AR20

CODE: 20CET203 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, June-2022

STRENGTH OF MATERIALS

(Civil Engineering)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

			Marks	CO	Blooms Level
		UNIT-I			
1.	a)	A steel circular bar has three segments as shown in **Fig. 1**. Determine i) the total elongation of the bar, ii) the length of the middle segment (BC) to have zero elongation of the bar, iii) the diameter of the last segment (CD) to have zero elongation of the bar. Take E=205GPa	6		

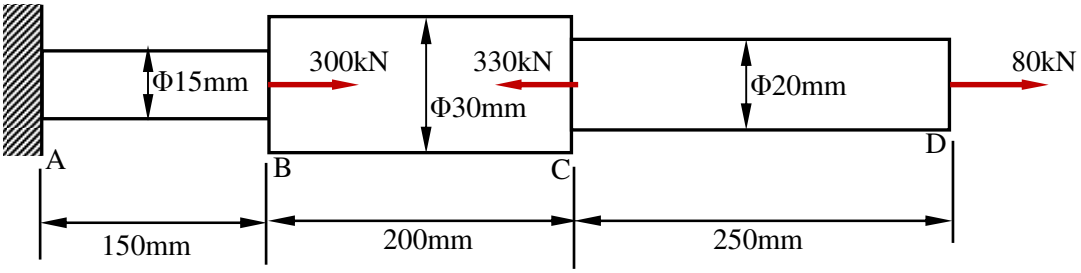


Fig. 1

	b)	Draw the stress-strain curve of mild steel , and explain all the salient points of stress-strain curve.	4		

(OR)

2.	a)	A composite bar made up of copper and steel is rigidly attached to the end supports as shown in **Fig. 2**. Determine the stresses in the two points of the bar when the temperature of the composite system is raised by 700C if i) the supports are rigid, ii) the supports yield by 0.2mm.	6		

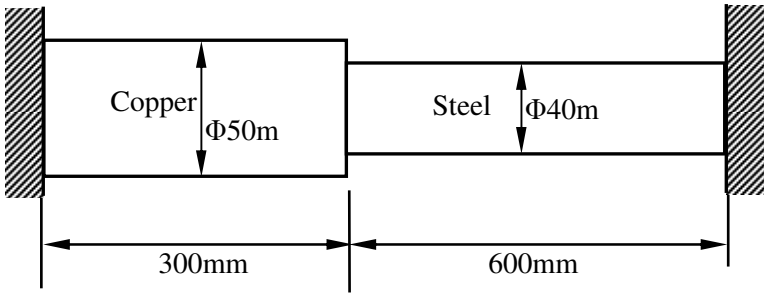


Fig. 2

Given,

For Copper: E_c=100GPa,α_c=18x$10^{-6}/^0$C

For Steer: E_s=205GPa, α_s=11x10-$^{6}/^{0}$C

b) A steel bar 40mmx40mm in section and 100mm in length is acted upon by tensile load of 150kN along its longitudinal axis and 200kN and 300kN along the axes of the lateral surfaces as shown in **Fig. 3**. Determine the change in the dimensions of the bar and change in volume. Take E=205GPa and υ=0.3. — 4

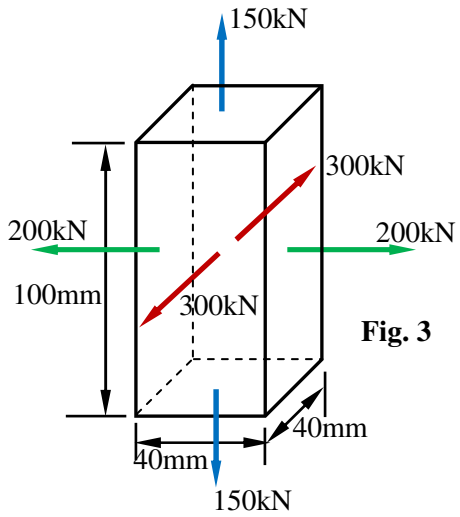


Fig. 3

Marks CO Blooms Level

UNIT-II

3. a) Deduce the relation among load intensity, shear force and bending moment. — 4

b) Draw the shear force and bending moment diagram of the beam shown in **Fig. 4**. — 6

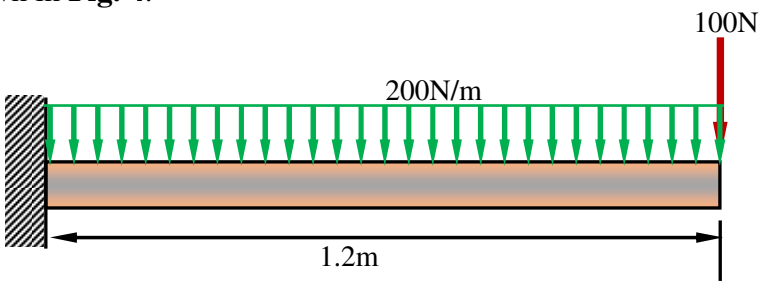


Fig. 4

(OR)

4. a) Draw the shear force and bending moment diagram of the beam shown in **Fig. 5**. — 6

b) Find the values of shear force and bending moment at 0.5m from A and also draw SFD and BMD diagram. — 4

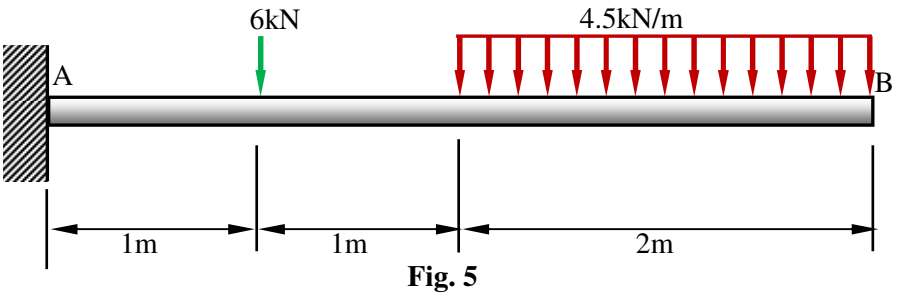


Fig. 5

Marks CO Blooms Level

UNIT-III

5. a) What are the assumptions for pure symmetrical bending? 3

b) Two wooden planks each are connected together to form a cross-section of a beam as shown in **Fig. 6**. If a bending moment of 340kgm is applied around the horizontal neutral axis, find the stresses at the extreme fibers of the cross-section. Also calculate the second moment of area about centroidal axes. 7

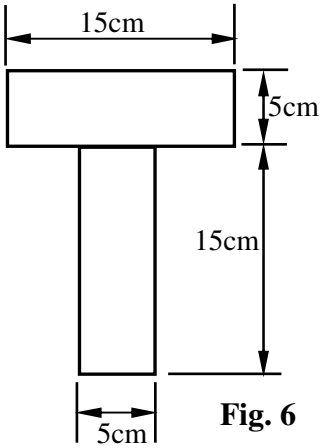


Fig. 6

(OR)

6. a) A beam is subjected to a shear force 'V' at a cross-section. Find the shear stress distribution in the cross-section for the following sections: 5+5
   i) rectangular
   ii) solid circular

UNIT-IV

			Marks	CO	Blooms Level
7.	a)	Derive the slope deflection equation of elastic curve of a beam and write down the assumptions which are made to derive the equation.	7		
	b)	What are the various methods to find deflection and slope of a beam?	3		

(OR)

8.	a)	A simply supported beam of length 'L' carries a concentrated load 'W' at a distance 'a' from one and 'b' from other (a>b). Find the position and magnitude of the maximum deflection.	6		
	b)	Explain the 'Macaulay's method to calculate the deflection of a beam.	4		

UNIT-V

			Marks	CO	Blooms Level
9.	a)	Derive the torsional equation of solid circular shaft.	5		
	b)	A solid circular shaft transmits 100kW power at 140r.p.m. What will be the minimum diameter of the shaft to satisfy the following conditions: i) Angle of twist must not exceed 30^0 in a length of 5m ii) The shear stress must not exceed 90MPa Take G=80GPa	5		

(OR)

10. a) An element in plane stress condition is subjected to σ_x=60N/mm^2 and τ_{xy}=20N/mm^2 as shown in **Fig. 7**. Determine i) the stresses acting on an element oriented at angle 40^0 in anticlockwise direction from x-plane ii) the principal stresses and c) maximum shear stress. 6

b) Also draw the Mohr's circle and obtain the above results. 4

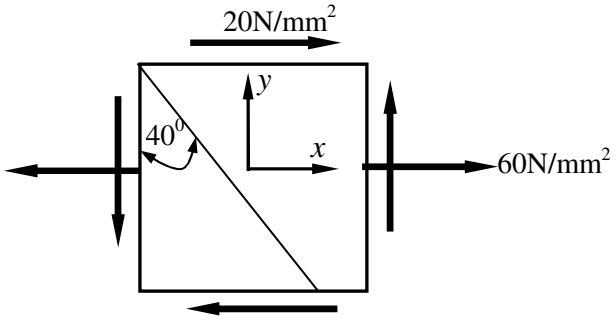


Fig. 7

			Marks	CO	Blooms Level
		UNIT-VI			
11.	a)	Calculate the Euler's buckling load for fixed-fixed column.	6		
	b)	Find the buckling load of a perfect column of length 4m and cross-section 120mmx180mm, when one end fixed and other free.	4		
		(OR)			
12.	a)	Calculate the Euler's buckling load for hinged-hinged column.	6		
	b)	Find the buckling load of a perfect column of length 4m and cross-section 120mmx180mm, when both ends are hinged.	4		

***

AR20

CODE: 20EET203 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, June, 2022

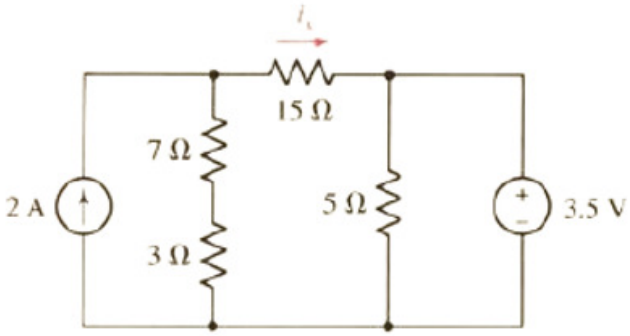
ELECTRIC CIRCUIT THEORY

(Electrical and Electronics Engineering)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

			Marks	CO	Blooms Level
		UNIT-I			
1.	a)	State and explain Norton's theorem	5M	CO1	L3
	b)	For the circuit shown in figure compute current i_x using superposition principle.	5M	CO1	L4



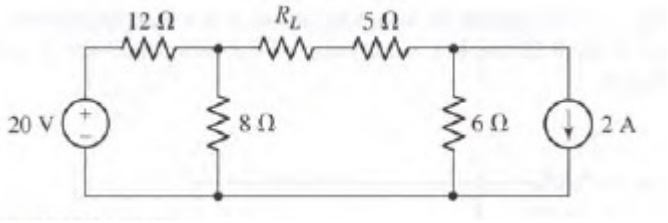
(OR)

2.	a)	State and explain Thevenin's theorem with suitable example.	10M	CO1	L3

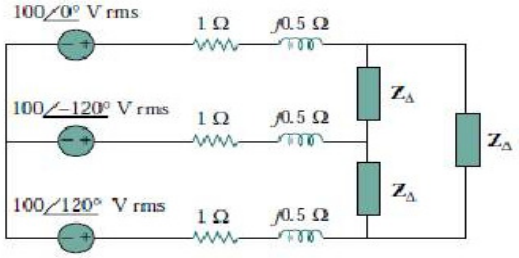
			Marks	CO	Blooms Level
		UNIT-II			
3.		State and explain Tellegen's with suitable example.	10M	CO2	L3

(OR)

4.		Determine the maximum power that can be delivered to the load resistance R_L in the circuit shown below	10M	CO2	L4



			Marks	CO	Blooms Level
		UNIT-III			
5.	a)	For the three-phase circuit shown below, find the average power absorbed by the delta-connected load with $Z_\Delta = (21 + j\,24)\Omega$	10M	CO3	L4

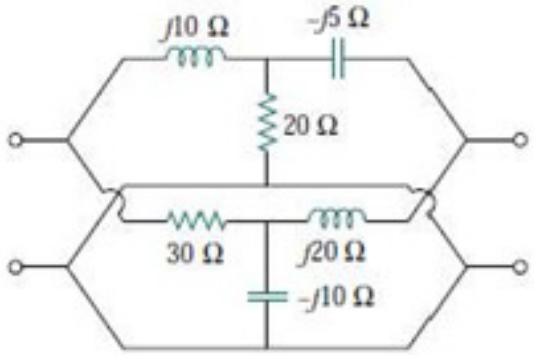


(OR)

			Marks	CO	Blooms Level
6.	a)	Explain any one method for determination of 3-phase active power	5M	CO3	L3
	b)	What are the advantages of three phase systems?	5M	CO3	L3

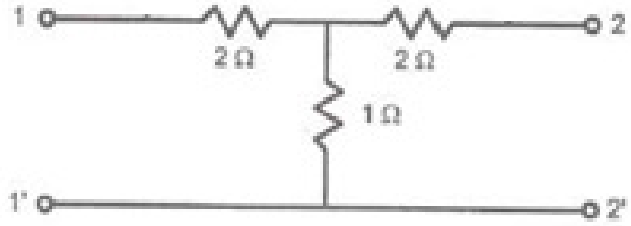
UNIT-IV

			Marks	CO	Blooms Level
7.		Determine the y parameters of the two two-ports in parallel shown blow	10M	CO4	L4



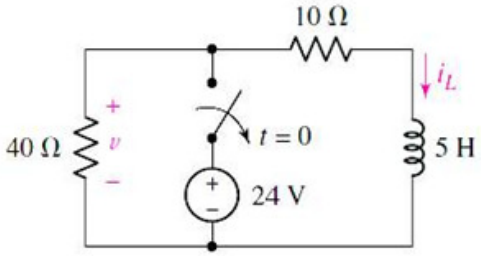
(OR)

8.	a)	Explain transmission and hybrid parameters of two-port networks	5M	CO4	L3
	b)	Obtain Y-parameters for the network shown below	5M	CO4	L4



UNIT-V

			Marks	CO	Blooms Level
9.	a)	Derive the expression for current in a series RL circuit for DC excitation.	5M	CO5	L3
	b)	For the circuit shown, find the voltage labelled v at t = 200 ms.	5M	CO5	L4



(OR)

10.	a)	Explain the transient response of RC series circuit by Sinusoidal excitations	10M	CO5	L3

UNIT-VI

			Marks	CO	Blooms Level
11.	a)	Develop the Cauer -1 LC network for given function $Z(s) = (S^5 + 5S^3 + 3S) / (S^4 + 3S^2 + 1)$	10M	CO6	L4

(OR)

12.	a)	Explain the procedure for realization of RC network in foster form.	5M	CO6	L3
	b)	Test whether the function $F(s) = (s^3 + s^2 + 3s + 5)/ (s^2 + 6s + 8)$ is a positive real function.	5M	CO6	L4

***

AR20

CODE: 20MET202 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, June, 2022

MATERIALS ENGINEERING

(Mechanical Engineering)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

			Marks	CO	Blooms Level
		UNIT-I			
1.		What is the Crystallization of metals? Explain in detail about different types of Crystallization?	10M	CO1	Understand
		(OR)			
2.	a)	What is Metallic bond? Explain with Example.	4M	CO1	Remembering
	b)	What are the grains and grain boundaries? Briefly explain the significance of grain size?	6M	CO1	Understand
		UNIT-II	Marks	CO	Blooms Level
3.	a)	Explain Hume–Ruthers rules? What are the conditions to be satisfied according to Hume–Ruthers rule to form alloys?	4M	CO2	Understand
	b)	Draw and explain isomorphous alloy system with a suitable example	6M	CO2	Apply
		(OR)			
4.	a)	What are the types of solid solutions? Explain with neat Sketches?	4M	CO2	Understand
	b)	Draw iron-iron carbon diagram and explain invariant reactions	6M	CO2	Appluy
		UNIT-III	Marks	CO	Blooms Level
5.	a)	What are the types of steels? Explain properties, advantages and applications of steels.	10M	CO3	Understand
		(OR)			
6.	a)	What is cast iron? Explain the properties and advantages of cast iron.	6M	CO3	Understand
	b)	Differences between white cast iron and grey cast iron.	4M	CO3	Analyse
		UNIT-IV	Marks	CO	Blooms Level
7.	a)	Briefly explain any two of surface hardening treatments?	5M	CO4	Apply
	b)	Difference between hot working and cold working?	5M	CO4	Understand
		(OR)			
8.		Explain the experimental procedure for construction of TTT diagram for various steels with neat sketch?	10M	CO4	Apply
		UNIT-V	Marks	CO	Blooms Level
9.		Explain Titanium and its alloys? What are its composition, Application and Properties of Titanium alloys?	10M	CO5	Understand
		(OR)			
10.	a)	What are the different methods of atomization for making metal powders in powder metallurgy?	5M	CO5	Understand
	b)	Write the advantages and limitations of powder metallurgy.	5M	CO5	Understand
		UNIT-VI	Marks	CO	Blooms Level
11.		Explain Vickers hardness test with neat sketch? Advantages and disadvantages of Vickers hardness test?	10M	CO6	Apply
		(OR)			
12.		What is mean by fatique testing? What are the types of fatique tests? Explain with neat sketches?	10M	CO6	Apply & Analyse

AR20

CODE: 20ECT202 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, June-2022

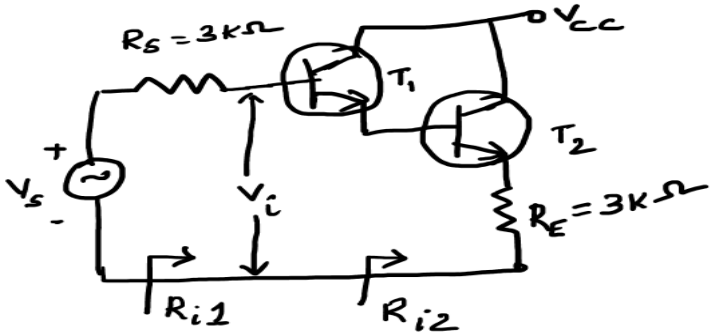
ELECTRONICS-II

(Electronics and Communication Engineering)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

			Marks	CO	Blooms Level
		UNIT-I			
1.	a)	Draw and explain common base amplifier using approximate analysis .	5M	1	Understand
	b)	Calculate current gain, voltage gain and input resistance of the common emitter amplifier for the given data $R_S = 1K\Omega$, $R_1 = 100K\Omega$, $R_2 = 4K\Omega$, $R_C = 2K\Omega$, $R_L = 1.2K\Omega$. $h_{fe} = 50$, $h_{ie} = 1.1k\Omega$, $h_{oe} = 2.5\mu A/V$, $h_{re} = 2.5 \times 10^{-4}$	5M	1	Evaluate
		(OR)			
2.	a)	State and Prove Millers theorem	5M	1	Understand
	b)	Analyze Common Emitter amplifier using h- parameter model.	5M	1	Analyze
		UNIT-II	Marks	CO	Blooms Level
3.	a)	Derive the equations for input resistance for Darlington transistor.	5M	2	Understand
	b)	For circuit shown in the figure calculate input resistance and overall current gain . $h_{ie} = 1.1k\Omega$, $h_{fe} = 50$, $h_{re} = 2.5 \times 10\text{-}4$, $h_{oe} = 25\mu A/V$	5M	2	Analyze



(OR)

4.	a)	Derive equations for upper cut of frequency of RC coupled amplifier.	5M	2	Understand
	b)	Compare Direct and RC coupling used for coupling multi stage amplifiers with their frequency response.	5M	2	Remember
		UNIT-III	Marks	CO	Blooms Level
5.	a)	Obtain general form of an LC Oscillator and Derive the frequency of oscillation for Colpitts Oscillator.	7M	3	Remember
	b)	Find the frequency of the oscillations of a transistor colpitts oscillator having C1 = 150Pf , C2 = 1.5Nf and L = 50 µH.	3M	3	Analyze

(OR)

			Marks	CO	Blooms Level
6.	a)	State and explain Barkhausel criterion	4M	3	Understand
	b)	Draw a neat circuit diagram of a phase shift oscillator using BJT.	6M	3	Analyze

UNIT-IV

			Marks	CO	Blooms Level
7.	a)	Explain the significance of all resistive components of hybrid pi model and give their typical values.	6M	4	Understand
	b)	A transistor is operating at I_{co} of 10mA at room temperature. It has h_{fe}= 100, h_{ie}=500Ω , h_{re}=10^{-4}, h_{oe}=50μʊ. Determine Transconductance and Base emitter resistance.	4M	4	Analyze
		(OR)			
8.	a)	Derive the expression for the CE short circuit current gain A_i as a function of frequency.	7M	4	Understand
	b)	Derive the equation for capacitance between base and emitter junction in hybrid pi model of a transistor.	3M	4	Understand

UNIT-V

			Marks	CO	Blooms Level
9.	a)	Derive an expression for its conversion efficiency of class B push pull power amplifier with neat circuit diagram.	7M	5	Understand
	b)	Summarize the advantages and disadvantages of class B push pull power amplifier	3M	5	Remember
		(OR)			
10.	a)	Draw the circuit diagram of class A transformer coupled power amplifier and derive an expression for its conversion efficiency.	7M	5	Understand
	b)	Compare class A and class B power amplifiers.	3M	5	Remember

UNIT-VI

			Marks	CO	Blooms Level
11.	a)	What are the requirements of Tuned amplifier	3M	6	Remember
	b)	A Single tuned transistor amplifier is used to amplify modulated RF carrier of 600 KHz and bandwidth of 15KHz. The circuit has a total output resistance of R_t = 20k Ω and output capacitance C_o = 50 pF . Calculate values of capacitances of the tuned circuit.	7M	6	Analyze
		(OR)			
12.	a)	Draw and explain the single tuned transformer coupled amplifier	5M	6	Remember
	b)	The bandwidth for single tuned amplifier is 25 KHz. Calculate the bandwidth if such three stages are cascaded and also calculate the bandwidth for four stages.	5M	6	Analyze

***

AR20

CODE: 20CST202 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Regular Examinations, February, 2022

DISCRETE MATHEMATICS

(Common to CSE & IT)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

			Marks	CO	Blooms Level
		UNIT-I			
1.	a)	Construct the truth tables for the following [(p V q) Λ(~r)] ↔q. Also, examine it is a tautology or not.	5	CO1	K3
	b)	Show that (p → q) ∧ (p → r) and p → (q ∧ r) are logically equivalent.	5	CO1	K3
		(OR)			
2.	a)	Find CNF and PCNF of the following: p ∨ (q → r)	5	CO1	K3
	b)	Determine whether rΛ(p V q) is a valid Conclusion or not from the premises H1: pVq, H2: q→r, H3: p→m and H4:~m.	5	CO1	K3
		UNIT-II			
3.	a)	Use predicates and quantifiers to express the following statements. a. Every person is precious b. Some rationales are real. c. No monkey can speak French	5	CO2	K2
	b)	Define Universal Specification (Instantiation) and Existential Specification (Instantiation) using one example.	5	CO2	K3
		(OR)			
4.	a)	Verify the validity of the following quantified statements by Rules of Inference. All clear explanations are satisfactory. Some excuses are unsatisfactory. Therefore, some excuses are not clear explanations	10	CO2	K2

UNIT-III

			Marks	CO	Blooms Level
5.	a)	Let 'm' be a positive integer. A relation R is defined on the set Z by "a R b if and only if a – b is divisible by m" for a, b ∈ Z. Show that R is an equivalence relation on set Z.	7	CO3	K3
	b)	Which of these are satisfying Reflexive, symmetric, Transitive, and antisymmetric properties? 1) R1 = {(1,1), (1,2), (2,1),(2,2),(3,4),(4,1),(4,4)} 2) R2 = {(1,1), (1,3), (3,1), (3,3)}	3	CO3	K2

(OR)

6.	a)	Draw the Hasse diagram representing the partial ordering using the relation R = {(a, b)|a divides b} on the set {1, 2, 3, 4, 6, 8, 12}.	5	CO3	K3
	b)	Determine whether (P (S), ⊆) is a lattice or not if S = {a, b, c}	5	CO3	K2

UNIT-IV

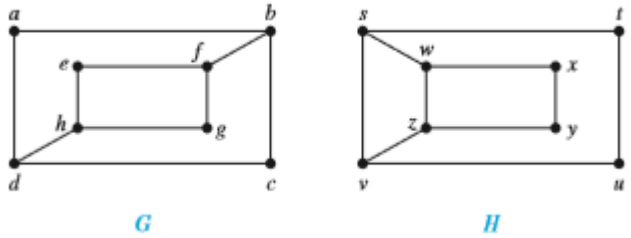
			Marks	CO	Blooms Level
7.	a)	Draw the digraph G corresponding to given adjacency matrix.	5	CO4	K2

$$A = \begin{bmatrix} 0 & 0 & 1 & 1 \\ 0 & 0 & 1 & 0 \\ 1 & 1 & 0 & 1 \\ 1 & 1 & 1 & 0 \end{bmatrix}$$

	b)	A connected planar graph has 10 vertices each of degree 3. Into how many regions does a representation of this planar graph split the plane?	5	CO4	K3

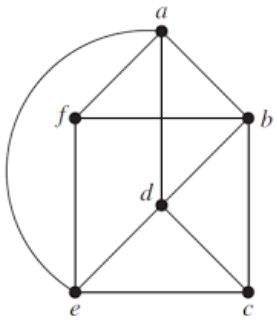
(OR)

8.	a)	Examine that whether the graphs G and H are isomorphic.	7	CO4	K2



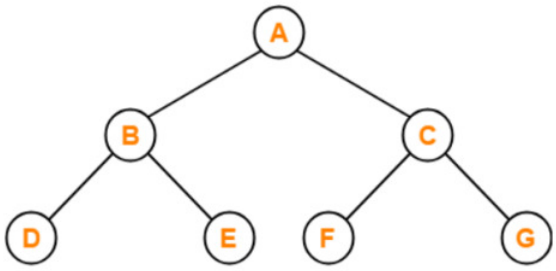
G H

	b)	Verify that whether the following graph is Eulerian graph or not. If so, find such a Eulerian circuit in G.	3	CO4	K3

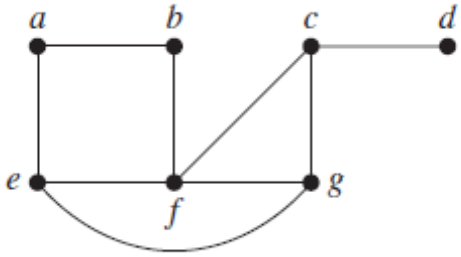


UNIT-V

			Marks	CO	Blooms Level
9.	a)	Determine the pre-order, post-order, in-order traversal for the following graph.	5	CO5	K3

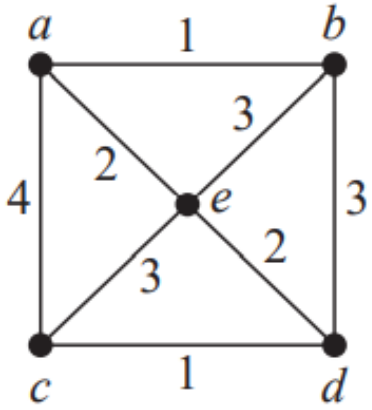


	b)	Obtain three spanning trees of the following simple graph	5	CO5	K3



(OR)

10.	a)	Apply Prim's algorithm to find a minimum spanning tree for the given weighted graph.	10	CO5	K3



UNIT-VI

			Marks	CO	Blooms Level
11.	a)	Find the coefficient of x^{10} in the power series of the function $(1 + x^5 + x^{10} + x^{15} + \cdots\cdots)^3$	5	CO6	K3
	b)	Find a closed form for the generating function for the given 0, 2, 2, 2, 2, 2, 2, 0, 0, 0, 0, 0, ...	5	CO6	K3

(OR)

12.	a)	Solve non-homogeneous recurrence relation $a_n - 5\,a_{n-1} + 4\,a_{n-2} = 2^n$ for $n \geq 2$ when $a_0 = 3,\ a_1 = 4$	10	CO6	K3

AR18

CODE: 18CET203 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, June-2022

MECHANICS OF SOLIDS-I

(Civil Engineering)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a) Define principal planes? Give the expression for major principal stress in a two dimensional system — 4M

   b) A tensile test was conducted on a mild steel bar. The following data was obtained from the test: — 8M
   (i) Diameter of the steel bar = 3 cm
   (ii) Gauge length of the bar = 20cm
   (iii) Load at elastic limit = 250 kN
   (iv) Extension at a load of 150 kN = 0.21 mm
   (v) Maximum load = 380 kN
   (vi) Total extension = 60 mm
   (vii) Diameter of rod at failure = 2.25 cm
   Determine: (1) The Young's modulus; (2) The stress at elastic limit

(OR)

2. a) Draw stress – strain diagram for mild steel, brittle material and a ductile material and indicate salient points. — 4M

   b) A bar 0.3m long is 50mm square in section for 120mm of its length, 25mm diameter for 80mm and of 40mm diameter for its remaining length. If the tensile force of 100kN is applied to the bar calculate the maximum and minimum stresses produced in it, and the total elongation. Take E = 2×10^5 N/mm2 and assume uniform distribution of stress over the cross section. — 8M

UNIT-II

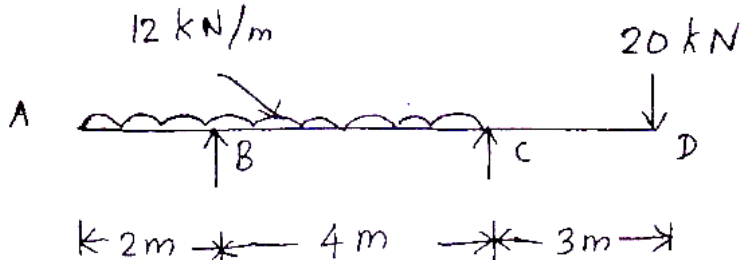
3. a) List the types of supports? Derive the relation between bending moment and shear force.? — 4M

   b) A rectangular beam 300 mm deep is simply supported over the span of 4 m. Determine the uniformly distributed load per metre which the beam may carry, if the bending stress should not exceed 120N/mm^2. Take I=8×10^6 mm^4. — 8M

(OR)

4. a) A beam subjected to a bending stress of 5N/mm^2 and the section modulus is 3530 cm^3. Calculate the moment of resistance of the beam? — 4M

   b) Draw shear force and bending moment diagram for the beam given in Fig. — 8M



UNIT-III

5. a) Explain bending stress, moment of resistance? Discuss the procedure to calculate maximum flexural stress? 4M

   b) A 100mm X 200mm rolled steel I section has the flanges 12mm thick and web 10mm thick. Find 8M
   (i) The safe UDL the section can carry over a span of 6m if the permissible stress is limited to 150 N/mm^2
   (ii) The maximum bending stress when the beam carries a central point load of 20kN.

(OR)

6. a) Derive the bending equation? 4M

   b) A simply supported beam of circular section 600mm diameter carries UDL 12kN/m over the span of 6m and point load 3kN at mid span. Find the maximum bending stress at mid span and 4m from right end? 8M

UNIT-IV

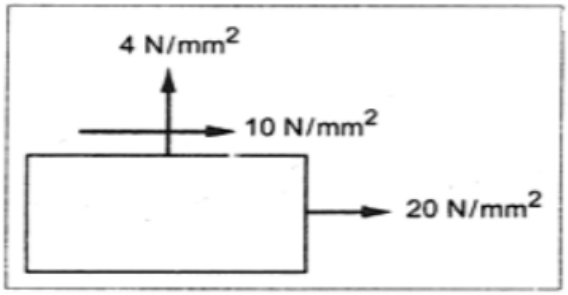
7. a) Draw shear stress distribution for rectangular section simply supported beam carried UDL? 4M

   b) An I-beam section with top and bottom flange width 250 mm and thickness 20mm and web length 400mm and thickness 12mm subjected to shear force 80kN. Draw shear stress distribution diagram with salient values and find out the maximum shear stress and it's location? 8M

(OR)

8. a) Define maximum shear stress theory? State the limitations of maximum shear stress theory. 4M

   b) For the state stress shown in fig. Find the principal plane and principal stress and maximum shear stress. 8M



UNIT-V

9. a) Define torsion and polar modulus? A circular shaft is subjected to a torque of 10kNm. The power transmitted by the shaft is 209.33kW. Find the speed of shaft in revolution per minute? 4M

   b) A leaf spring 750mm long is required to carry a central load of 8kN. If the central deflection is not to exceed 20mm and the bending stress is not to be greater than 200N/mm^2. Determine the thickness, width and number of plates. Assume the width of the plates is 12 times, their thickness and modulus of elasticity of the springs material as 200kN/mm^2. 8M

(OR)

10. a) Discuss the application of a moment to produce torque in a shaft? What is the equivalent bending moment for a shaft subjected to moment M and torsion T? 4M

    b) A circular shaft of 1000mm diameter and 2m length is subjected to a twisting moment which creates a shear stress of 20N/mm2 at 30mm from the axis of the shaft. Calculate the angle of twist and the strain energy stored in the shaft. Take G=$8x10^4$ N/mm^2. 8M

***

AR18

CODE: 18MET202 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, June, 2022

MATERIALS ENGINEERING

(Mechanical Engineering)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a)	What is a metallic bond? How the type of bonding does influence the properties of crystals?	6M
	b)	What is the ASTM grain size number of a material? What is the influence of grain size on mechanical properties	6M
		(OR)	
2.	a)	Explain about density calculations of crystal structures	6M
	b)	Explain methods to determine grain size	6M

UNIT-II

3.	a)	What is phase rule, Lever rule and cooling curve	6M
	b)	Write a note on Transformations of solid state.	6M
		(OR)	
4.		Draw the Fe-Fe_3C Diagram and label all the points, lines, temperatures, and reactions	12M

UNIT-III

5.	a)	Differentiate between white Iron and grey cast Iron	6M
	b)	Explain tool steels, maraging steels, HSLA steels with applications	6M
		(OR)	
6.	a)	Give an account of the composition, properties, and applications of any two types of cast iron.	6M
	b)	Explain effect of small quantities of S,P, Mn,Si upon properties of steel	6M

UNIT-IV

7.		Discuss the importance of heat treatment. Explain the important methods of heat treatment of steels.	12M
		(OR)	
8.	a)	What is hardenability? Explain the Jominy end quench test used for determining the hardenability of steels	6M
	b)	Elaborate characteristics of powders used in powder metallurgy process	6M

UNIT-V

9.	a)	Write notes on Al-Cu alloys.	4M
	b)	Differentiate Charpy & Izod impact tests	8M
		(OR)	
10.		Write about structure, properties, heat treatment cycles and Applications of Titanium and its alloys.	12M

***

AR18

CODE: 18EST202 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, June, 2022

PROGRAMMING FOR PROBLEM SOLVING

(Electronics and Communication Engineering)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a)	Explain how to write, edit, compile and execute C program with neat flowchart.	6M
	b)	Write an algorithm and flowchart to find average of 30 numbers entered by the user.	6M
		(OR)	
2.	a)	Explain I/O statements in C?	6M
	b)	Write an algorithm and draw a flowchart to find simple interest?	6M

UNIT-II

3.	a)	Discuss about different kinds of loops available in C with examples?	6M
	b)	Write a C program to check whether a given number is palindrome or not	6M
		(OR)	
4.	a)	Explain nested conditional statements in C with examples?	6M
	b)	Write a C program to generate Fibonacci series	6M

UNIT-III

5.	a)	Explain different categories of functions with examples?	6M
	b)	Write a C program to find GCD of a given number using recursion?	6M
		(OR)	
6.	a)	Differentiate how to read a string using gets() and scanf() with example.	6M
	b)	Write a C program to find the reverse of a given string without using sttrev()?	6M

UNIT-IV

7.	a)	What is a pointer? Explain how to declare, initialize a pointer and its advantages?	6M
	b)	Write a C program to reverse a string using pointers.	6M
		(OR)	
8.	a)	Differentiate between pointers and arrays? Write a C program to display the contents of an array using pointer arithmetic.	6M
	b)	Write a C program to swap two numbers using pointers?	6M

UNIT-V

9.	a)	Distinguish and compare between structures and unions	6M
	b)	Construct a C program to read roll number, name and marks in three subjects of 'n' students and find the total marks of each student. Display all the above student details sorted by total marks.	6M
		(OR)	
10.	a)	Define a file. Explain any three operations on files.	6M
	b)	Write a C program to print number of characters and lines in a file?	6M

***

AR18

CODE: 18CST202 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, June-2022

DISCRETE MATHEMATICS

(Common to CSE & IT)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a) Find the Disjunctive normal form of $P \to \{(P \to Q) \wedge (\neg Q \vee \neg P)\}$. 6M

   b) Show that $R \wedge (P \vee Q)$ is a valid conclusion from the premises $P \vee Q, Q \to R, P \to M$ and ¬M 6M

(OR)

2. a) Obtain the Principle Conjunctive normal form of $(P \wedge Q) \vee (\neg P \vee Q \vee R)$. 6M

   b) Test the validity of the following argument. 6M
   If you work hard, you will pass the exam. You did not pass. Therefore you did not work hard.

UNIT-II

3. a) Let $A = \{1,2,3,4,6,8,12\}$. On *A,* define the partial ordering relation R by *aRb* if and only if *a/b*. Draw the Hasse diagram for *R* and write down the relation matrix for *R*. 6M

   b) If $f : A \to B$ and $g : B \to C$ are invertible functions, then $g \circ f : A \to C$ is an invertible function and $(g \circ f)^{-1} = f^{-1} \circ g^{-1}$. 6M

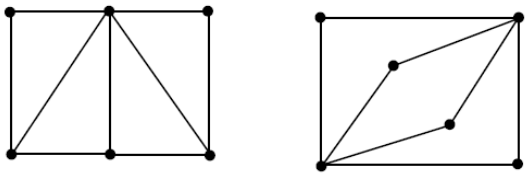
(OR)

4. a) Prove that the cancellation law holds good in a distributive lattice. 6M

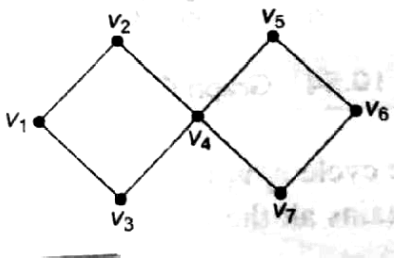
   b) Let $f(x) = x + 2, g(x) = x - 2$ and $h(x) = 3x$ for $x \in R$, where *R* is the set of real numbers. Find $f \circ g,\ g \circ f, f \circ f,\ g \circ g, f \circ h,\ h \circ g$ and $h \circ f$. 6M

UNIT-III

5. a) Define Euler Graph? Which of the following are Eulerian Graphs 6M



   b) Find a spanning tree of a graph G by using BFS algorithm. 6M



(OR)

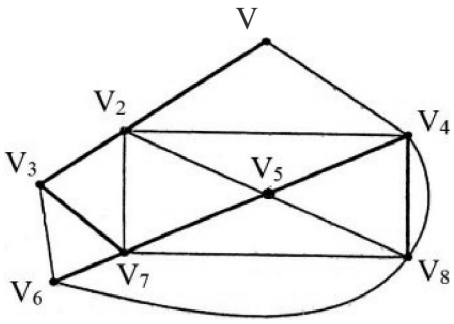
6. a) State necessary conditions for the graph to be Isomorphic and justify that it is not sufficient with suitable example. 6M

b) Write the short notes on DFS and BFS. 6M

UNIT-IV

7. a) Illustrate with an example to find minimal spanning tree using Kruskal's algorithm. 6M

b) Find a spanning tree of following graph G by using DFS algorithm 6M



(OR)

8. a) Illustrate with an example to find minimal spanning tree using Prims algorithm 6M

b) What is Walk, Trail, Paths and circuit? Explain with suitable graphs examples. 6M

UNIT-V

9. a) Find the generating function for the sequence $1^3, 2^3, 3^3, \ldots$. 6M

b) Solve the recurrence relation $a_n + 4a_{n-1} + 4a_{n-2} = 8$ for $n \geq 2,$ and $a_0 = 1, a_1 = 2$. 6M

(OR)

10. Using generating function method solve the recurrence relation 12M
$a_{n+1} = 3a_n + (n+1), n \geq 0$

***

AR16

CODE: 16CE2002 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, June, 2022

STRENGTH OF MATERIALS-I

(Civil Engineering)

Time: 3 Hours **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a)	Draw the stress – strain curve for tension test on a ductile material and mark the significant points on it.	7 Marks
	b)	What are elastic moduli? Derive the relationship between modulus of elasticity and modulus of rigidity.	7 Marks
		(OR)	
2.	a)	a) Explain the following terms: proof stress, proof resilience, modulus of resilience.	7 Marks
	b)	A bar of uniform cross section is subjected to an axial tensile load such that the linear strain in the direction of load is 1.4mm over a length of 1meter. If μ=0.3, find volumetric strain.	7 Marks

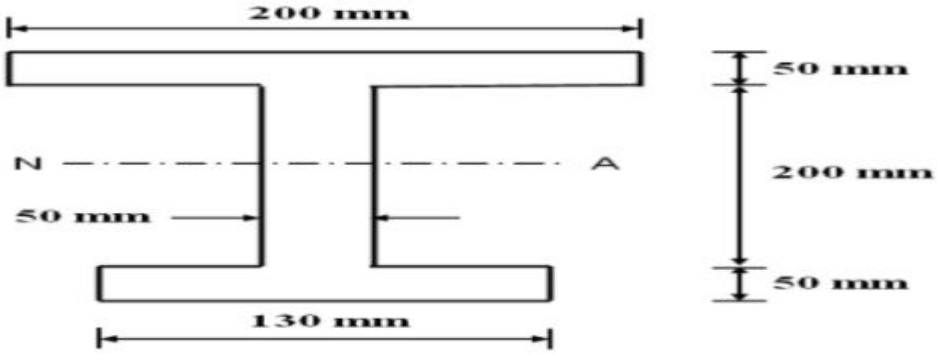
UNIT-II

3.		Draw SFD and BMD for the simply supported beam and cantilever beam with full UDL of 20kN/m over a span of 10m. Also find magnitude and position of maximum bending moment and shear forces.	14 Marks
		(OR)	
4.		A beam 6 meters long is simply supported at the ends and carries a uniformly distributed load of 30 kN per meter run for a distance of 4 meters form the left end and also a point load 25 kN acting at 1 meter from the right end. Find the maximum shear force and bending moment and draw S.F and B.M diagrams.	14 Marks

UNIT-III

5.	a)	What do you mean by simple bending? What are the assumptions made in the theory of simple bending?	7 Marks
	b)	A rectangular beam 200mm deep and 300mm wide is simply supported over a span of 8m. What uniformly distributed load per meter the beam may carry, if the bending stress is not to exceed 120N/mm^2	7 Marks
		(OR)	

6. A cast iron bracket subject to bending has the cross section of I – form with unequal flanges is shown in Figure 1. Compute the position of the neutral axis and moment of inertia of the section about the neutral axis. If the maximum bending moment on the section is 40,000N-mm, compute the maximum bending stress. What is the nature of stress? 14 Marks



UNIT-IV

7. A beam of triangular cross section having base width of 100mm and height of 150mm is subjected to a shear force of 15kN. Find the value of maximum shear stress, and sketch the shear stress distribution along the depth of beam. 14Marks

(OR)

8. a) Prove that the maximum shear stress in a circular section of a beam is 4/3 times the average shear stress. 7 Marks

   b) A rectangular beam 100mm wide and 250mm deep is subjected to a maximum shear force of 50kN. Determine (i) average shear stress (ii) maximum shear stress and (iii) shear stress at a unit distance of 25mm above the N.A. 7 Marks

UNIT-V

9. Determine the safe diameter of a solid shaft which will transmit 337.7kW at 300 r.p.m. The maximum shear stress should not exceed 35 N/mm^2 and twist should not be more than 1^0 in a shaft of length 2.5m. Take modulus of rigidity = $9x10^4$ N/mm^2 14 Marks

(OR)

10. a) Write the assumptions of torsional equation. 7 Marks

    b) Derive the Torsional rigidity equation. 7 Marks

AR16

CODE: 16EE2008 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, June-2022

ELECTRICAL CIRCUIT ANALYSIS

(Electrical and Electronics Engineering)

Time: 3 Hours **Max Marks: 70**

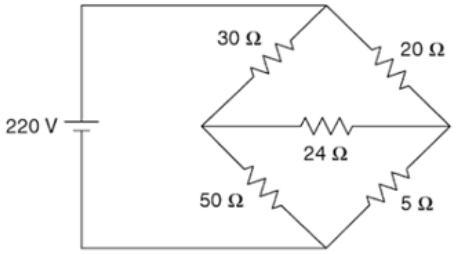
Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

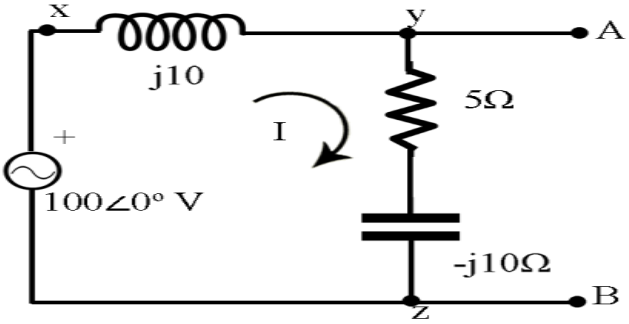
1. State and explain Thevenin's theorem 14M

(OR)

2. a Find the current through the 24ohms resistor using Thevenin's theorem 7M

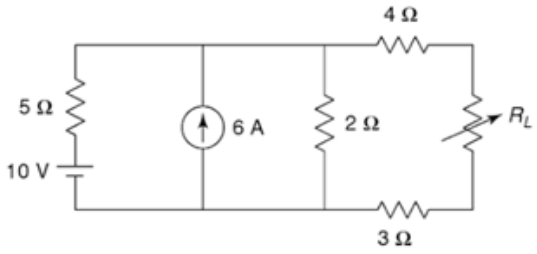


b Find Nortons's equivalent across AB 7M



UNIT-II

3. a. Find the value of resistance RL for maximum power transfer and calculate maximum power 9M

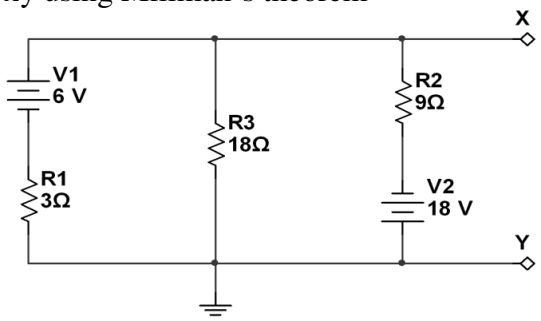


b. State and prove Milliman's theorem 5M

(OR)

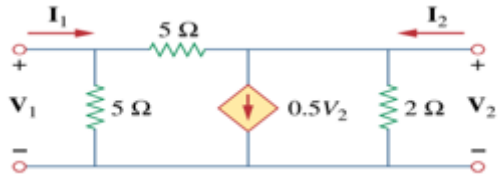
4. a. Explain compensation theorem 7M

b. Determine Vxy using Millman's theorem 7M



UNIT-III

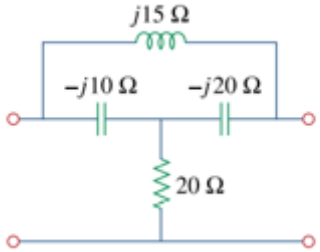
5. a. Determine Y- parameters for the given network 7M



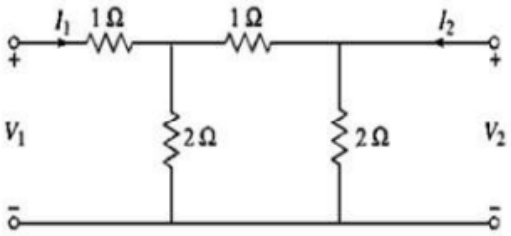
b. Obtain the relationship between ABCD and hybrid parameters 7M

(OR)

6. a. Determine transmission parameters for the given network 7M



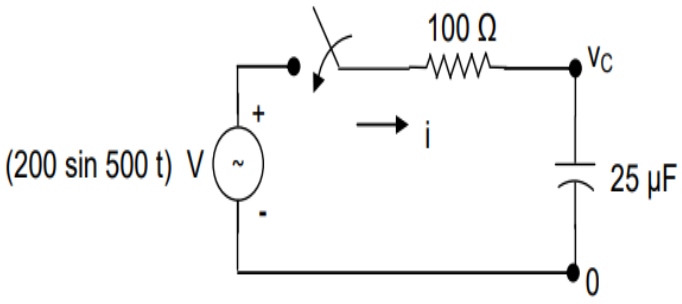
b. Find the Z- parameters of the network 7M



UNIT-IV

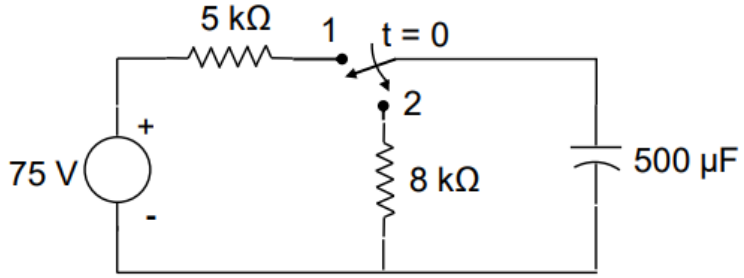
7. a. A series RLC circuit comprises of R=10 ohms, L= 0.5H & C=1 μf is excited by a constant voltage source of 100V. Obtain the expression for the current. Assume that the circuit is relaxed initially. 7M

b. For the circuit shown below, find the transient current, assuming that the initial charge on the capacitor as zero, when the switch is closed at time t = 0. 7M



(OR)

8. a. The switch in circuit shown was in position1 for a long time. It is moved from position 1 to position 2 at time t = 0. Sketch the wave form of Vc(t) for t > 0. 7M



b. In an RC circuit, having a time constant of 2.5 ms, the capacitor discharges with initial voltage of 80 V. (a) Find the time at which the capacitor voltage reaches 55 V, 30 V and 10 V (b) Calculate the capacitor voltage at time 1.2 ms, 3 ms and 8 ms. 7M

UNIT-V

9. a. Explain the procedure for realization of RC network in foster form. 7M

b. Find the first and second Foster form of the driving point impedance function of LC network is $Z(s) = 2(S^2 + 1)(S^2 + 9) / [S(S^2+4)]$ 7M

(OR)

10. a. Synthesize the following LC impedance function in Cauer forms. 7M

$$Z(s) = \frac{10s^4 + 12s^2 + 1}{2s^3 + 2s}$$

b. Test whether the following polynomials are Hurwitz or not 7M

$i)$ $P(s) = 2s^4 + 5s^3 + 6s^2 + 3s + 1$

$ii)$ $P(s) = s^5 + 3s^3 + 2s$

AR16

CODE: 16EC2006 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, June-2022

ELECTRONIC CIRCUITS – I

(Electronics and Communication Engineering)

Time: 3 Hours **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

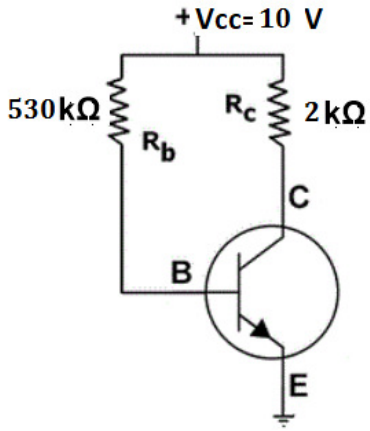
1. a) With circuit and necessary waveforms explain the operation of Full wave rectifier. 10M
   b) Compare the parameters of HWR and FWR. 4M

(OR)

2. a) Draw the circuit diagram and derive the expression for ripple factor of HWR with an capacitor filter? 8M
   b) Derive FWR parameters ripple factor, rectification efficiency and transformer utilization factor. 6M

UNIT-II

3. a) Explain diode compensation circuit for variations in I_{Co} for self bias circuit. 6M
   b) Draw the DC load line and locate the operating point for the fixed biasing transistor circuit shown in Fig. 1. Assume β= 60. 8M



(OR)

4. a) Explain the self bias circuit. 8M
   b) Explain thermister and sensistor bias compensation techniques. 6M

UNIT-III

5. a) Find expressions for voltage gain, current gain, Input impedance and output impedances of CE amplifier using simplified hybrid model. 10M
   b) Discuss how h – parameters can be obtained from transistor characteristics. 4M

(OR)

6. a) A common emitter amplifier has the following components: $R_s = 600\Omega$, $R_C = 5.6k\Omega$, $R_L = 39k\Omega$. The transistor parameters are $h_{ie} = 1.1k\Omega$, $h_{fe} = 50$, $h_{re} = 2.5\times10^{-4}$ and $h_{oe} = 24\mu A/V$. Calculate R_i, R_o, A_v and A_i. 8M

b) Draw the h-parameters small signal model for common collector, common base and common emitter amplifier. 6M

UNIT-IV

7. a) Draw the CE amplifier and formulate an expression for Ai, Ri and Av using approximate model. 7M

b) Explain CB hybrid model 7M

(OR)

8. a) State and prove Dual of Miller's theorem. 7M

b) Demonstrate the small signal equivalent circuit of a JFET. 7M

UNIT-V

9. a) Explain the general characteristics of negative feedback amplifiers. 10M

b) A single stage CE amplifier has a Voltage gain of 600 without feedback. When feedback is employed, its gain reduces to 50. Calculate the percentage of the output which is fed back to the input. 4M

(OR)

10. a) Formulate the expression for input impedance (Zif) and output impedance (Zof) of current series feedback amplifier. 8M

b) Compute the feedback factor when the gain of an amplifier is decreased from 4000 to 2000 after applying a feedback. 6M

AR13

CODE: 13CE2001 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, June-2022
STRENGTH OF MATERIALS-I
(Civil Engineering)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1. a) Define stress and strain
   b) List any four types of loads acting on beams.
   c) Sketch the variation of bending stress over an I section.
   d) What is shear stress?
   e) State the importance of calculating deflection of beams.
   f) State the relationship between young's modulus and modulus of rigidity.
   g) Define shear force and bending moment.
   h) What is the importance of section modulus?
   i) What is the ratio of maximum shear stress to average shear stress of a rectangular section?
   j) State moment of area theorems.

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

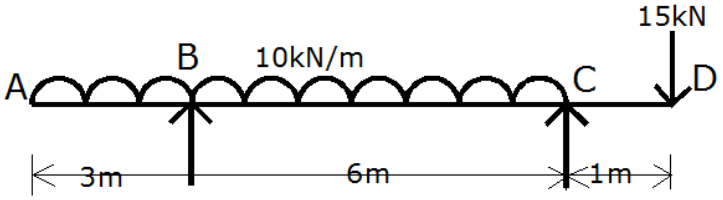
2. a) A bar of 25 mm diameter is subjected to a pull of 40 kN. The measured extension on gauge length of 200 mm is 0.085 mm and change in diameter is 0.003 mm. Calculate poission's ratio and value of young's modulus and modulus of rigidity. 6
   b) Derive the relation between modulus of elasticity and modulus of rigidity. 6

(OR)

3. a) A steel rod of 3 cm diameter and 5 m long is connected to two grips and the rod is maintained at a temperature of 90^0C. Determine the stress and pull exerted when the temperature falls to 30^oC, if (i) the ends do not yield and (ii) the ends yield by 0.13 cm. Take E = $2.1x10^5$ N/mm^2 and $\alpha = 12x10^{-6}/^o$C. 8
   b) A bar of length 20 cm tapers uniformly from 40 mm dia. to 35 mm dia. calculate the change in its length due to an axial pull of 100 kN, if E = 200 GPa. 4

UNIT-II

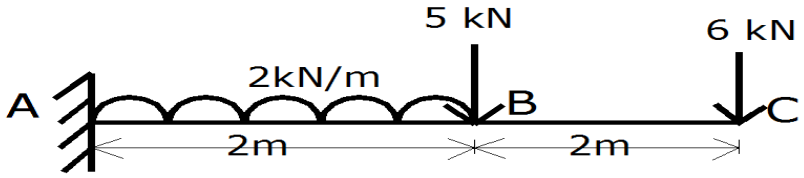
4. a) Derive the expression for the relation between bending moment and shear force. 4
   b) Draw the shear force and bending moment diagrams. 8



(OR)

5. a) What do you mean by point of contraflexure and state any one difference between point of contraflexure and point of inflextion? 4

b) Draw the shear force and bending moment diagram for the beam. 8



UNIT-III

6. A timber beam of rectangular section of length 8 m is simply supported. The beam carries a UDL of 12 kN/m run over the entire length and a point load of 10 kN at 3 m from the left support. If the depth is two times the width and the stress in the timber is not to exceed 8 N/mm^2, find the suitable dimensions of the section. 12

(OR)

7. a) Derive the bending equation from first principles. 8

b) A cantilever of length 2 m fails when a load of 2 kN is applied at the free end. If the section of the beam is 40 mm * 60 mm, find the stress at the failure. 4

UNIT-IV

8. An I – section beam 350 mm × 250 mm has a web thickness of 12 mm and flange thickness of 20mm. It carries a shear force of 120 kN. Sketch the shear stress distribution across the section. 12

(OR)

9. a) Derive an expression $\tau = Fay/ Ib$. 6

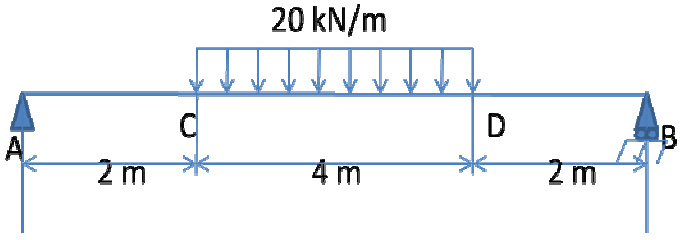
b) A timber beam of rectangular section is simply supported at the ends and carries a point load at the centre of the beam. The maximum bending stress is 12 N/mm^2 and maximum shear stress is 1 N/mm^2, find the ratio of span to the depth. 6

UNIT-V

10. A simply supported beam of span 5 m, carrying a point load of 5 kN at a distance of 3 m from the left end. Find (i) slope at the left support, (ii) deflection under the load and (iii) maximum deflection. Take E= 2 x 10^5 N/mm^2 and I = 1 x 10^8 mm^4. Use double integration method 12

(OR)

11. a) Derive the expressions for slope and deflection for the following beam using Macaulay's method.



6

b) Determine the slopes at A,B and deflection at the centre of the span for the above beam. 6

AR13

CODE: 13EE2004 **SET-2**

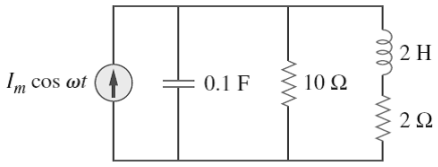
ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, June-2022
ELECTRICAL CIRCUIT ANALYSIS-I
(Electrical & Electronics Engineering)

Time: 3 Hours **Max Marks: 70**

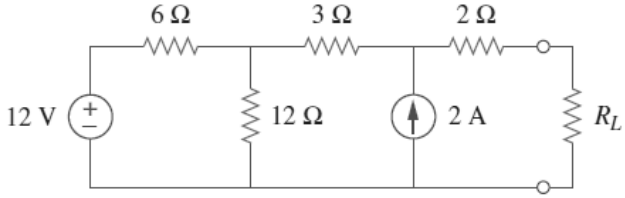
PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

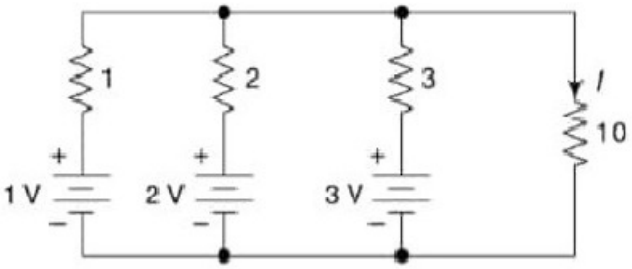
1. a) Define Kirchoff's Current law.
   b) Find the resonant frequency of the circuit.



   c) What is planar graph?
   d) List any four properties of Tree.
   e) Define Norton's theorem.
   f) What is meant by superposition theorem?
   g) Find the value of R_L for maximum power transfer in the below circuit



   h) Find the load current, *i* using millman's theorem. All resistor values are in ohms



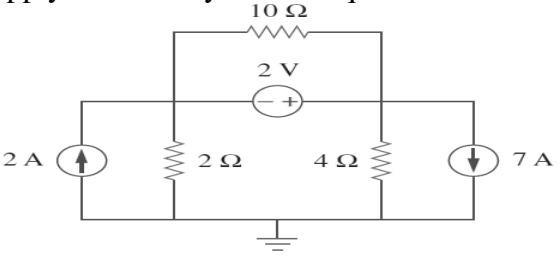
   i) What is reciprocal network?
   j) The z- parameters of a two port network are Z_{11}=20 Ω, Z_{22}=30 Ω, Z_{12}=Z_{21}=10Ω. Find A and B parameters of the network.

PART-B

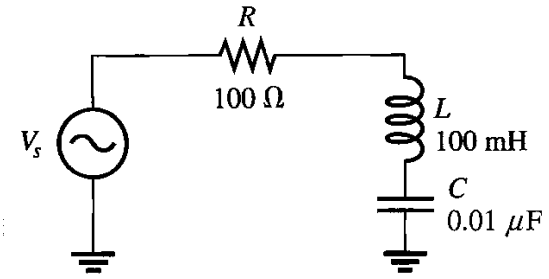
Answer one question from each unit **[5x12=60M]**

UNIT-I

2. a) Apply nodal analysis technique in the below figure to find the node voltages. [6M]



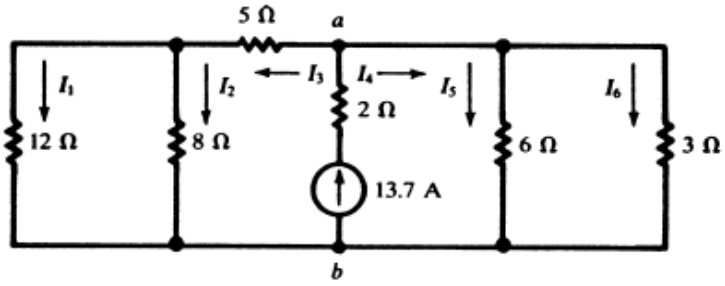
b) For the circuit shown in figure, solve for the impedance magnitude in the following frequencies (i) resonant frequency (ii) 1000Hz below resonant frequency. [6M]



(OR)

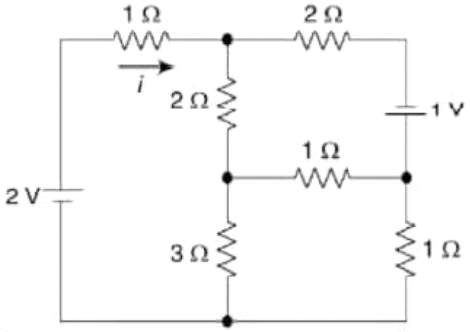
3. a) An RLC series circuit has a current which lags the supply voltage by 45 degree. The voltage across the inductance has the maximum value equal to twice the maximum value across capacitor. Voltage across inductance is 300sin(1000t) and R= 20 ohms. Find thevalue of L and C. [6M]

b) Find all branch currents in the network shown in figure. [6M]



UNIT-II

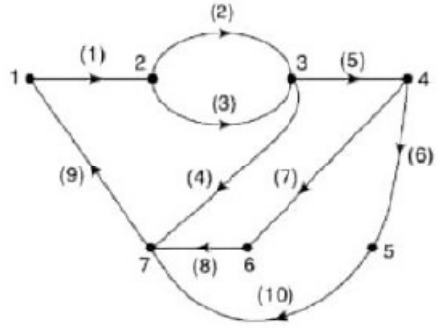
4. a) For the network shown in below figure, construct the oriented graph and obtain the tie set matrix. [6M]



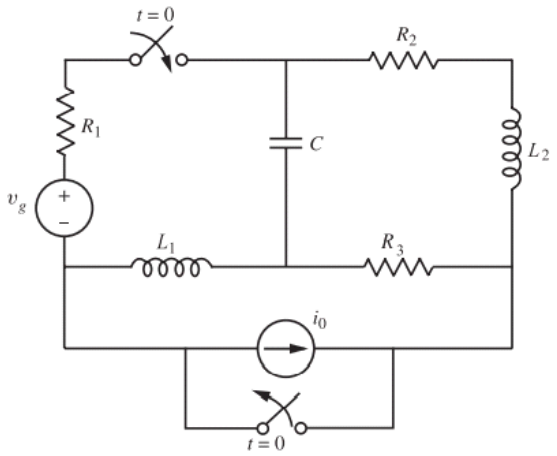
b) Make use of the tie-set matrix to find the current, 'i' as shown in figure 4a [6M]

(OR)

5. a) Draw the tree and find i) Complete incidence matrix ii) Reduced incidence matrix. [6M]

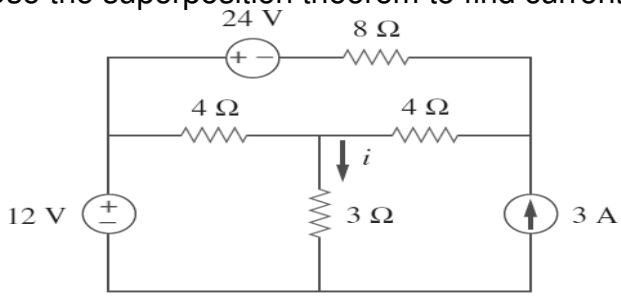


b) Construct the dual network for the following circuit. [6M]

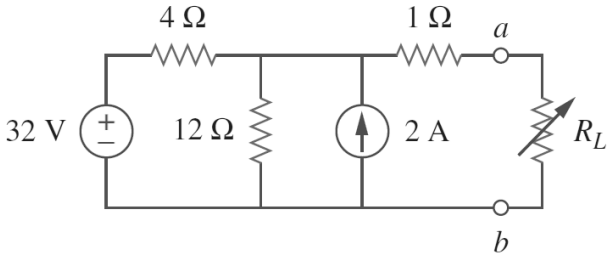


UNIT-III

6. a) Use the superposition theorem to find current,*i*. [6M]



b) Find the Thevenin equivalent circuit of the figure. Then find the current throughR_L when R_L is 6Ω. [6M]

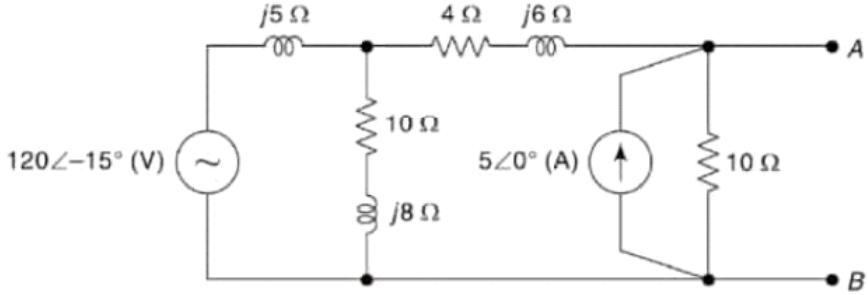


(OR)

7. State and explain the Norton's theorem with suitable example. [12M]

UNIT-IV

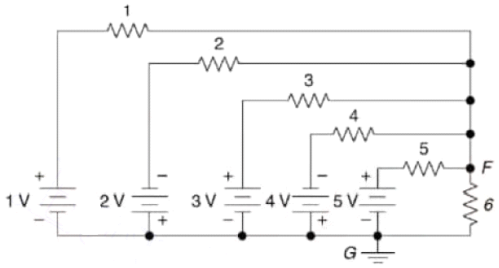
8. a) A loudspeaker is connected across terminals A and B of the network. What should be the impedance to obtain maximum power dissipation in it? [6M]



b) State and explain millman's theorem. [6M]

(OR)

9. a) Find the potential of node F with respect to node G by using millman theorem. All resistor values are in ohms [6M]



b) State and explain maximum power transfer theorem. [6M]

UNIT-V

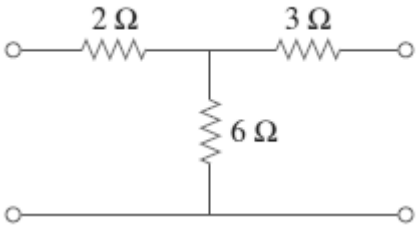
10. a) Find [z] of a two port network if [6M]

$$[T] = \begin{bmatrix} 10 & 1.5\Omega \\ 2S & 4 \end{bmatrix}$$

b) Define h-parameters. Derive the equations to obtain the h-parameters from z-parameters. [6M]

(OR)

11. a) Find the hybrid parameters for the two-port network shown in figure. [6M]



b) Define y-parameters. Derive the equations to obtain y-parameters from z-parameters. [6M]

***

AR13

CODE: 13CS2003 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, June-2022
MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE
(Common to CSE and IT)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1. a) What is CNF?
   b) Construct the Truth Table for P<->Q.
   c) Write the properties of Well-formed formula.
   d) What is Tautology? Give an Example.
   e) What is Euler's Circuit?
   f) What is Bi-partite Graph?
   g) Give an example for Prime Factorization?
   h) Define Group?
   i) What is abelian group?
   j) Define Recurrence Relation with example.

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2. a) Prove that $(\neg P \wedge (\neg Q \wedge R)) \vee (Q \wedge R) \vee (P \wedge R) \Leftrightarrow R$. 6M

   b) Obtain the PDNF for $(P \wedge Q) \vee (\neg P \wedge R) \vee (Q \wedge R)$. 6M

(OR)

3. a) Show that $S \vee R$ is tautologically implied by $(P \vee Q) \wedge (P \rightarrow R) \wedge (Q \rightarrow S)$. 4M

   b) Write the following statements in symbolic form 8M

   (i). Something is good

   (ii). Everything is good

   (iii). Nothing is good

   (iv). Something is not good.

UNIT-II

4. a) Find the gcd of 42823 and 6409 using Euclids algorithm. 6M

   b) Find 7^{222} mod 11. 6M

(OR)

5. a) Find the greatest common divisors of the following pairs of integers 144 and 118. 6M

   b) Explain about Fundamental Theorem of Arithmetic. 6M

UNIT-III

6. a) Discuss about planar and non-planar graph with suitable example. 6M

   b) Using Prim's algorithm, find a minimal spanning tree with suitable weighted graph 6M

(OR)

7. a) What is Walk, Trail, Paths and circuit? Explain with suitable graphs examples. 8M
   b) How to determine adjacency matrix for a graph. Explain properties of adjacency matrix. 4M

UNIT-IV

8. a) Prove that G=(-1,1,i,-i) is an abelian group under multiplication. 8M
   b) Explain about properties of Monoid. 4M

(OR)

9. a) Show that the set {1,2,3,4,5} is not a group under multiplication modulo 6. 6M

   b) Show that (Z,*) is a group, where * is defined by a*b=a+b+1. 6M

UNIT-V

10. a) Solve $a_n = 6a_{n-1} - 9a_{n-2}$ with initial conditions $a_0=4$ and $a_1=6$? 6M

    b) Solve $a_n = 3a_{n-1} + 2^n$ with initial conditions $a_0=27$. 6M

(OR)

11. a) Solve $a_n = a_{n-1} + n$ where $a_0 = 2$ by substitution? 6M

    b) Solve the following recurrence relation $a_n = 5\ a_{n-1} + 6\ a_{n-2} = 0$, $n >= 2$ by the generating function method with $a_0 = 3$, $a_1 = 3$. 6M

***