BT-I/D-21   **41023**

ELECTRICAL TECHNOLOGY FUNDAMENTALS
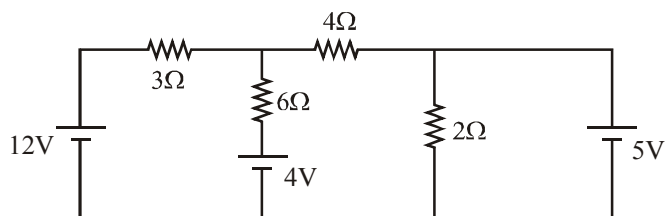
Opt.-I, EE-101N

Time : Three Hours]   [Maximum Marks : 75

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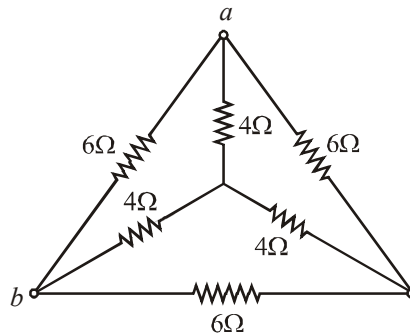
Section A

1. Find the current in 4 Ω resistor using Norton's theorem fig. shown below and verify the result by Nodal analysis and show that current find by both method should be same.   **15**
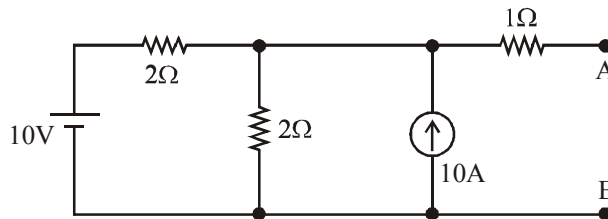
2. (a) Determine the R_{ab} for the figure shown below : **6**

(b) Predict the Thevenin's equivalent for the circuit as shown in fig. **9**

Section B

3. (a) Define Average value and RMS value of a sinusoidal quantity. **5**

(b) A coil is in series with a 20 μF capacitor across a 230 V, 50 Hz supply. The current taken by the circuit 10 A and power consumed is 200 W. Calculate the inductance of the coil if the power factor of the circuit it leading and lagging. Also sketch phasor diagram of each condition. **10**

4. Show that the condition for resonance in parallel R.L.C. circuit is same as that in a series RLC circuit. State the applications of series and parallel resonance. **15**

Section C

5. (a) How two wattmeters measure 3-phase power for a delta connected load ? Derive an expression for 3-phase power in terms of wattmeter readings. **7**

(b) Explain open circuit and short circuit test on a 1-phase transformer. How can these Test be used for to find the efficiency of the transformer ? **8**

6. (a) What do you mean by eddy current and hysteresis losses ? How to minimize these losses ? **7**

(b) Derive the relationship between the phase and line voltage, and between phase and line current for a balance star circuit. **8**

Section D

7. How does a three phase induction motor work ? Draw and describe its torque speed characteristics. **15**

8. (a) How does a synchronous generator work ? Can synchronous generator work as motor ? **7**

(b) Define working principle of DC motor. Why dc series motor does not run without load ? **8**