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(Revision-2021)

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Reg.No...........................

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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/ COMMERCIAL PRACTICE, NOVEMBER - 2022

FUNDAMENTALS OF ELECTRIC CIRCUITS

[Maximum marks: 75]   (Time: 3 Hours)

PART A

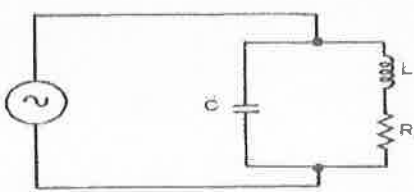**I. Answer all questions in one word or one sentence. Each question carries one mark.**

(9 x 1 = 9 Marks)

		Module outcome	Cognitive level
1	Name any one energy source in an electric circuit.	M1.01	R
2	In Norton's equivalent circuit current source and resistance are connected in............	M1.02	R
3	Convert 2 + j3 into polar form	M2.01	U
4	Write the condition for resonance in an RLC series circuit	M2.04	R
5	Give the equation for reactive power in a single-phase AC circuit	M2.02	R
6	List any one method of solving parallel circuits.	M3.02	R
7	The reciprocal of impedance is called.................	M3.02	R
8	Name any one type of 3 phase connection	M4.02	R
9	Give the relation between phase value and line value of current in a 3 φ delta connected system	M4.02	U

PART B

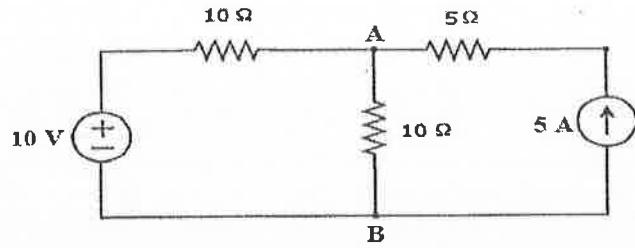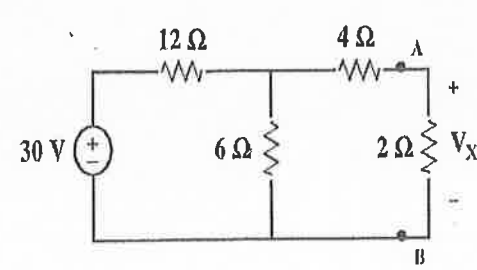**II. Answer any eight questions from the following. Each question carries three marks.**

(8 x 3 = 24 Marks)

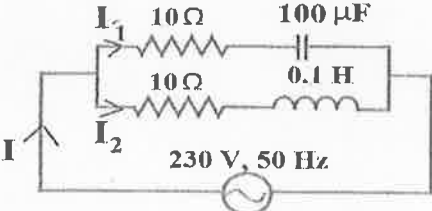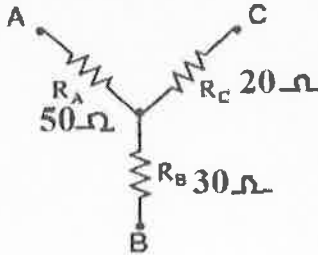|		Module outcome	Cognitive level
1	Explain the steps to Thevenize a circuit	M1.03	U
2	State reciprocity theorem.	M1.02	R
3	Two phasors are given as A= 4 + j3 and B = 5 + j6. Calculate $\frac{A}{B}$ in rectangular and polar form.	M2.01	U
4	Explain the nature of current and voltage in a pure inductive circuit with a neat figure.	M2.01	U
5	Derive the expression for resonant frequency in a series RLC circuit.	M2.04	U
6	A 10Ω resistor, 15 mH inductor and 100 μF capacitor are connected in parallel to a 200V, 50Hz, AC supply. Calculate the current in each branch.	M3.03	A

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7	A parallel circuit is given in Fig.1. Given R = 15Ω, C = 2.5 μF and L=260 mH. Calculate the resonant frequency.	M3.04	U
8	Draw the vector diagram of an AC circuit with R and L connected in parallel	M3.01	U
9	List any 3 advantages of 3 phase system.	M4.01	R
10	Write the expression of powers in a three-phase balanced system.	M4.04	R

PART C
Answer all questions. Each question carries seven marks   (6 x 7 = 42 Marks)

		Module outcome	Cognitive level
III	Using superposition theorem calculate the current in the branch AB of the circuit shown below.	M1.04	A
	OR		
IV	Calculate the voltage across 2Ω resistor using Thevenin's theorem	M1.04	A
V	Explain Norton's theorem along with the procedure to nortanize an electric circuit	M1.03	U
	OR		
VI	Explain (i) Maximum power transfer theorem (ii) Superposition theorem	M1.03	U
VII	A resistor of 10Ω, is connected in series with a 0.2H inductor, across a 230V, 50Hz supply. Calculate (i) current (ii) voltage across each component (iii) the power dissipated.	M2.03	A

VIII	**OR** An impedance of (8-j6)Ω is connected to a voltage source of (150 + j120) Volts. Calculate the current taken from the supply and power factor.	M2.03	A
IX	Two impedances $Z_1 = (10 + j5)$ Ω and $Z_2 = (25 - j10)$ Ω are connected in parallel across a 100 V, 50Hz AC source. Calculate the total current and power factor using admittance method.	M3.03	A
X	**OR** Draw the vector diagram for the following network. 	M3.03	A
XI	With the help of a vector diagram derive the relation between line voltage and phase voltage in a star connected system. **OR**	M4.02	U
XII	Write any 5 comparisons between a three-phase star and delta connected system.	M4.02	U
XIII	Three coils each with a resistance of 45 Ω and inductance 0.2 H are connected in delta to a 415V, 50Hz, 3 phase supply. Calculate the current in each coil and total power absorbed. **OR**	M4.04	A
XIV	Draw the equivalent delta connected network for the given star connected network 	M4.03	A

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