Roll No. ..... Total Pages : 03

BT-2/M-24 42041

BASIC ELECTRICAL ENGINEERING

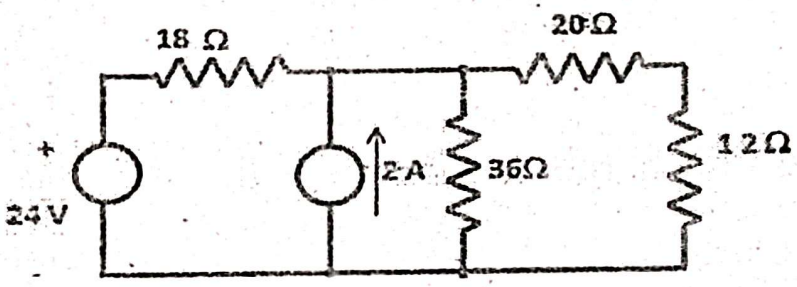
ES-101A

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit.

Unit I

1. Find Thevenin's equivalent of circuit shown as Figure-1, w.r.t. the 12 Ω resistor. 15



2. (a) Explain Maximum power transfer theorem and correlate it with Thevenin's theorem. 9

   (b) A resistor R is connected in series with a parallel circuit containing of two resistors having resistance of 12 and 8 ohm, respectively. The total power dissipated in the circuit is 96 watt and applied voltage is 24 V. Calculate the value of R. 6

Unit II

3. (a) Explain in detail the theory of sinusoidal AC response of series RC ckt. with neat sketches and waveforms. 10

(b) Given the voltages $V_1 = 40\sin(\omega t)V$ and $V_2 = 40\cos(\omega t)V$, find their sum in periodic sine reference. 5

4. (a) Explain the generation of sinusoidal AC emf with the help of dynamo and neat waveforms. 10

(b) Find the average values for full and complete cycles of an ac wave $v = V_m \sin \omega t$. 5

Unit III

5. (a) Establish relation between line voltage and phase voltage in a star connected balanced 3-phase system. 8

(b) Taking X-axis intervals of 30 degrees each, draw neatly the complete waves on simultaneous axis : $V_1 = V_m \sin \omega t$, $V_2 = V_m \sin(\omega t - 120°)$ and $V_3 = V_m \sin(\omega t - 240°)$. 7

6. (a) Explain single phase actual transformer at no load. 10

(b) Deduce condition of maximum efficiency of a single phase transformer. 5

Unit IV

7. Explain in detail the construction of a DC generator and working of commutator using neat sketches. 15

8. With neat sketches, explain and prove the statement : 'A 3 phase pulsating magnetic flux produced by 3-phase excited stator winding is equivalent to a single (bipolar) rotating flux'. Hence, explain how the rotor of squirrel cage type 3-phase induction motor starts rotating. Also explain the concept of slip. 15