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(Revision - 2021)

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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/ COMMERCIAL PRACTICE, NOVEMBER - 2025

ELECTRIC CIRCUIT AND NETWORK THEORY

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

PART A

I. Answer all the following questions in one word or one sentence. Each question carries 1 mark.

(9 x 1 = 9 Marks)

		Module outcome	Cognitive level
1	Value of form factor for a sine wave is……..	M1.01	R
2	Power factor lies in the range ……	M1.03	R
3	Most important figure of merit of a resonant circuit is ……	M1.04	R
4	State KVL.	M2.01	R
5	In an induction motor, synchronous speed……with the number of poles.	M4.02	R
6	The basic law behind emf generation in DC machines is …….	M3.01	R
7	If the conductor moves in parallel to the direction of flux, then the emf produced will be equal to …….V	M4.01	R
8	Torque developed by single phase induction motor at starting is……	M4.02	R
9	The current that will flow through a 12 Ohm resistor maintained at 12 V is ……..	M2.01	U

PART B

II. Answer any eight questions from the following. Each question carries 3 marks.

(8 x 3 = 24 Marks)

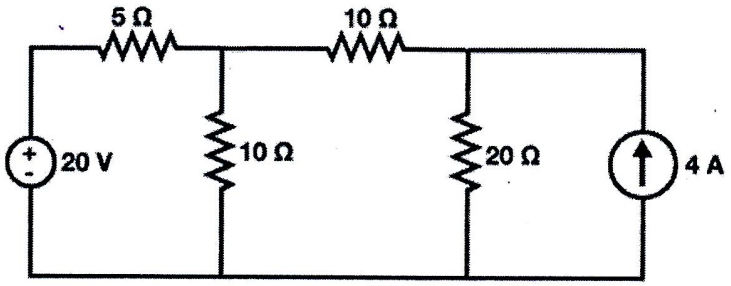
		Module outcome	Cognitive level
1	State and explain Thevinin's theorem.	M2.01	U
2	List the applications of Transformers.	M2.04	R
3	Explain the back emf in DC Motors.	M3.03	U
4	Explain the open circuit characteristics of an alternator.	M4.01	U
5	Derive the rms value of a full sine wave.	M1.01	U
6	Explain the terms (i) Active power (ii) Reactive power (iii) Apparent power	M1.03	R

7	Define a phasor and represent a leading waveform using phasor diagram.	M1.03	U
8	List the different losses of a transformer.	M2.03	R
9	List the applications of servomotor.	M4.03	R
10	Explain the working principle of three phase induction motor.	M4.04	U

PART C

Answer all questions. Each question carries seven marks.

(6 x 7 = 42 Marks)

		Module outcome	Cognitive level
III	A resistance of 20 ohm, an inductance of 0.2 H and a capacitor 150 μF in series combination is connected to a power supply of 250 V 50Hz. Calculate the power factor, active power and the reactive power.	M1.03	A
	OR		
IV	Prove that a pure capacitive load does not consume any power.	M1.02	U
V	Derive the emf equation of a transformer.	M2.03	U
	OR		
VI	State and prove maximum power transfer theorem and derive maximum power delivered to the load.	M2.02	U
VII	Find the current through 20 Ω using the superposition theorem. 	M2.02	A
	OR		
VIII	Illustrate the AC analysis of series RLC circuit. Draw the phasor diagram and impedance triangle.	M2.03	U
IX	Explain the construction of DC machines with the help of relevant diagrams.	M3.01	U

	OR		
X	Explain the no-load characteristics of a self-excited DC Shunt generator.	M3.01	U
XI	Explain the working of universal motor with the help of relevant diagrams.	M4.02	U
	OR		
XII	Explain the working of three phase induction motor with the help of relevant diagrams.	M4.04	U
XIII	Explain the working of a DC generator with the help of relevant diagrams.	M3.01	U
	OR		
XIV	Explain the working of three point starter for DC motor with the help of relevant diagrams.	M3.03	U

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