Course Code: 2030201 Roll No: MLRS- R20

MARRI LAXMAN REDDY
INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
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II B.Tech I Sem Regular End Examination, February-2022

Basic Electrical Engineering
(ECE)

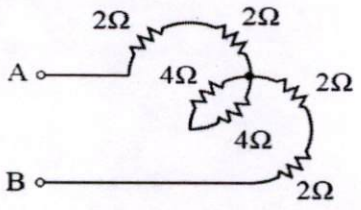
Max. Marks: 70

Note: 1. Question paper consists: Part-A and Part-B.
2. In Part – A, answer all questions which carries 20 marks.
3. In Part – B, answer any one question from each unit.
Each question carries 10 marks and may have a, b as sub questions.

PART- A

(10*2 Marks = 20 Marks)

1 a) What is the equivalent resistance between the terminals, AB in the following circuit?



2M

b) Explain the effect of temperature on resistance. 2M

c) Give the relation between phase & line values of voltage & current for star connection. 2M

d) Explain the behaviour of AC through a series RL circuit. 2M

e) What are various losses in Transformer? How would they change with respect to load variation? 2M

f) Define voltage regulation of a transformer. 2M

g) In an Induction motor, slip is always Positive, Why? 2M

h) What is the need of starter in a DC Machine? 2M

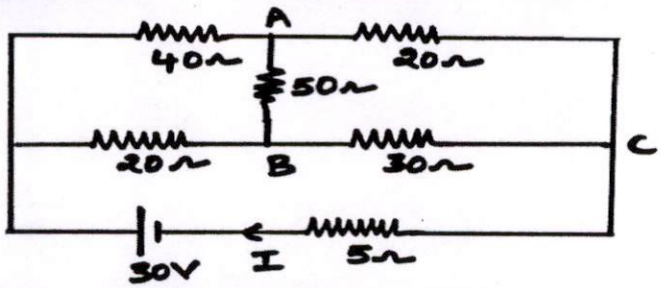
i) In brief classify the types of batteries and materials used. 2M

j) What is the necessity of earthing in domestic buildings? 2M

PART- B

(10*5 Marks = 50 Marks)

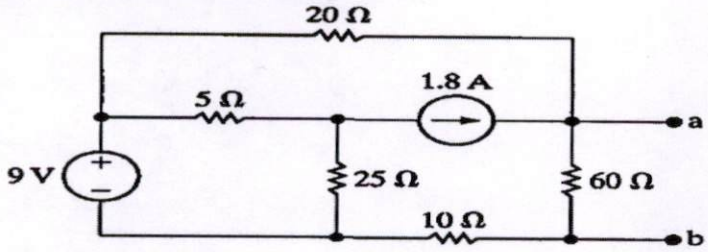
2 a) By using star-delta transformation for the following figure. Find the current 'I' supplied by the battery? 5M



b) A certain voltage source has a terminal voltage of 120 V when the load current is 1A. When the load current is 2A, the terminal voltage is 100V. Calculate the internal resistance of the voltage source, open circuit voltage and short circuit current. 5M

OR

3 Find the Thevenin's equivalent with respect to the terminals 'a-b' for the circuit in the following figure 10M



4 a) In a series RC circuit, the values of R = 100 Ω and C = 25 μF. A sinusoidal voltage of 50 MHz is applied and the maximum voltage across the capacitance is 2.5V. Find the maximum voltage across the series combination and also determine the apparent power. 5M

b) Explain the concept of Average value and RMS value. What is the phasor diagram, draw the phasor diagrams of RL parallel circuit under steady state conditions? 5M

OR

5 Explain in detail about different representations of sinusoidal quantities.
A series combination of resistance of 100Ω and a coil with inductance 0.5 H and winding resistance 50Ω and a capacitor of 0.36 μF is connected to an AC supply with internal resistance 50Ω. Find the resonant frequency and quality factor. 10M

6 a) A single-phase transformer has 500 turns in the primary winding. When it is connected to a 1-Ø, 120 V, 60 Hz power supply, the no-load current is 1.6A and the no-load power is 80 W. Neglect the winding resistance and leakage reactance of the winding. Calculate 5M
(i) The core loss current, Ic.
(ii) The magnetizing current, Im.
(iii) The peak value of the core flux, Ømax.
(iv) The magnetizing impedance Zm,

b) Explain the transformer on no-load with phasor diagram. What are the distinguished features of Y-Y and Δ-Y three phase transformers? 5M

OR

7 A 25 kVA, 2200/220V, 50Hz single phase transformer obtained the following test results. OC test (L.V.side) = 220V, 1.2A, 100 w SC test (H.V.side) = 100V, 7A, 310w. Calculate the parameters of the equivalent circuit of transformer referred to L.V. side and draw the equivalent circuit. 10M

8 a) A three-phase induction motor runs at 1440 rpm at full load when supplied power from 50 Hz, 3-phase line. Calculate i) slip at full load ii) frequency of rotor voltage iii) speed of rotor at a slip of 10%. 5M

b) Explain various speed control methods of separately excited dc motor. 5M

OR

9 Derive the condition for maximum torque under running condition of 3-phase Induction Motor. 10M

10 a) What are the drawbacks of low power factor, describe how it is improved? 5M

b) What are the important features of ELCB, where it is used for protection? Mention advantages and disadvantages of ELCB. 5M

OR

11 Differentiate SFU, MCCB and ELCB with working principle and schematic diagram 10M

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