle has a compression ratio of 17. The Pressure at the   5M
beginning of compression stroke is 1bar and the temperature is 23^0C. The maximum
temperature is 1430^0C. Determine the thermal efficiency and the mean effective pressure
for this cycle. Take $\gamma = 1.4$.

OR

15. B). i) Derive an expression for air standard efficiency of Otto cycle in standard form.   5M

ii) Define mean effective pressure and thermal efficiency of an air standard cycle.   5M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations July/August-2024
Course Name: Mechanics of Solids
(Mechanical Engineering)

Date: 20.07.2024 AN	Time: 3 hours	Max.Marks: 70

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.   **10x2=20M**

1. Define Young's modulus of elasticity and Poisson's ratio.   2 M
2. An element in a strained material is subjected to pure shear stress of 60MPa. Determine the   2 M
    principal stresses and planes.
3. Define the point of contra flexure and section modulus.   2 M
4. Sketch the distribution of shear stress across the depth of a circular section of a beam of   2 M
    diameter 60mm and subjected to a Shear Force of 80kN at a section.
5. A cantilever carries a UDL over the entire span of 2m. If the slope at the free end is 1.5^0, find   2 M
    the deflection at the free end. Take EI= 20×10^6 N-mm^2.
6. State and Maxwell's reciprocal theorem.   2 M
7. Differentiate between flexural and torsional stiffnesses.   2 M
8. Determine the angle of twist of shafts in series.   2 M
9. Explain the necessary difference of radii for shrinkage.   2 M
10. Differentiate between thin and thick cylinders.   2 M

PART-B
Answer the following. Each question carries TEN Marks.   **5x10=50M**

11.A). The stepped bar shown in Fig.1 is made up of two different materials. The material 1 has   10M
        Young's modulus as 200GPa, while that of material 2 is 100GPa. Find the extension of
        the bar under a pull of 30kN. If both portions are 20mm in thickness.

Fig. 1
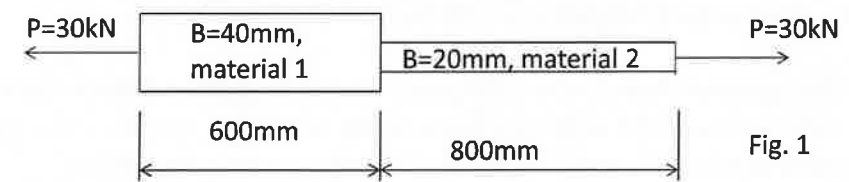
OR

11. B). At a point P in a machine element, the rectangular stress components are σ_x=30MPa,   10M
         σ_y=10MPa and τ_{xy}=20MPa. Determine the principal stresses, the principal planes and the
         principal shear. Indicate them on a properly oriented element.

12. A). Draw BMD and SFD for the beam shown in Fig. 2.   10M

Fig. 2.

(P.T.O..)
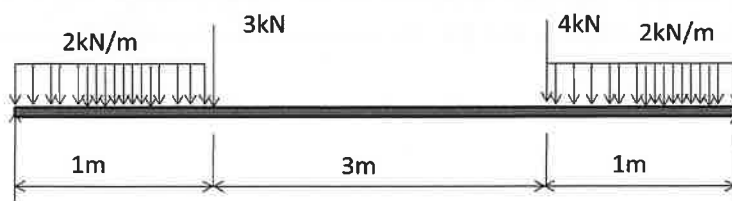
12. B). A beam of span 'L' meters simply supported at the ends carries a central load W. the   10M
beam section has an overall depth of 290mm with horizontal flanges each 150mmx 20mm
and vertical web 250mm x 10mm. if the maximum shear stress is to be 45MPa and the
maximum bending stress is 150MPa. Find the value of the centrally applied point load
'W' and the span 'L'.

13. A). A simply supported beam of 10m carries a UDL of 20kN/m as shown in Fig 3. Determine   10M
the maximum deflection of the beam. Take EI constant.

20kN/m

3m   3m

A   4m   B
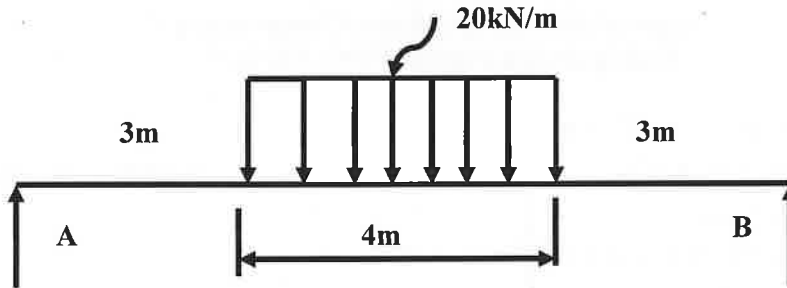
Fig.3

OR

13. B). A simply supported beam of a span of 8 m carries two concentrated loads of 100N and   10M
150KN at a distance of 2 m and 5 m from left-hand support respectively. Given
E = 200GPa; I = 18x 10^{6}mm^8. Calculate the deflection under each load, the maximum
deflection and its location.

14. A). Determine the power transmitted by a solid shaft of 100 mm diameter at 150 r.p.m., the   10M
maximum shear stress is not to exceed 80MPa. The maximum torque is 30% more than its
mean value. If this shaft is replaced by a hollow shaft of the same weight with an outer
diameter to inner diameter ratio of 0.6. What will be the percentage increase in the power
transmitted by this hollow shaft?

OR

14. B). Determine the diameter of a solid shaft which will transmit 150 kW at 200 RPM. Also,   10M
determine the length of the shaft if the twist must not exceed 1.5^0 over the entire length.
The maximum shear stress is limited to 75 MPA, Take G = 85 GPa.

15. A). A pipe of 400mm internal diameter and 100mm thickness contains a fluid at a pressure of   10M
8MPa. Find the maximum and minimum hoop stress across the section. Also, construct
the radial pressure distribution and hoop stress distribution across the section.

OR

15. B). A cylinder with an external diameter of 300 mm and an internal diameter of 200 mm is   10M
subjected to an internal pressure of 25 MPa. Compare the relative merits of a single thick-
walled cylinder and a composite cylinder with the inner cylinder whose internal and
external diameters are 200 mm and 250 mm respectively. A tube of 250 mm internal
diameter and 300 mm external diameter is shrunk on the main cylinder. The safe tensile
yield stress of the material is 110 MPa and the stress setup at the junction due to shrinkage
should not exceed 10 MPa.

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations July/August-2024
Course Name: Machine Drawing
(Mechanical Engineering)
Date: 23.07.2024 AN   Time: 3 hours   Max.Marks: 60

(Note: Assume suitable data if necessary)
PART-A
Answer any TWO questions (Compulsory)
**Each question carries FIVE marks.**   **2x5=10M**

1. The figure (a) shows the isometric view of shaft support. Draw its Sectional view from the front, the view from above, and the view from the right. Assume the section planes at the centre of the part.   5 M
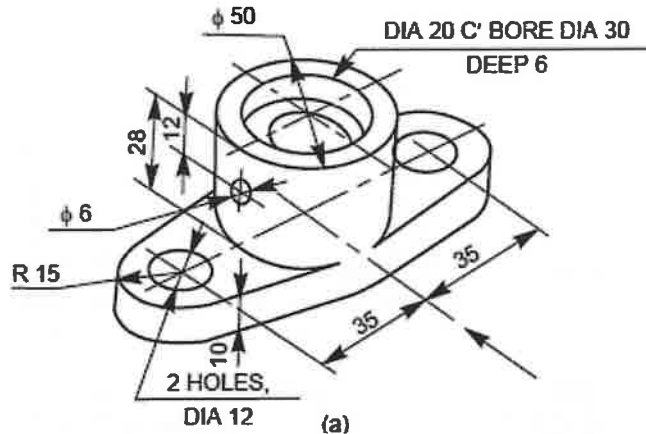
2. Sketch the following thread profiles for a nominal diameter of 25 mm and pitch 3 mm and give their applications: 5 M
   (a) Buttress thread (b) Square thread

3. Sketch the following types of keys in two views, fitted in position between a shaft and the mounting. Choose the shaft diameter as 30 mm and the hub diameter of the mounting as 60 mm: (a) flat saddle key, (b) taper sunk key.   5 M

4. Sketch the required views, indicating the proportions of a solid flange coupling used in marine engines to connect two shafts, each with a diameter of 60 mm.   5 M

5. Draw (a) half sectional view from the front, with left half in section, suitable for supporting a shaft of diameter 25mm.   5 M

(P.T.O..)

6. The details of the stuffing box for a vertical steam engine are given in Figure. Assemble the parts and draw: (i). Front view right half in section. (ii). Half-sectional side view. (iii). Top view.   50M

Parts list

Part No.	Name	Matl	Qty
1	Body	CI	1
2	Gland	Brass	1
3	Bush	Brass	1
4	Stud	MS	2
5	Nut, M12	MS	2
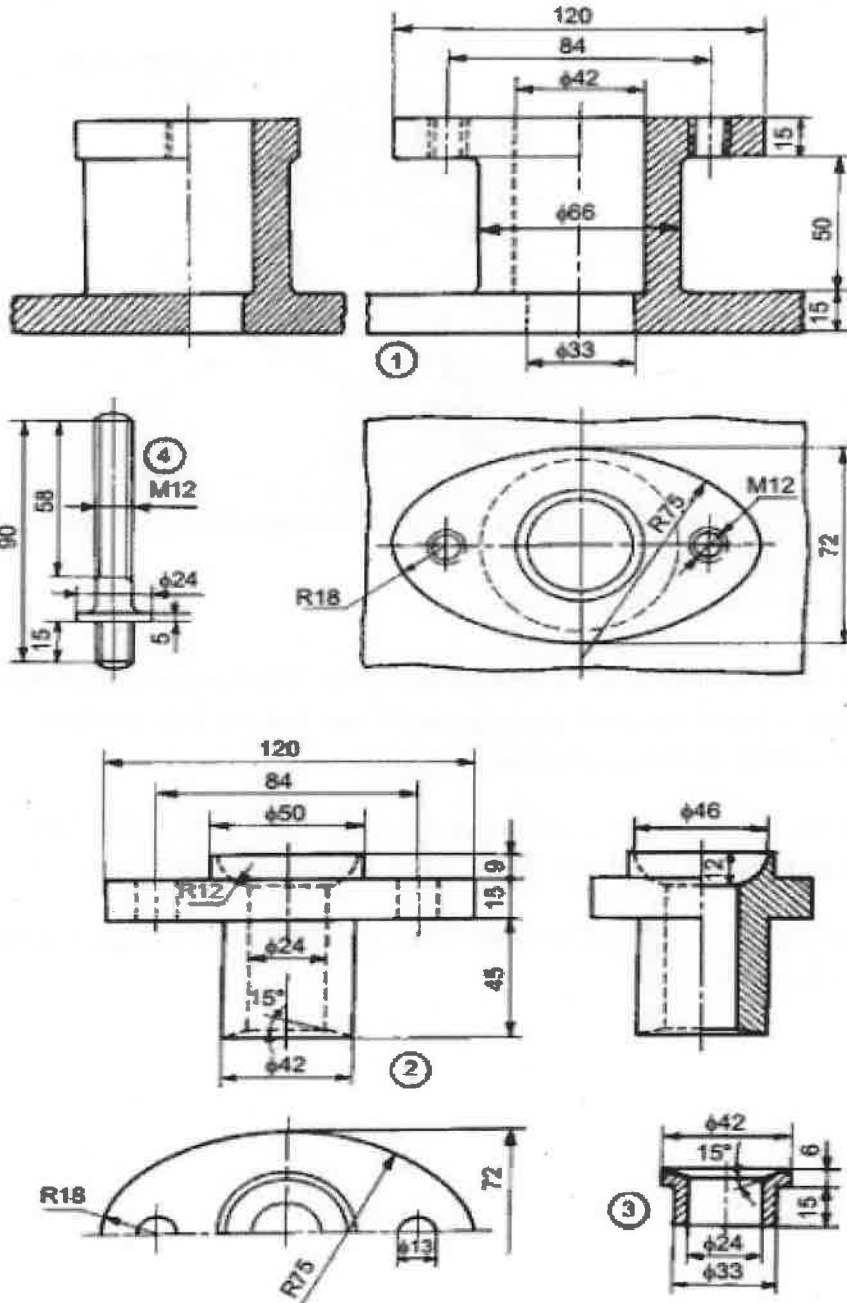
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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations July/August-2024
Course Name: Electrical Engineering
(Electronics & Communication Engineering)

Date: 18.07.2024 AN	Time: 3 hours	Max.Marks: 70

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.   10x2=20M

1.	List the difference between ideal and practical sources.	2 M
2.	Three equal Resistors of 1ohm are connected in star fashion calculate the equivalent delta network parameters.	2 M
3.	List the significance of 'j' operator and their properties.	2 M
4.	Define Form factor and peak factor.	2 M
5.	Calculate the Inverses Laplace transform for G(s) $=\frac{s+2}{s(s-1)}$ using partial transforms.	2 M
6.	Define Time constant and formulas for RL and RC circuits.	2 M
7.	List the Total losses associated with practical transformer.	2 M
8.	What is the principle of Transformer?	2 M
9.	List the significance of pole shoes and yoke.	2 M
10.	Define synchronous speed in synchronous motor.	2 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A). Calculate the loop currents in the circuit shown below.   10M
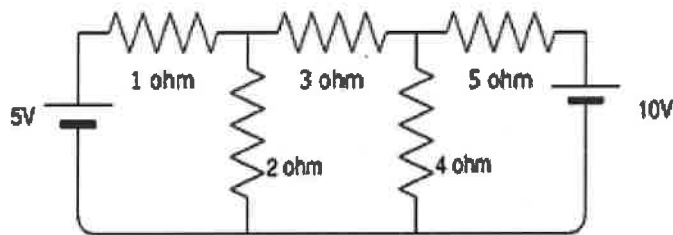
OR

11. B). Apply Thevenin's theorem to calculate the current through R_L in the network shown below.   10M
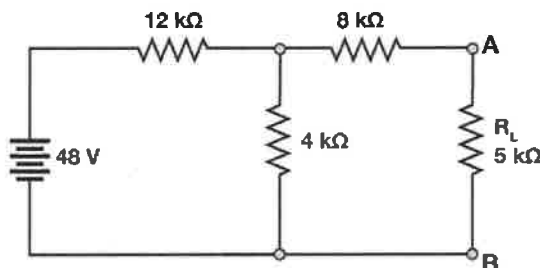
(P.T.O..)

12. A). A sinusoidal voltage of 200V, 50Hz supply is connected to series network comprising of Z1=10+j5 ohms and Z2= 5-2j ohms. Calculate the following i) Total impedance ii) Current   iii) Phase difference   iv) Power factor.   10M

OR

12. B). A series RLC circuit under resonance contains R=0.1ohm, L=1mH and C=1pF connected to a function generator of 100V, calculate the following i) Resonance frequency ii) Current at resonance   iii) Net admittance   iv) quality factor.   10M

13. A). Derive the transient response of series RL circuits.   10M

OR

13. B). Derive the following Two port parameters for the circuit shown below i) ABCD parameters ii) hybrid parameters   10M
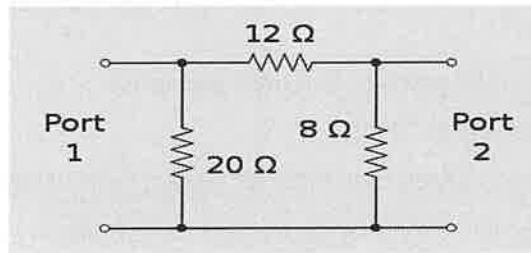
14. A). Elaborate the procedure to obtain the equivalent circuit diagram of Transformer.   10M

OR

14. B). Derive the EMF equation of Transformer from basics.   10M

15. A). Elaborate the construction and operating principle of DC generator.   10M

OR

15. B). Explain the operating principle of Synchronous generator.   10M

✶✶✶✶✶

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations July/August-2024
Course Name: Probability & Stochastic Processes
(Electronics & Communication Engineering)

Date: 20.07.2024 AN	Time: 3 hours	Max.Marks: 70

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions (Compulsory)
**Each question carries TWO marks.**   10x2=20M

1. List out the properties of probability.   2 M
2. Mention the laws of Sets.   2 M
3. Mention the Gaussian density function and distribution function of a random variable X.   2 M
4. Define variance.   2 M
5. Define covariance of two random variables.   2 M
6. Sate the Central Limit Theorem.   2 M
7. Define wide sense stationary process.   2 M
8. State the Ergodic theorem and Ergodic processes.   2 M
9. Define cross power density spectrum of two real random processes.   2 M
10. Find out the cross correlation function for the psd $S_{XY}(\omega) = \dfrac{1}{25 + \omega^2}$ 2 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A). i) State and analyze the Baye's theorem with necessary proof.   5M
        ii) Two boxes are selected randomly. The first box contains 2 white balls and 3 black   5M
        balls. Second box contains 3 white and black balls. What is the probability of drawing a
        white ball.

OR

11. B). i) A pack contains 4 white and 2 green pencils, another contains 3 white and 5 green   5M
        pencils. If one pencil is drawn from each pack. Find the probability that:
        (a) Both are white
        (b) One is white and another is green
        ii) Determine the probability of the card being either a red or a king when one card is   5M
        drawn from a regular deck of 52 cards

12. A). i) List out the properties of Conditional Distribution Function.   6M
        ii) Find the value of 'K' for a valid probability density of a random variable is given by   4M
        $f_x(x) = K(1 - x^2)$ $0 < x < 1$

(P.T.O..)

OR

12. B). If X be a discrete random variable with probability mass function is given as   10M

X	-2	-1	0	1	2
$P(X)$	$\dfrac{1}{5}$	$\dfrac{2}{5}$	$\dfrac{1}{10}$	$\dfrac{1}{10}$	$\dfrac{1}{5}$

Find (i). $E[X]$ (ii). $E[2X+3]$

     (iii). $E[X^2]$ and (iv). $E[(2X+1)^2]$

13. A). The valid joint probability density function is given as   10M

$f_{xy}(x,y) = A\, e^{-(2x+y)}$ *for* $x \geq 0$ *and* $y \geq 0$

Find (a) the value of A and (b) the marginal density function

OR

13. B). The joint density function of X and Y is   10M

$$f_{xy}(x,y) = \begin{cases} \dfrac{1}{100} & 0 < x < 5, \qquad o < y < 20 \\ 0 & \text{else where} \end{cases}$$

Find the expected value of the functions

$X\,Y$ (b) $X^2\,Y$ (c) $(X\,Y)^2$

14. A). Prove that the random process $X(t) = A\cos(\omega_c t + \theta)$ is wide sence stationary if it is   10M
assumed that ω_c is a constant and Θ is uniformly distributed variable in the interval
$(0, 2\pi)$.

OR

14. B). The autocorrelation function of a stationary random process X(t) is given by   10M
$R_{XX}(\tau) = 36 + \dfrac{16}{1 + 8\tau^2}$. Find mean, mean square and variance of the process.

15. A). Determine which of the following functions are valid power density spectrums and why?   10M

(i). $\dfrac{\cos 8(\omega)}{2+\omega^4}$ (ii). $e^{-(\omega-1)^2}$ (iii). $\dfrac{\omega^2}{\omega^6 + 3\omega^2 + 3}$

OR

15. B). The autocorrelation function of a WSS random process is $R_{XX}(\tau)\ a\ \exp(-(\tau/b)^2)$. Find   10M
the power spectral density and normalized average power of signal.

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations July/August-2024
Course Name: Switching Theory & Logic Design
(Electronics & Communication Engineering)

Date: 23.07.2024 AN   Time: 3 hours   Max.Marks: 70

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.   **10x2=20M**

1. Implement a two-input OR gate using NAND gates only.   2 M
2. If $\sqrt{41} = 5$, find the radix (base) of the number system.   2 M
3. a) Define prime implicant.   2 M
   b) The code used for labelling the cells of the K–map is_____
4. A programmable logic array has n = 8 inputs, k = 20 product terms, and m = 100 outputs.   2 M
   What is the number of fuses to be programmed?
5. A J-K flip-flop is invariably used in a master-slave configuration. Why?   2 M
6. Give the transition table for the D flip-flop.   2 M
7. Define finite state machine.   2 M
8. What is the basic difference between synchronous and asynchronous circuits?   2 M
9. List out the limitations of finite state machines.   2 M
10. Distinguish between an ASM chart and a conventional flow chart.   2 M

PART-B
Answer the following. Each question carries TEN Marks.   **5x10=50M**

11.A). Apply the excess-3 code and its 9's complement for the following decimal numbers: 10M
(i) 235 (ii) 146 (iii) 404.

OR

11. B). i) Identify if any errors for the Hamming code 10011010 is received, using even parity.   5M
ii) Solve $(179)_{10} + (422)_{10}$ with the help of BCD subtraction using 9's complement   5M
technique.

12. A). Design 8x1 multiplexer using two 4x1 multiplexer.   10M

OR

12. B). Design a Combinational Logic circuit using a PROM. The Circuit accepts 3-bit binary   10M
number and generates its equivalent Excess-3 Code?

13. A). i) Analyze logic diagrams for D, JK Flip flops.   5M
ii) Convert JK-flip flop into D-Flip flop.   5M

OR

13. B). i) Define the following terms of a flip flop: i) Hold time ii) Set up time iii) Propagation   3M
delay time.
ii) Draw the circuit diagram of a master-slave JK flip-flop and explain its operation with   7M
the help of a Truth Table.

(P.T.O..)

14. A). What do mean by (i) a ripple counter and (ii) a ring counter? Explain their circuits. 10M

OR

14. B). i) Construct a 4-bit shift register using flip-flops and explain its operation. 6M
ii) Explain, how you obtain a left shift, using a shift register. 4M

15. A). Design the FSM controller for the traffic lights at an intersection North/South (NS) vs East/West (EW) with green and red lights only. The rule: (a) if no car detected, stay the same state, (b) if cars are detected in the direction with red light (independent of whether cars detected in, the direction with green light), switch state 10M

OR

15. B). Write down the steps involved in the design of FSM with suitable example. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations July/August-2024
Course Name: Discrete Mathematics
(Common for CSE, IT, CSC & CSM)

Date: 15.07.2024 AN　　　　Time: 3 hours　　　　Max.Marks: 70

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.　　　　　　　10x2=20M

1. R:A->A, A={1,2,3,4} ,R={(1,4)(2,3),(4,2),(3,3).(1,1)} find inverse relation of R and complement of R.　　2 M

2. Draw the hasse diagram for the poset (P(x), $\leq$).where x={1,2,3,4} and $\leq$ ={(x,y)/ x is subset to y}　　2 M

3. In how many ways 6men and 6 women be seated in a row such that men and women occupy alternate seats?　　2 M

4. State the fundamental theorem of arithmetic.　　2 M

5. Give the converse and contra positive of the implication "If it is raining then I get wet".　　2 M

6. Show that $p \to q \equiv \sim p \lor q$ using truth table.　　2 M

7. What is abelian group (G,*)?　　2 M

8. Define Field.　　2 M

9. What are the applications of Spanning Trees?　　2 M

10. Find an Euler circuit in the complete bipartite graph $K_{3,3}$　　2 M

PART-B
Answer the following. Each question carries TEN Marks.　　　　　5x10=50M

11.A). Let A={1,2,3,4} determine whether or not the following relation on A are functions.f={(2,3),(1,4),(2,1),(3,2),(4,4)} g={(3,1),(4,2),(1,1)}　　10M

OR

11. B). Given A = {1, 2, 3, 4} and B = {x, y, z}. Let R be the following relation from A to B:　　10M
R = {(1, y), (1, z), (3, y), (4, x), (4, z)}
(i) Determine the matrix of the relation.
(ii) Draw the arrow diagram of R.
(iii) Find the inverse relation R−1 of R.
(iv) Determine the domain and range of R.

12. A). A total amount of Rs 1500 is to be distributed to 3 students A, B, C of a class. In how many ways the distribution can be made in multiples of Rs100 if:　　10M
i) Every one of these must get at least Rs.300
ii) If A must get at least Rs 500, B and C get at least Rs 400 each

OR

12. B). In how many ways can we distribute 7 apples and 6 oranges can distributed among 4 children so that each child gets at least one apple?　　10M

(P.T.O..)

13. A). Show that $\neg P \wedge (\neg Q \wedge R) \vee (Q \wedge R) \vee (P \wedge R) \Leftrightarrow R$ without constructing truth table.　　10M

OR

13. B). What is the principle disjunctive normal form? Obtain the principle disjunctive normal form of $P \rightarrow (P \rightarrow Q) \wedge \neg (\neg Q \vee \neg P))$　　10M

14. A). Find the Principal Disjunctive Normal form of $P \vee (\neg P \rightarrow (Q \vee (\neg Q \rightarrow R)))$.　　10M

OR

14. B). Set $G = \{ 1, \omega, \omega^2 \}$ i.e., three roots of unity and form a finite abelian group with respect to multiplication, also prove this statement by composition table.　　10M

15. A). Prove that in an undirected graph there is an even number of vertices of odd degree　　10M

OR

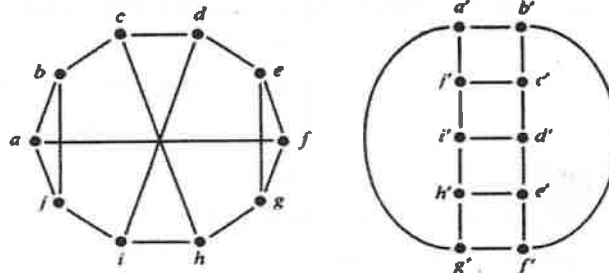15. B). Show that the following two graphs are not Isomorphic.　　10M

Fig.1

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations July/August-2024
Course Name: Analog & Digital Electronics
(Common for CSE & IT)

Date: 18.07.2024 AN	Time: 3 hours	Max.Marks: 70

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.   10x2=20M

1.	Define Diode, how PN junction will acts as a diode?	2 M
2.	Define rectifier and regulator.	2 M
3.	How transistor acts as an amplifier.	2 M
4.	Draw CB, CE, CC configurations neatly.	2 M
5.	What is MOSFET and draw different types of it.	2 M
6.	Convert 101100, 010011 into decimal equivalents.	2 M
7.	Why NAND and NOR are called universal gates justify.	2 M
8.	Define Multiplexer and Demultiplexer.	2 M
9.	Give the logic symbols and truth tables for J-K FF and Clocked S-R FF.	2 M
10.	Write about capabilities and limitations of FSM.	2 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A). Explain and working principle of operation of P-N junction diode.   10M

OR

11. B). i) Construct and explain the working principle of the bridge rectifier.   5M
ii) A 230 V, 50Hz voltage is applied to the primary of a 4:1 step down transformer used in a bridge rectifier having a load resistance of a 600Ω, Determine PIV, dc output voltage.   5M

12. A). i) Describe the construction of BJT with and without biasing.   5M
ii) Determine the value of Ic and I_E for the transistor circuit of β=200 and I_B =0.125mA   5M

OR

12. B). i) Compare CB, CE, CC configurations.   5M
ii) For a transistor circuit having α=0.98, $I_{CBO}=I_{Co}=5\mu A$ and $I_B=100\ \mu A$, Find I_C and I_E.   5M

13. A). Explain construction of principle of operation of JFET.   10M

OR

13. B). Verify that the following codes are self complementing codes are not justify i) Excess -3 code ii) 2-4-2-1 code.   10M

14. A). Implement the given expression using only 2 input NAND gates.   10M
f(A,B,C,D)=ABC+B$\bar{C}$+AC+$\bar{A}$ $\bar{B}$ $\bar{C}$

OR

14. B). Implement of full adder circuit using two half adders.   10M

(P.T.O..)

15. A). i) Write about types of flip flops.   5M
       ii) Conver SR of D flipflop.   5M

OR

15. B). Write about capabilities and limitation of FSM and explain abut mealy and more models.   10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations July/August-2024
Course Name: Computer Organization & Architecture
(Common for CSE, IT, CSC, CSM, AID & AIM)

Date: 20.07.2024 AN　　　　Time: 3 hours　　　　Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.　　　　　　　　**10x2=20M**

1.	Define the term processor and discuss about output unit.	2 M
2.	Discuss about Condition Register (CR) and Integer Exception Register (XER).	2 M
3.	Write a note on condition codes for branch instruction.	2 M
4.	Discuss briefly about EPROM.	2 M
5.	Write a note on DMA.	2 M
6.	Write a note on shifted immediate operand.	2 M
7.	Define and discuss about instruction execute.	2 M
8.	Describe the term memory unit.	2 M
9.	What action is required for executing this instruction Add (R3), R1?	2 M
10.	Discuss briefly about PROM.	2 M

PART-B
Answer the following. Each question carries TEN Marks.　　　　**5x10=50M**

11.A).	Draw and explain single bus structure.	10M
	OR	
11. B).	Draw the functional unit of a computer and discuss about the control unit in details.	10M
12. A).	Explain the following addressing modes. i) index mode　ii) Auto increment mode　iii) Auto decrement mode.	10M
	OR	
12. B).	Write a short note on rotate instructions.	10M
13. A).	Write a short note on branch instruction.	10M
	OR	
13. B).	Discuss briefly about secondary storage devices.	10M
14. A).	Discuss about Synchronous bus and draw the timing diagram of input transfer of synchronous bus.	10M
	OR	
14. B).	Discuss briefly about peripheral component inter connect (PCI).	10M
15. A).	Define locality of reference and explain use of a cache memory and direct–mapped cache.	10M
	OR	
15. B).	Define ALU? Explain the arithmetic and logical operation.	10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations July/August-2024
Course Name: Object Oriented Programming
(Common for CSE & IT)

Date: 23.07.2024 AN   Time: 3 hours   Max.Marks: 70

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.   10x2=20M

1.	Define a constructor. Give an example for it.	2 M
2.	What is *Object* class? Mention few methods in it?	2 M
3.	Differentiate checked exceptions and unchecked exceptions.	2 M
4.	Define inner class with an example.	2 M
5.	List File operations in java.	2 M
6.	Discuss about thread priorities.	2 M
7.	What is the purpose of hash table?	2 M
8.	Differentiate JDBC type 3 and type 4 drivers.	2 M
9.	In the context of event handling, list events and sources.	2 M
10.	Give the hierarchy of swing and Scala components.	2 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A). Develop a Java code to create a class called **Box** with length, breadth and depth as   10M
members in it. Develop a method **volume()** which computes the volume of the Box inside
the class. Develop suitable constructors in this context. Create two objects for Box class
and compute the corresponding volume.

OR

11. B). i) Explain multi-level inheritance with an example.   5M
ii) Define package. How to create and access a package with an example?   5M

12. A). Explain about uses of inner classes and also differentiate *Local inner classes,*   10M
Anonymous Inner classes and *static inner classes*

OR

12. B). Define exception. Explain about *try, catch, throw, throws* and *finally* keywords in Java.   10M
Give suitable examples.

13. A). What are different ways to create a thread? Create two threads where first thread prints   10M
the even numbers in the range of 1 to 1000 and second thread prints the message "*Hello
India*" for 500 times.

OR

13. B). Differentiate Byte stream and character stream with suitable example.   10M

(P.T.O..)

14. A). Discuss about Java collection framework and its related components. 10M

OR

14. B). Explain about JDBC drivers in detail. 10M

15. A). Develop a Java code to give output as the following frame. User has to enter age. If age is 10M
greater than or equal to 18 then give result as "Eligible for Vote", otherwise give result as
"Not Eligible for Vote" in the result text box.

OR

15. B). Explain about delegation event model with suitable example. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations July/August-2024
Course Name: Database Management Systems
(Common for CSE, IT, CSC, CSD & AID)

Date: 25.07.2024 AN   Time: 3 hours   Max.Marks: 70

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.   10x2=20M

1.	Define Database Management System.	2 M
2.	Define a data model.	2 M
3.	What is a foreign key? Give relevant example	2 M
4.	Describe any 3 aggregate functions in SQL.	2 M
5.	Define functional dependency.	2 M
6.	What are the problems caused by redundancy?	2 M
7.	What are the two pitfalls of lock-based protocols?	2 M
8.	Define durability and atomicity of a transaction.	2 M
9.	What are the disadvantages of index sequential files?	2 M
10.	Differentiate primary index from secondary index.	2 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A). Explain the main characteristics of the database approach versus the file processing approach.   10M

OR

11. B). Draw an ER-diagram of an Airline reservation system, taking into account at least five entities. Indicate all keys, constraints and assumptions that are made?   10M

12. A). What is a view? How can it be created? Explain with an example.   10M

OR

12. B). Explain nested queries and correlated nested queries with example.   10M

13. A). What is a normal form? Explain about various normal forms with examples.   10M

OR

13. B). Explain tuple relational calculus and domain relational calculus with an example for each.   10M

14. A). What is 2-phase locking protocol? How does it guarantee serializability?   10M

OR

14. B). Illustrate multiple granularity locking algorithm with a suitable example.   10M

15. A). Explain about hash-based indexing technique.   10M

OR

15. B). Discuss in detail about B+ tree indexing.   10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations July/August-2024
Course Name: Design & Analysis of Algorithms
(Common for CSC & CSD)

Date: 18.07.2024 AN	Time: 3 hours	Max.Marks: 70

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.   **10x2=20M**

1.	Write the properties of algorithm.	2 M
2.	Find the space complexity of addition of two numbers.	2 M
3.	Write the general method for Divide and conquer.	2 M
4.	What is the principle of the optimality?	2 M
5.	Draw state space tree for 4 queens problem.	2 M
6.	What is Graph Coloring?	2 M
7.	What is the minimum spanning tree? Give example?	2 M
8.	Define transitivity closure of a graph.	2 M
9.	What is NP complete problem?	2 M
10.	What is deterministic algorithm?	2 M

PART-B
Answer the following. Each question carries TEN Marks.   **5x10=50M**

11.A). Write the algorithm to find the matrix multiplication and analyze its time complexity and space complexity?   10M

OR

11. B). i) Solve the recurrence relation $T(n) = T(n/5) + T(4n/5) + n$ using recursive tree method.   6M
ii) Write the algorithm to find sum of 'n' numbers.   4M

12. A). i) Find an optimal solution for 5 jobs of profits (P1,P2,P3,P4,P5) = (20,15,10,5,1) with deadlines (d1,d2,d3,d4,d5)=(2,2,1,3,3).   5M
ii) Explain about Bin packing.   5M

OR

12. B). Solve the travelling sales person problem for the given graph using dynamic programming.   10M
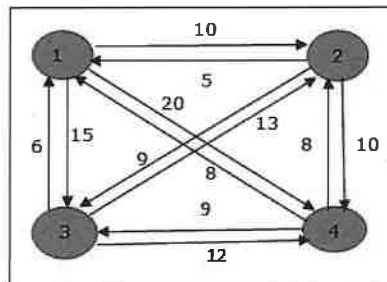
(P.T.O..)

13. A).   i) Solve the 8-queen problem for a feasible sequence (6,4,7,1).   6M

           ii) Explain Graph coloring with example.   4M

<div align="center">OR</div>

13. B).   Solve the 0/1 knapsack problem using branch and bound method for the following data   10M
           M=15, n=4, (p1,p2,p3,p4)=(10,10,12,18) (w1,w2,w3,w4)=(2,4,6,9).

14. A).   i) Find the number of different topological orderings possible for the given graph.   5M
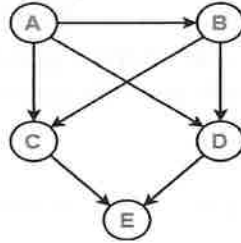
           ii) Discuss about DFS algorithm.   5M

<div align="center">OR</div>

14. B).   i) Find Minimum Spanning tree using Prims Algorithm for the given graph.   5M
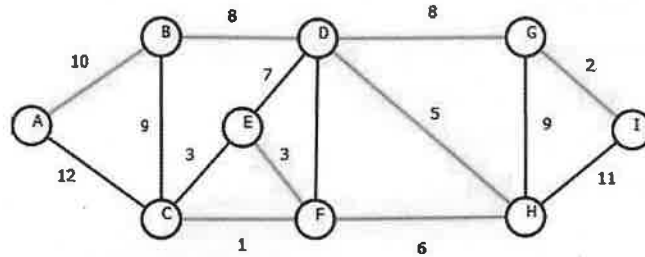
           ii) Discuss about network flow algorithm.   5M

15. A).   i) Write the algorithm to find the maximum and minimum element from an array.   5M

           ii) Explain game tree with an example.   5M

<div align="center">OR</div>

15. B).   i) Write non deterministic algorithm for 0/1 knapsack problem.   5M

           ii) Prove that 3-CNF is NP complete problem.   5M

<div align="center">*****</div>

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations July/August-2024
Course Name: Operating Systems

(Common for CSD, AID & AIM)

Date: 15.07.2024 AN | Time: 3 hours | Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.   10x2=20M

1. Define Operating system.   2 M
2. List the services of operating system.   2 M
3. Define process state and mention the various states of a process.   2 M
4. List the various scheduling criteria for CPU scheduling.   2 M
5. Describe the conditions under which a deadlock situation may arise.   2 M
6. Define monitor.   2 M
7. State the purpose of TLB.   2 M
8. Distinguish between demand paging and pure demand paging.   2 M
9. Explain any four file operations.   2 M
10. List common file attributes.   2 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A). List out the types of operating system and explain batch operating system and real time   10M
operating system in brief.

OR

11. B). Distinguish between multiprogramming, multitasking and multiprocessing.   10M

12. A). Consider the following set of process, with the length of the CPU burst given in   10M
milliseconds.

Process | Burst Time
P1 | 10
P2 | 1
P3 | 2
P4 | 1
P5 | 5

The processes are assumed to have arrived in the order P1, P2, P3, P4, P5, all at time 0.
What are the Waiting time, turnaround time, and throughput of each process by applying
FCFS, SJF scheduling algorithm with neat ghant chart?

OR

12. B). Describe the differences among short-term, medium-term, and long-term scheduling with   10M
an example.

13. A). Explain the infinite buffer producer/consumer problem for concurrent processing which   10M
uses binary semaphores.

(P.T.O..)

13. B). Describe resource-allocation graph? Explain how resource graph can be used for detecting   10M
deadlocks with neat diagram?

14. A). Describe, what is the need of Page Replacement? Consider the following reference string   10M
7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1.
Find the number of Page Faults with FIFO, Optimal Page replacement and LRU with four
frames which are empty initially. Which algorithm gives the minimum number of page
faults?

OR

14. B). Consider a job queue with 5 processes P1, P2, P3, P4 and P5, the memory requirements of   10M
each process as 600K, 1000K, 300K, 700K, 500K respectively for a total of 2560K
memory available. From this memory, an operating system resides in 400K. Calculate
memory fragmentation in each of the following algorithms.
i) First fit
ii) Best fit
iii) Worst fit

15. A). Describe File-system structure and its implementation.   10M

OR

15. B). Explain contiguous and linked file allocation methods with an example.   10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations July/August-2024
Course Name: Numerical Techniques & Probability Distributions
(Common for CSM, AID & AIM)

Date: 18.07.2024 AN   Time: 3 hours   Max.Marks: 70

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.   10x2=20M

1. Write sufficient condition for convergence of an iterative method for $f(x) = 0$; written as $x = g(x)$.   2 M

2. Find the second order difference of f (x) = x (x+1) (x+2) given that h=1.   2 M

3. Write the Simpson's $\frac{3}{8}$ rule.   2 M

4. Given $y' = x + y$, $y(0) = 1$ find $y(0.1)$ by Euler's method.   2 M

5. State the sufficiency condition for the existence of Laplace transform.   2 M

6. Find $L(t\, cos2t)$.   2 M

7. Check whether the following is a probability density function or not   2 M

   $$f(x) = \begin{cases} \lambda e^{-\lambda x}, & x > 0, \lambda > 0 \\ 0, & \text{otherwise} \end{cases}$$

8. For a binomial distribution with mean 6 and standard deviation $\sqrt{2}$, find the first two terms of the distribution.   2 M

9. Define Type I and Type II errors.   2 M

10. Write the applications of 'χ^2' test.   2 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A). Find an iterative formula to find $\sqrt{N}$ where N is a positive integer using Newton's method and hence find $\sqrt{11}$.   10M

OR

11. B). Use Lagrange's formula, find the polynomial of degree three which takes the value below: 10M

x	0	1	2	5
y	2	3	12	147

and hence find $y(3)$.

12. A). Evaluate $\int_4^{5.2} \log_e x\, dx$ by using (i) Trapezoidal rule   (ii) Simpson's 1/3 rule.   10M

OR

12. B). Using Taylor's series method, find y at $x = 1.1$ by solving the equation   10M

   $\frac{dy}{dx} = x^2 + y^2; y(1) = 2$. Carryout the computations up to fourth order derivative.

(P.T.O..)

13. A). Find $L\left(\frac{1-\cos t}{t^2}\right)$. 10M

OR

13. B). Find the Laplace transform of the half sine wave rectifier function given by 10M

$$f(t) = \begin{cases} \sin\omega t, & 0 < t < \frac{\pi}{\omega} \\ 0, & \frac{\pi}{\omega} < t < \frac{2\pi}{\omega} \end{cases} \quad \text{and} \quad f\left(t + \frac{2\pi}{\omega}\right) = f(t) \text{ for all values of } t.$$

14. A). A random variable X has the following probability function. 10M

X	0	1	2	3	4	5	6	7
$P(x)$	0	k	$2k$	$2k$	$3k$	k^2	$2k^2$	$7k^2 + k$

    (i) Find the value of k.

    (ii) Evaluate $P(X < 6), P(X \geq 6)$ and $P(0 < X < 5)$

    (iii) Find the distribution function of X

    (iv) If $P(X \leq k) > \frac{1}{2}$ find the minimum value of k.

OR

14. B). Derive the formula for mean, variance and moment generating function of a random variable X following Poisson distribution with parameter λ. 10M

15. A). A random sample of 10 boys had the following I. Q's 70, 120, 110, 101, 88, 83, 95, 98, 107, 100. Does the data support the assumption of a population mean I.Q of 100? Find a reasonable range in which most of the mean I.Q values of samples of 10 boys lie. (To calculate at 5% level of significance). 10M

OR

15. B). Two independent samples of eight and seven items respectively had the following values of the variables. 10M
Sample-1: 9   11   13   11   15   9   12   14
Sample-2: 10 12   10   14   9   8   10
Do the two estimates of population variance differ significantly at 5% level of significance.

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations July/August-2024
Course Name: Statistical Foundations of Data Science
(CSD)

Date: 20.07.2024 AN	Time: 3 hours	Max.Marks: 70

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.   10x2=20M

1.	What can a Histogram tell you?	2 M
2.	Illustrate the data frame with an example.	2 M
3.	Write Difference between sample mean and population mean.	2 M
4.	Why we need to consider standard error in the process of data analysis?	2 M
5.	Differentiate Type1 and type2 error.	2 M
6.	What is the use of Degree of freedom?	2 M
7.	Summarize the use of Cross validation.	2 M
8.	Define confidence.	2 M
9.	What happens when predictor variables are correlated?	2 M
10.	What is confounding variable in statistics?	2 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A).	Demonstrate box plot and density plot with a sample data.	10M
	OR	
11. B).	Elaborate the use of Scatter plot to understand the correlation among the attributes of the data set.	10M
12. A).	What is regression? Explain Regression to mean with an example.	10M
	OR	
12. B).	Explain binomial distribution with your own example.	10M
13. A).	Demonstrate ANOVA with an example.	10M
	OR	
13. B).	Demonstrate Chi-Square test with an example.	10M
14. A).	Explain the procedure to assessing a model.	10M
	OR	
14. B).	Interpret the r^2 error with an example.	10M
15. A).	Explain in detail about Multi collinearity.	10M
	OR	
15. B).	Explain about Partial residual plots and nonlinearity.	10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations July/August-2024
Course Name: Object Oriented Programming Through Java
(Common for CSC, CSM, AID & AIM)

| Date: 23.07.2024 AN | Time: 3 hours | Max.Marks: 70 |

(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.   **10x2=20M**

1.	Define a constructor. Give an example for it.	2 M
2.	What is *Object* class? Mention few methods in it?	2 M
3.	Differentiate checked exceptions and unchecked exceptions.	2 M
4.	Define inner class with an example.	2 M
5.	List File operations in java.	2 M
6.	Discuss about thread priorities.	2 M
7.	What is the purpose of hash table?	2 M
8.	Differentiate JDBC type 3 and type 4 drivers.	2 M
9.	In the context of event handling, list events and sources.	2 M
10.	Give the hierarchy of swing and Scala components.	2 M

PART-B
Answer the following. Each question carries TEN Marks.   **5x10=50M**

11.A). Develop a Java code to create a class called *Box* with length, breadth and depth as members in it. Develop a method *volume()* which computes the volume of the Box inside the class. Develop suitable constructors in this context. Create two objects for Box class and compute the corresponding volume.   10M

OR

11. B). i) Explain multi-level inheritance with an example.   5M
ii) Define package. How to create and access a package with an example?   5M

12. A). Explain about uses of inner classes and also differentiate *Local inner classes, Anonymous Inner classes* and *static inner classes*   10M

OR

12. B). Define exception. Explain about *try, catch, throw, throws* and *finally* keywords in Java. Give suitable examples.   10M

13. A). What are different ways to create a thread? Create two threads where first thread prints the even numbers in the range of 1 to 1000 and second thread prints the message "*Hello India*" for 500 times.   10M

OR

13. B). Differentiate Byte stream and character stream with suitable example.   10M

(P.T.O..)

14. A). Discuss about Java collection framework and its related components. 10M

OR

14. B). Explain about JDBC drivers in detail. 10M

15. A). Develop a Java code to give output as the following frame. User has to enter age. If age is 10M
greater than or equal to 18 then give result as "Eligible for Vote", otherwise give result as
"Not Eligible for Vote" in the result text box.

OR

15. B). Explain about delegation event model with suitable example. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations July/August-2024
Course Name: Basic Electrical Engineering
(Common for CSM & AIM)

Date: 25.07.2024 AN   Time: 3 hours   Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.
10x2=20M

1. State Ohms law.   2 M
2. State Kirchhoff's current law.   2 M
3. What is meant by R.M.S. Value of an alternating quantity?   2 M
4. Define form factor.   2 M
5. List types of DC motors.   2 M
6. List out different speed control methods of DC motor.   2 M
7. Define regulation of Transformer.   2 M
8. Three-phase transformers are classified into how many types?   2 M
9. Define slip of induction motor.   2 M
10. Explain the reason, why single-phase induction motor is not a self-starting motor.   2 M

PART-B
Answer the following. Each question carries TEN Marks.
5x10=50M

11.A). State and explain the Super-position theorem.   10M

OR

11. B). Find the voltage Vo using Thevenin's theorem.   10M
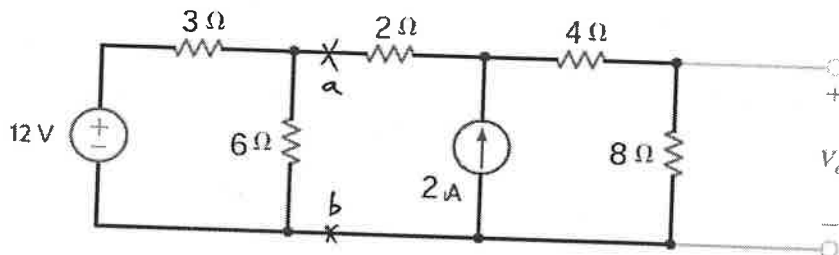
12. A). Draw the circuit diagram of a balanced star connected three phase Resistive load and mention the relations of voltages and currents.   10M

OR

12. B). Derive RMS and Average value of sinusoidal waveform.   10M

13. A). Explain the operation of a D.C. generator, with a neat circuit diagram.   10M

OR

13. B). What is back emf? Explain the significance of back emf in dc motor.   10M

(P.T.O..)

14. A). Explain the working principle of Single-Phase Transformer.   10M

OR

14. B). Derive an expression for voltage regulation of a single-phase transformer from its   10M
equivalent circuit or phasor diagram.

15. A). Explain the operation of Single-phase Induction motor, with neat circuit diagram.   10M

OR

15. B). Draw and explain the torque –slip characteristics of three phase induction motor.   10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Supplementary Examinations July/August-2024

Course Name: Python Programming

(Common for CE & EEE)

Date: 27.07.2024 AN   Time: 3 hours   Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.   10x2=20M

1.	How python works?	2 M
2.	Why does Python code generate fewer types of syntax errors than code in other programming languages? Justify your answer.	2 M
3.	How to format text for output?	2 M
4.	What are Value – Returning functions?	2 M
5.	Do numbers and strings are immutable? Give your answer.	2 M
6.	What is a set data type?	2 M
7.	What is polymorphism? Give one example.	2 M
8.	When should the programmer define a class variable rather than an instance variable?	2 M
9.	What is a widget and how do you use it.	2 M
10.	What is meant by Image Processing?	2 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A). i) What is a Variable? Write about the rules and multiple assignments of variables.   5M
        ii) Demonstrate about type conversions with suitable examples.   5M

OR

11. B). i) Discuss in brief about data types in python.   5M
         ii) What is a Module? Explain how to import the modules with an example program.   5M

12. A). What are arguments? Discuss the actual arguments used in the function call with examples.   10M

OR

12. B). i) Demonstrate the purpose of Global variables and constants with an example program.   5M
         ii) Summarize the concept of storing functions in modules.   5M

13. A). Inspect about List and Tuple data types in detail with example each and also overleaf the comparisons among them.   10M

OR

13. B). i) Asses the Structure of Strings and slicing for Substring.   5M
         ii) Outline the concept of text files and their formats.   5M

(P.T.O..)

14. A).   i) What OOP terminology python support? Discuss.   5M

                ii) Discuss about Multiple Inheritance with an example program.   5M

<div align="center">**OR**</div>

14. B).   How Object Oriented Programming differs from Procedural? Illustrate.   10M

15. A).   How to create GUI in Python using tkinter? Explain.   10M

<div align="center">**OR**</div>

15. B).   i) Write a short note on: a) Prompter box   b) Keyboard Events.   5M

                ii) Summarize the concept of Colors and RGB System in brief.   5M

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