TED (21) -2031
(Revision- 2021)

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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/ COMMERCIAL PRACTICE – APRIL - 2023

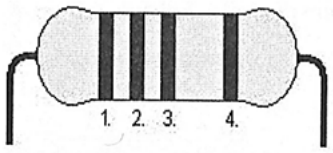
FUNDAMENTALS OF ELECTRICAL & ELECTRONICS ENGINEERING

(Maximum Marks : 75) [Time : 3 hours]

PART–A

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

(9x1=9 marks)

		Module Outcome	Cognitive level
1	State ohm's law.	M 1.01	R
2	Given the equation for instantaneous voltage of an AC circuit as e(t)=100 Sin (314t), the maximum value of voltage is……	M 1.04	A
3	The equation for power in a three phase AC circuit is …….	M2.02	R
4	Commercial unit of electrical energy is ……	M2.03	R
5	 The colour coding on the above resistor are as follows Band 1=Brown Band 2 = Black Band 3 = Orange, Band 4 = Gold The resistance value is ……..	M3.01	A
6	Three capacitors 4,6,7 micro farads connected in parallel, the effective capacitance is …….	M3.02	U
7	The device used to convert AC to DC is called as ……	M4.01	R
8	Draw the symbol of Zener diode.	M4.02	R
9	Transistor work as an amplifier when it is operated in …..... region.	M4.03	R

PART B

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

(8x3=24)

		Module Outcome	Cognitive level
1	With a neat diagram explain the generation of alternating voltage in a coil placed in a magnetic field.	M 1.03	U
2	Define service connection and state its purpose.	M 2.01	U

3	Explain Active power, Reactive Power and Apparent Power with respect to single phase AC circuit.	M2.02	R
4	Three 60 W lamps connected across a 230 V supply. Find the number of Units consumed if the three lamps are operated for 5hrs.	M2.03	A
5	State the importance of electric safety in a work place.	M2.04	R
6	List the classification of Resistors.	M3.01	R
7	Write any three comparisons between half wave and full wave center tapped rectifiers.	M4.01	R
8	Draw the symbol of semiconductor diode and illustrate its operation under forward biased condition.	M4.01	U
9	List any three applications of Zener diode.	M4.02	R
10	Match the following (a1) AND (a2) Y= A+B (a3) (b1) OR (b2) Y= $\overline{AB}$ (b3) (c1)NAND (c2) Y=AB (c3)	M4.04	R

PART C

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

(6x7=42marks)

		Module Outcome	Cognitive level
III	Draw an alternating voltage waveform and mark the following parameters on it. Write the Definition for each of them. i. Frequency ii. Maximum value iii. Time period iv. Cycle	M 1.04	U
	OR		
IV	Draw the circuit diagram of the following combinations of three resistors connected in (a) series (b) parallel Give any three comparison between these two circuits.	M1.02	U
V	A resistor of 12 Ω is connected in series with a combination of 15Ω and 20Ω resistor in parallel. When voltage of 120 V is applied across the whole circuit, find (a) the equivalent resistance of the combinations. (b) the total current taken from the supply.	M1.02	A

<table>
<tr><td></td><td>OR</td><td></td><td></td></tr>
<tr><td>VI</td><td>An alternating voltage is represented by the following expression.
V= 100 Sin 628 t.
Calculate the following
(a) Amplitude (b) Frequency (c) Time period
(d) instantaneous value of voltage at t=3s.</td><td>M1.04</td><td>A</td></tr>
<tr><td>VII</td><td>A residential Building has the following electrical load and appliances are operated as per the load details given. Calculate the following.
i. Total Connected Load in kW.
ii. Energy Consumption in kWh in one day.
iii. Monthly Electricity bill for a month of June at the rate of Rs. 7 per kWh.
<table><tr><th>Sl.No.</th><th>Load Details</th></tr><tr><td>1</td><td>5 Tube lights each 60 watts working 8 hours/day</td></tr><tr><td>2</td><td>An electric Iron 750 Watts working 1 hour/day.</td></tr><tr><td>3</td><td>4 fans each 60 watts working 10 hours/day.</td></tr><tr><td>4</td><td>A Mixer- 750 Watts working 2 hours/day.</td></tr></table></td><td>M2.03</td><td>A</td></tr>
<tr><td></td><td>OR</td><td></td><td></td></tr>
<tr><td>VIII</td><td>A circuit consisting of resistance 70Ω and inductive reactance 50Ω in series is supplied with an AC voltage of 300 V.
Determine
(a) Impedance of the circuit
(b) Power factor of the circuit
(c) Active power.</td><td>M2.02</td><td>A</td></tr>
<tr><td>IX</td><td>Define inductance of a coil and distinguish between self and mutual inductance.</td><td>M3.03</td><td>U</td></tr>
<tr><td></td><td>OR</td><td></td><td></td></tr>
<tr><td>X</td><td>Summarize the working of a transformer. Also define the turns ratio of the transformer.</td><td>M3.04</td><td>U</td></tr>
<tr><td>XI</td><td>Define capacitance and explain any four specifications of capacitors.</td><td>M3.02</td><td>U</td></tr>
<tr><td></td><td>OR</td><td></td><td></td></tr>
<tr><td>XII</td><td>Explain colour coding of resistors by band system with examples. Specify the tolerance also.</td><td>M3.01</td><td>U</td></tr>
<tr><td>XIII</td><td>Explain the working of Full wave bridge rectifier with circuit diagram and waveform.</td><td>M4.01</td><td>U</td></tr>
<tr><td></td><td>OR</td><td></td><td></td></tr>
<tr><td>XIV</td><td>Explain the basic operation of transistor as an amplifier with sketches.</td><td>M4.03</td><td>U</td></tr>
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