

**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

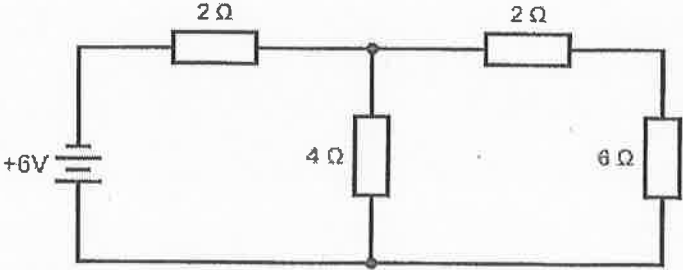
8	Explain the different types of losses in a transformer.	M2.03	R
9	Explain the different parts of a transformer.	M2.03	U
10	Show that in a pure inductive circuit, current lags voltage by an angle 90 degrees.	M1.01	U

**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.  <b>OR</b>	M2.03	U
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.  <b>OR</b>	M3.01	U
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.  <b>OR</b>	M4.02	U
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.  <div style="text-align: center;"> </div>	M2.02	A
X	State Thevenin's Theorem. Calculate the current through the resistor of resistance 6 Ω.	M2.02	A

			
XI	<p>Explain the working of three phase induction motor with the help of relevant diagrams.</p> <p style="text-align: center;"><b>OR</b></p>	M4.04	U
XII	<p>Explain the working universal motor with the help of relevant diagrams.</p>	M4.02	U
XIII	<p>Define the terms time period, frequency, rms value and form factor.</p> <p style="text-align: center;"><b>OR</b></p>	M1.01	R
XIV	<p>A 500 <math>\mu\text{H}</math> inductor, <math>80/\pi^2</math> pF capacitor and a 628 <math>\Omega</math> resistor are connected to form a series RLC circuit. Calculate the resonant frequency and Q-factor of this circuit at resonance.</p>	M1.04	A

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