AR23

CODE: 23CET101 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Regular & Supplementary Examinations, June , 2025

CONSTRUCTION MATERIALS AND CONCRETE TECHNOLOGY

(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

			Marks	CO	Blooms Level
		UNIT-I			
1.	a)	Explain the characteristics of good building stones.	7	1	2
	b)	Discuss the classification of timber and its uses in construction.	7	1	2
		(OR)			
2.	a)	Explain in detail the composition and properties of cement.	10	1	2
	b)	Differentiate between chemical and mineral admixtures with examples.	4	1	2
		UNIT-II			
3.	a)	Define workability and explain the factors affecting workability.	7	2	2
	b)	Explain the Vee-Bee Consistometer test for measuring workability.	7	2	2
		(OR)			
4.	a)	Discuss in detail the steps involved in the manufacture of concrete.	10	2	2
	b)	Explain segregation and bleeding in fresh concrete.	4	2	2
		UNIT-III			
5.	a)	Define hardened concrete and explain the factors affecting its strength.	7	3	2
	b)	Explain in detail the split tensile strength test of concrete.	7	3	2
		(OR)			
6.	a)	Explain Abram's Law and discuss its significance in concrete mix design.	4	3	2
	b)	Discuss the various factors affecting the durability and strength of concrete.	10	3	2
		UNIT-IV			
7.		Define special concretes and discuss in detail different types of special concretes.	14	4	2
		(OR)			
8.		Explain in detail the properties, advantages, and applications of self-compacting concrete.	14	4	2
		UNIT-V			
9.		Design a concrete mix of M40 grade as per IS 10262.	14	5	2
		(OR)			
10.	a)	Define mix design and discuss the important factors influencing mix proportioning.	7	5	2
	b)	Explain the factors affecting the durability of concrete.	7	5	2

AR23

CODE: 23ECT102 SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Regular & Supplementary Examinations, June , 2025

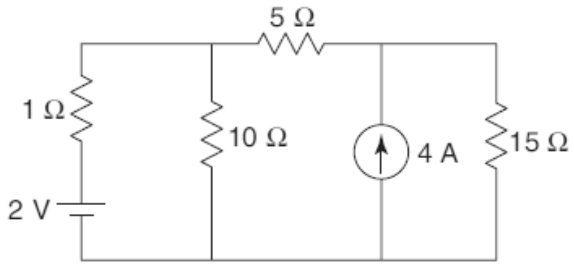
NETWORK ANALYSIS

(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

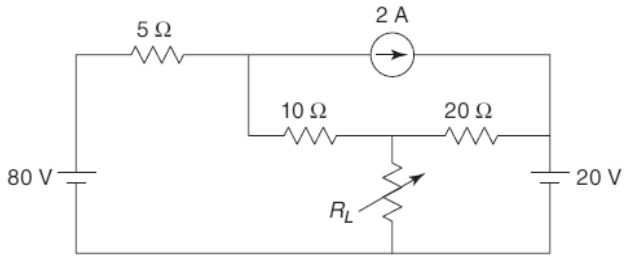
		UNIT-I	Marks	CO	BTL
1.	a)	Find the current through 10Ω resistor using Mesh analysis.	7	1	2



	b)	State and explain the Superposition theorem with a suitable example.	7	1	2

(OR)

2.	a)	Find the value of resistance R_L in the fig for maximum power transfer and calculate the maximum power.	7	1	2



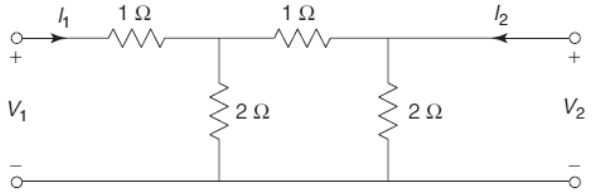
	b)	State and explain the Thevenin's, theorem with a suitable example.	7	1	2

UNIT-II

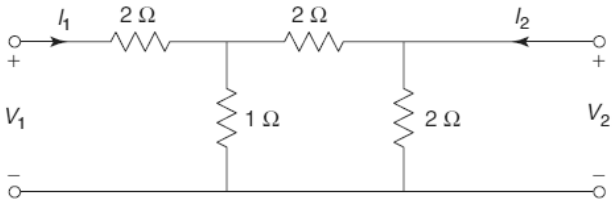
3.	a)	Explain the Relationship between Z & Y Parameters.	7	2	2
	b)	The Z parameters of a two port network are $Z_{11} = 20\Omega$, $Z_{22} = 30\Omega$, $Z_{12} = Z_{21} = 10\Omega$. Find Y parameters.	7	2	2

(OR)

4.	a)	Obtain ABCD parameters for the network shown in fig	7	2	2

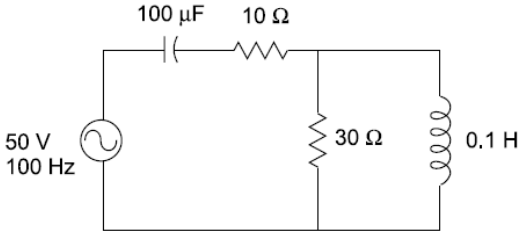


	b)	Two identical sections of the network shown in fig are connected in cascade. Obtain the transmission parameters of the overall connection.	7	2	2

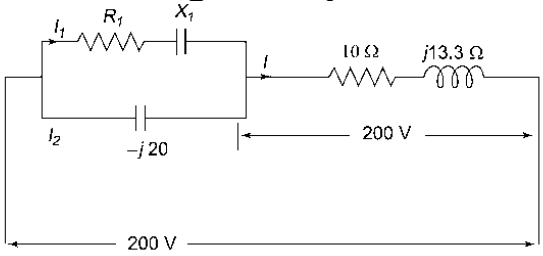


UNIT-III

5.	a)	For the circuit shown in fig, determine the total current I_T , phase angle Θ and voltage across each element.	7	3	2

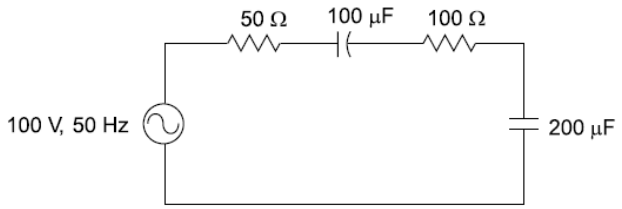


	b)	Find the value of R_1 and X_1 when a lagging current in the circuit gives a power of 2KW.	7	3	2



(OR)

6.	a)	For the circuit shown in fig, determine the impedance, phase angle and total current.	7	3	2



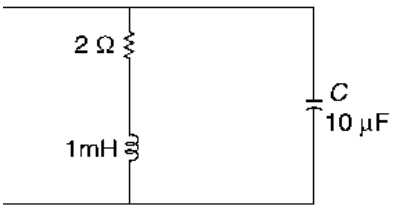
	b)	Two circuits the impedance of which Z_1 = (10 +j15)Ω and Z_2 = (6+j8)Ω are connected in parallel. If the total current supplied is 15 A, what is the power taken by each branch.	7	3	2

UNIT-IV

7.	a)	Derive the expression for bandwidth of a series RLC resonant circuit?	7	4	2
	b)	Obtain the expression for the frequency at which maximum voltage occurs across the capacitance in series resonant circuit in terms of the quality factor and resonance frequency?	7	4	2

(OR)

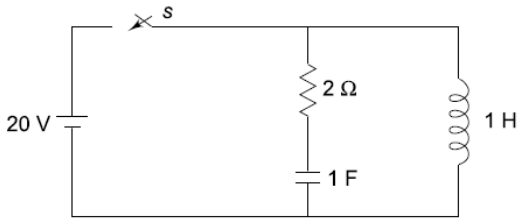
8.	a)	In the parallel resonant circuit determine the resonance frequency, dynamic resistance and bandwidth for the circuit shown in fig.	7	4	3



	b)	Draw the locus diagram for a series RL circuit with variable reactance.	7	4	2

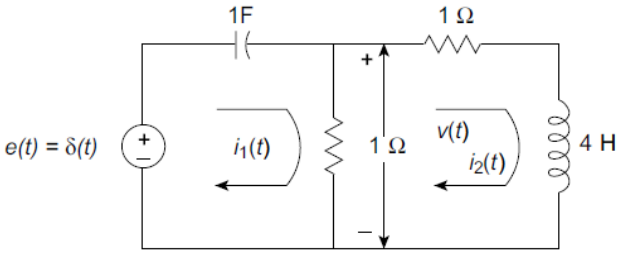
UNIT-V

9.	a)	Draw and explain DC transient response series RL circuit.	7	5	3
	b)	For the circuit shown in fig, determine the current delivered by the source when the switch is closed at t=0. Assume that there is no initial charge on the capacitor and no initial current through the inductor.	7	5	3

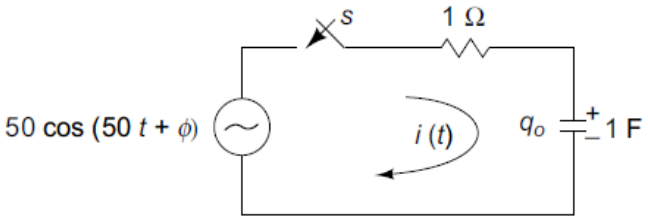


(OR)

10.	a)	In the circuit shown in fig determine the voltage v(t). The capacitor and inductor are initially de energised.	7	5	3



	b)	For the circuit shown in fig, determine the current when the switch is closed at a time corresponding to ϕ = 0. Assume initial charge on the capacitor is q_0 = 2 C with polarity shown.	7	5	3



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CODE: 23EET101 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Regular & Supplementary Examinations, June , 2025

SWITCHING THEORY AND LOGIC DESIGN

(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

			Marks	CO	BTL
		UNIT-I			
1.	a)	Convert the following numbers into decimal numbers i) 1011011101101110_2 ii) A0CB.EE $_{16}$	7	1	3
	b)	Perform the subtraction using 1's complement and 2's complement methods. (i)11010 – 10111 (ii)11000 – 1010	7	1	3
		(OR)			
2.	a)	Express the following numbers in decimal: (i) $(26.24)_8$ (ii) $(16.5)_{16}$	7	1	3
	b)	Perform the following subtraction in binary using 1's and 2's complement method: $(677)_{10} - (899)_{10}$	7	1	3
		UNIT-II			
3.	a)	Determine the complement of the given Boolean functions and simplify them to the minimum number of literals. a) (b c' +a' d) (ab' +cd') b) (b' d+ a' b c' +a c d+ a' b c)	7	2	2
	b)	Simplify the following functions using K-map method. i) f(A,B,C,D)= ∑ m (7,13, 14, 15) ii) F(A,B,C,D) = ∑ m (1,3,5,8,9,11,15)	7	2	2
		(OR)			
4.	a)	Convert the given expression in standard SOP form f(A,B,C)=AC+BA+BC	7	2	2
	b)	Simplify the following Boolean function using K –Map method in POS form. F=Π (2,3,4,6,9,11,12,13).	7	2	2
		UNIT-III			
5.	a)	Explain the importance of a full subtractor and illustrate its design using logic gates.	7	3	2
	b)	Draw the logic diagram 4-bit binary adder-subtractor circuit and explain its operation.	7	3	2
		(OR)			
6.	a)	Demonstrate the implementation of a full adder using two half adders and justify its functionality.	7	3	3
	b)	Design a 4 bit carry look ahead adder circuit.	7	3	3
		UNIT-IV			
7.	a)	Implement full adder using decoder and OR gates.	7	4	3
	b)	Design a 1:8 demultiplexer using two 1:4 demultiplexer.	7	4	3
		(OR)			
8.	a)	Design 3-bit digital comparator and explain with neat sketch.	7	4	3
	b)	Implement 16 : 1, 8 : 1 MUX using ∑ m (1,3,5,8,9,11,15).	7	4	3
		UNIT-V			
9.	a)	Illustrate and describe the operation of the SR flip-flop using its characteristic table and characteristic equation.	7	5	2
	b)	Convert JK flip-flop to T flip-flop	7	5	2
		(OR)			
10.	a)	Design a decade counter using T flip-flops.	7	5	3
	b)	Design and analyze a 3-bit universal shift register with a detailed explanation of its working principles.	7	5	3

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ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Regular & Supplementary Examinations, June , 2025

THERMODYNAMICS

(MECHANICAL 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

			Marks	CO	BTL
		UNIT-I			
1.	a)	Explain the following in brief (i)Macroscopic and microscopic viewpoints applied to the study of thermodynamics. (ii) State, Path, Process and cycle.	7M	1	1
	b)	Explain the quasistatic process and the concept of continuum.	7M	1	2
		(OR)			
2.	a)	In what respects are the heat and work interactions (i) similar and (ii) dissimilar and derive expression for Pdv work and heat interaction for closed system under going isothermal process.	7M	1	2
	b)	A gas contained in a piston cylinder arrangement expands from 0.75 m^3 to 1.25 m^3 under constant pressure process at a pressure of 200kPa. If the gaseous system receives 80 kJ of work from a paddle wheel, determine the net work done by the system.	7M	1	3
		UNIT-II			
3.	a)	What is the essence of first law of thermodynamics, first law applied to cycle and Show that the internal energy is a property of the system?	7M	2	3
	b)	Air initially at 300kPa pressure and 0.02 m^3 volume expands according to pV= constant until the pressure reduces to 150 kPa. Subsequently it is compressed at constant pressure to its original volume of 0.02 m^3. Sketch the process on p-V diagram and make calculations for the work interaction per unit mass of air.	7M	2	3
		(OR)			
4.	a)	Write the steady flow energy equation and point out the significance of various terms involved.	4M	2	3
	b)	0.8 kg/s of air flows through a compressor under steady state conditions. The properties of air at entry are: pressure 1 bar, velocity 10m/s, specific volume 0.95 m^3/kg and internal energy30 kJ/kg. The corresponding values at exit are 8 bar, 6 m/s, 0.2 m^3/kg and 124 kJ/kg. The outlet is in-line with the intake. Determine the power input to compressor and the pipe diameter at entry and exit.	10M		

UNIT-III

5.	a)	What are the limitations of the first law of thermodynamics and explain the working of heat engine and refrigerators with a simplified sketch?	7M	3	2
	b)	Determine the power required to run a refrigerator that transfers 2000 kJ/min of heat from a cooled space at 0 0C to the surrounding atmosphere at 27 0C. The refrigerator operates on a reversed Carnot cycle.	7M	3	4

(OR)

6.	a)	State and prove the Inequality of Clausius.	7M	3	3
	b)	A lump of steel of mass 8 kg at 1000K is dropped in 80 kg of oil at 300 K. Make calculations for the entropy change of steel, the oil and the universe. The specific heats of steel and oil as 0.5 kJ/kg.K and 3.5 KJ/kg K, respectively.	7M	3	4

UNIT-IV

7.	a)	Derive an expression for a decrease in available energy when heat transfer through finite temperature difference.	7M	4	3
	b)	0.25 kg of air at constant pressure and a temperature of 250^0C receives 300 kJ of heat reversibly. Determine the available and unavailable energy if the temperature of the surroundings is 27°C. Take c_p of air as 1.005 kJ/kg K.	7M	4	3

(OR)

8.	a)	Derive Maxwell's equations and state their importance in thermodynamics.	7M	4	3
	b)	Derive T-ds equations.	7M	4	3

UNIT-V

9.	a)	List the four processes that comprise the ideal Otto and Diesel cycles and show them on P-v and T-s coordinates	7M	5	2
	b)	Derive an expression for the air standard efficiency of an Otto cycle.	7M	5	3

(OR)

10.	a)	In an air-standard Diesel cycle, the pressure and temperature at the start of compression are 1 bar, 330 K, and the compression ratio is 16. The heat transfer to the air at constant pressure is 1250 kJ/kg. Determine the cycle efficiency, the maximum pressure, and the temperature of the cycle.	7M	5	4
	b)	Compare Otto, Diesel, and Duel cycles for (i) the same compression ratio and heat input and (ii) the same maximum pressure and heat input with the aid of p-V and T-s diagrams.	7M	5	3