

Roll No. .... Total Pages : 3

**BT-1/D-12                      8012**  
**ELECTRICAL TECHNOLOGY**  
**Paper-EE-101E**  
**Option-I**

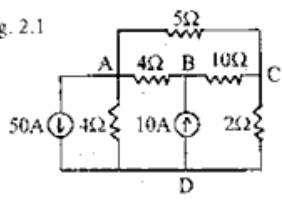
Time Allowed : 3 Hours]                      [Maximum Marks : 100

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

**UNIT-I**

1. (a) Find the average and r.m.s. values of  $v = V_m \sin \omega t$  for complete cycle. 5
- (b) What do you mean by real power, reactive power and apparent power? 5
- (c) Given (all in volts) :  $V_1 = 50 \cos \omega t$ ,  $V_2 = 40 \sin(\omega t + 225^\circ)$ ,  $V_3 = 40 \sin(\omega t - 225^\circ)$ . find  $V = V_1 + V_2 + V_3$ . 10
2. (a) Use nodal method to determine the current through  $2\Omega$  resistor shown in the figure 2.1. 10
- (b) Use mesh analysis to determine the voltage across  $2\Omega$  resistor shown in the figure 2.1 : 10

Fig. 2.1



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**UNIT-II**

3. (a) A practical coil of power factor 0.8 is in series with a  $200 \mu\text{F}$  capacitor when connected to 100 Hz supply, the potential difference across the coil is equal to the potential difference across the capacitor. Find the resistance and inductance of the coil. 5
- (b) Explain and derive the expressions for ac frequency response of series RLC circuit and deduce the condition for resonance. 15
4. (a) State and explain the maximum power transfer theorem and explain its importance. 10
- (b) Explain delta to star and star to delta transformations of set of pure resistors. 10

**UNIT-III**

5. (a) Explain 2 watt meter method of power measurement for star connected inductive load (RL Series,  $\theta > 30^\circ$ ) with the help of neat circuit and generalized phasor diagram showing all the voltages, currents and phases. 15
- (b) Given per phase balanced impedances :  $Z_p = 4 - 3j\Omega$ , supply 500 V, 50 Hz and 3 $\phi$ . Find  $V_L$ ,  $V_p$  and  $I_L$ ,  $I_p$ . Active power and p.f. of the system in both star and  $\Delta$  (delta) cases. 5
6. (a) A 200 KVA transformer has an efficiency of 98.77% at full load at 0.8 p.f. and an efficiency of 99.13% at half load at unity p.f. Calculate the iron loss and full load copper loss. 5
- (b) While performing short circuit test, rated voltage is never applied to the transformer. Why? 5

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2

- (c) In short circuit test, it is said that the iron losses are almost zero. Why ? 5
- (d) Draw complete labelled equivalent circuit of an actual transformer. 5

**UNIT-IV**

- 7. (a) Explain the constructional features of squirrel cage rotor type  $3\phi$  induction motor with the help of neat sketches. 10
- (b) Explain the working of Commutator in DC Generator by explaining the working of split ring. 10
- 8. (a) Why do we need a Commutator in DC motor ? 4
- (b) Why do we need Carbon brushes in DC machines ? 4
- (c) Why is the armature core of machines laminated and made up of silicon steel ? 4
- (d) Why do we acknowledge phase sequence in  $3\phi$  induction motor industrial drives ? 4
- (e) What is the need of starter in motors ? 4