Reg. No.															

Sri SAI RAM ENGINEERING COLLEGE

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Question Paper Code	14180

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2025

First Semester

Computer Science and Business Systems

24ESEE101 - PRINCIPLES OF ELECTRICAL ENGINEERING

Regulations - 2024

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	Work done by electric current is given by (a) VI (b) V/I (c) I/R (d) R/I	1	K1	CO1
2.	Kirchhoff's Current Law is based on conservation of (a) Charge (b) Energy (c) Momentum (d) Flux	1	K1	CO1
3.	Superposition theorem applies to (a) Non-linear circuits (b) Linear circuits (c) Magnetic circuits (d) Digital circuits	1	K1	CO2
4.	Star network equals delta network when (a) All resistances are equal (b) Product/sum rule satisfies (c) Voltage = current (d) PF = 1	1	K1	CO2
5.	Impedance of pure inductor (a) R (b) XC (c) XL (d) None	1	K1	CO3
6.	At resonance, series RLC has (a) Max impedance (b) Min impedance (c) Infinite power (d) Zero frequency	1	K1	CO3
7.	Permittivity indicates ability to (a) Conduct heat (b) Store electric energy (c) Oppose magnetism (d) Produce current	1	K1	CO4
8.	Energy stored in capacitor depends on (a) Voltage only (b) Plate area only (c) Capacitance & voltage (d) Resistance & current	1	K1	CO4
9.	Faraday's law relates emf to (a) Charge (b) Magnetic flux change (c) Resistance (d) Capacitance	1	K1	CO5
10.	Thermocouple works on (a) Hall effect (b) Seebeck effect (c) Piezoelectric (d) Photoelectric	1	K1	CO6

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

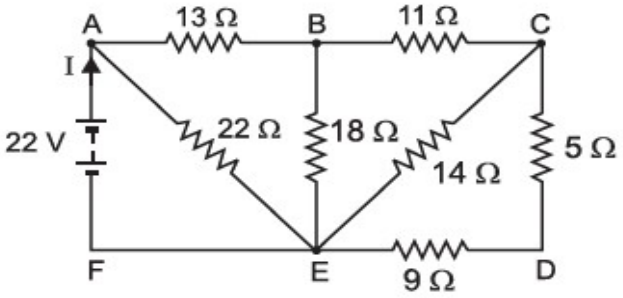
		Marks	K – Level	CO
11.	List the steps to convert a given voltage source into an equivalent current source.	2	K1	CO1
12.	Calculate energy consumed when a 10 Ω resistor carries 2 A for 5 s.	2	K3	CO1
13.	Compare mesh analysis and nodal analysis.	2	K2	CO2
14.	Explain steps to obtain Thevenin equivalent.	2	K2	CO2
15.	Derive impedance of series RL circuit.	2	K2	CO3
16.	Give the condition for series resonance.	2	K2	CO3
17.	Define Dielectric constant.	2	K1	CO4
18.	List any two engineering applications of electrostatics.	2	K1	CO4
19.	Differentiate between self and mutual inductance.	2	K2	CO5

20.		List practical transformer losses.	2	K1	CO5
21.		Draw block diagram of a transducer system.	2	K1	CO6
22.		Define accuracy and precision in context of measurement.	2	K1	CO6

PART - C (6 × 11 = 66 Marks)

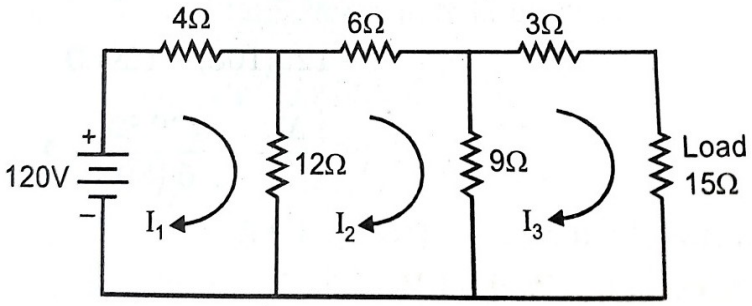
Answer ALL Questions

23.	a)	Solve the circuit shown in figure and find the value of current in the branch AF.	11	K3	CO1



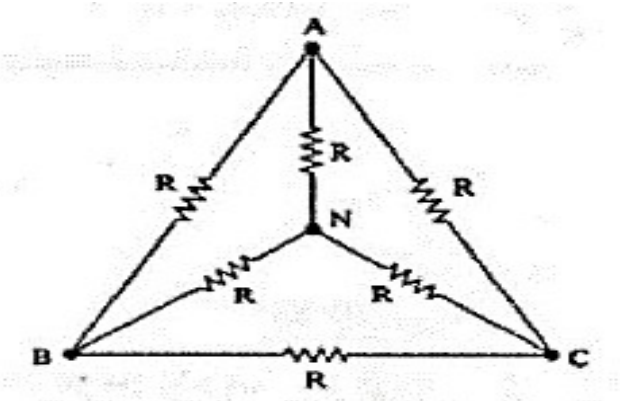
OR

	b)	Three resistances of values 2Ω, 3Ω and 5Ω are connected in series across 20V, D.C supply. Calculate (i) Equivalent resistance of the circuit (ii) The total current of the circuit (iii) The voltage drop across each resistor and (iv) The power dissipated in each resistor.	11	K3	CO1
24.	a)	Apply Mesh analysis and Find the load current and power delivered to 15Ω showin in figure below.	11	K3	CO2



OR

	b)	Six resistances each of R ohms are connected as shown. Calculate the equivalent resistance across the terminals B and C using star delta transformation.	11	K3	CO2



25.	a)	Explain the operation of RLC series AC circuit with relevant phasor diagram and derive the formulas for phase angle, Impedance, Admittance and power.	11	K2	CO3

OR

	b)	Compare single-phase and three-phase systems analytically with diagrams.	11	K2	CO3

26.	a)	Derive the expression for the potential and field between parallel plates with a dielectric.	*11*	*K2*	*CO4*
		OR			
	b)	Interpret permittivity in dielectrics and derive the expression for the energy stored in a capacitor.	*11*	*K2*	*CO4*
27.	a)	Derive the expression for induced emf using Faraday's law.	*11*	*K2*	*CO5*
		OR			
	b)	Summarize electromechanical energy conversion in an elementary system.	*11*	*K2*	*CO5*
28.	a)	Discus the measurement system using block representation indicating all functional elements.	*11*	*K4*	*CO6*
		OR			
	b)	Explain the working principles of thermocouple transducers.	*11*	*K4*	*CO6*