Roll No. ..... Total Pages : 04

BT-I/D-21 41012

ELECTRICAL TECHNOLOGY

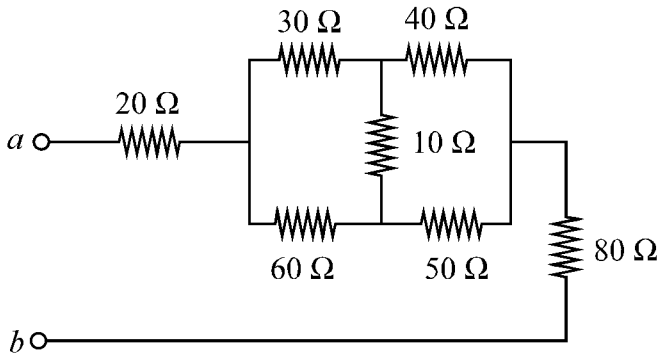
EE-101-E

Time : Three Hours] [Maximum Marks : 100

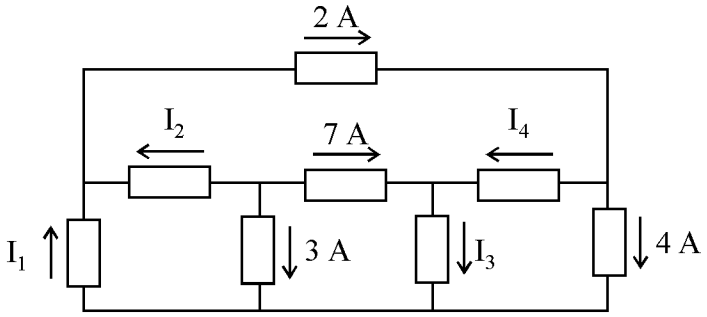
Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. (a) Obtain the equivalent resistance of the circuit shown in below figure : **10**



(b) For the circuit shown in given ahead fig., use KCL to find the branch current I_1 to I_4 : **10**



2. (a) (i) What is ideal voltage and ideal current source ?

(ii) Define time constant of RC and RL circuit. **10**

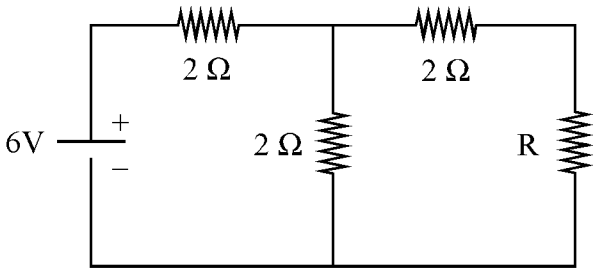
(b) Write short notes on the following :

(i) Kirchhoff's Law

(ii) Power Factor. **10**

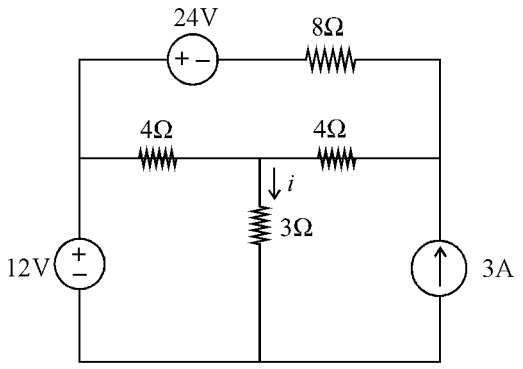
Unit II

3. (a) What is maximum power transfer theorem ? Find R so that the maximum power transfers from source to it. **10**



(b) Determine the resonant frequency, bandwidth and quality factor of the coil for the series resonant circuit considering R = 10 Ω, L = 0.1 H and C = 10 μF. **10**

4. (a) For the circuit shown, find *i* using the superposition theorem : **10**



(b) Derive the transient response of series R-L circuit with DC input. Sketch the variation of current and voltage across the inductor. **10**

Unit III

5. (a) Explain the following in context of three-phase circuit :

(i) What is phase sequence ?

(ii) What do you mean by balanced and unbalanced load ?

(iii) List the method used for 3-phase power measurement.

(iv) Advantage of 3-phase system. **10**

(b) Describe star and delta connected three-phase balanced circuits with neat sketches. **10**

6. (a) State the principle of operation of a transformer. Also, define and explain voltage regulation of transformer. **10**

(b) Write down the EMF equation of a single-phase transformer. Also, describe the constructional details of transformer. **10**

Unit IV

7. (a) Draw and explain the circuit for various types of D.C. motor. **10**

(b) Distinguish between induction motor and synchronous motor. **10**

8. (a) A short shunt compound generator supplies a load of 10 kW at 200 V through a pair feeders of total resistance 0.1 Ω. Iron and friction losses amount of 631 W.

R_a = 0.01 Ω, R_{sh} = 52.5 Ω, R_{se} = 0.1 Ω

Find :

(i) Terminal Voltage (ii) Generated emf

(iii) Cu-loss (iv) Efficiency. **10**

(b) Explain with neat sketches, the construction and principle of operation of a 3-phase induction motor. **10**