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

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.

(9x1=9 marks)

		Module Outcome	Cognitive level
1	..........is a rule which gives the direction of induced emf.	M 3.01	R
2	In Thevinin's equivalent circuit, Thevinin's resistance is connected in..........with the equivalent voltage source.	M 2.02	R
3	Power factor of a purely capacitive circuit is.......	M1.03	R
4	The current that will flow through a 12 Ohm resistor maintained at 12 V is...............	M2.01	U
5	DC component of an AC signal is given by its...........	M1.01	R
6	Unit of inductance is..........	M1.01	R
7	Impedance is ....for a series resonant circuit.	M1.04	R
8	Iron losses occur in the.........of a transformer.	M2.03	R
9	Torque developed by single phase induction motor at starting is............	M4.02	R

PART - B

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

(8x3=24marks)

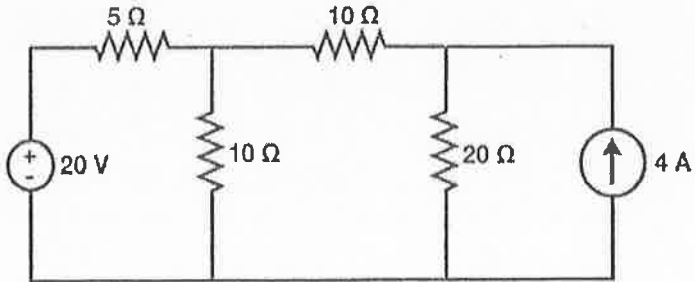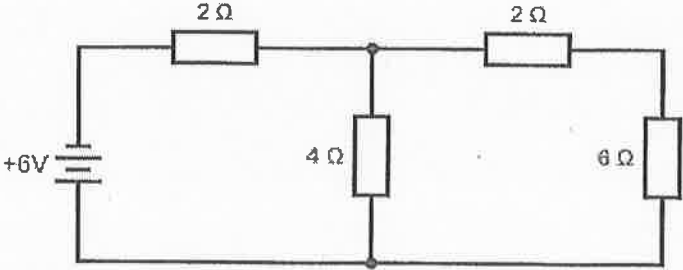|		Module Outcome	Cognitive level
1	List the applications of a stepper motor.	M 4.03	R
2	Define phasor. Illustrate a leading wave form for an angle 30 degrees with the help of phasor diagram.	M 1.03	U
3	Briefly explain the need for starters in dc motors	M3.03	U
4	Derive the rms value of a full sine wave.	M1.01	U
5	List the various effects of armature reaction.	M3.01	R
6	Draw the speed-torque characteristics of a DC series motor.	M3.01	U
7	Explain the difference between self excited and separately excited generator.	M3.02	U

8	Explain the different types of losses in a transformer.	M2.03	R
9	Explain the different parts of a transformer.	M2.03	U
10	Show that in a pure inductive circuit, current lags voltage by an angle 90 degrees.	M1.01	U

PART - C

Answer **all** questions from the following. Each question carries 7 marks.

(6x7=42marks)

		Module Outcome	Cognitive level
III	Derive the emf equation of a transformer.	M2.03	U
	OR		
IV	Derive the equation for Q for a parallel resonant circuit.	M2.04	U
V	Explain the working of a DC generator with the help of relevant diagrams.	M3.01	U
	OR		
VI	Draw and explain the electrical characteristics of DC shunt motor.	M3.02	U
VII	Explain the principle of operation of a stepper motor with the help of relevant diagrams.	M4.02	U
	OR		
VIII	Explain the constructional details of an alternator with the help of relevant sketches.	M4.04	U
IX	Find the current through 20Ω using the superposition theorem.	M2.02	A
	OR		
X	State Thevinin's Theorem. Calculate the current through the resistor of resistance 6 Ω.	M2.02	A

2 Ω   2 Ω

+6V   4 Ω   6 Ω

XI	Explain the working of three phase induction motor with the help of relevant diagrams.	M4.04	U
	OR		
XII	Explain the working universal motor with the help of relevant diagrams.	M4.02	U
XIII	Define the terms time period, frequency, rms value and form factor.	M1.01	R
	OR		
XIV	A 500 µH inductor, $80/\pi^2$ pF capacitor and a 628 Ω resistor are connected to form a series RLC circuit. Calculate the resonant frequency and Q-factor of this circuit at resonance.	M1.04	A

****

3