Nov-Dec
2011

[4061] – 104

F.E. (Semester – I) Examination, 2011
BASIC ELECTRICAL ENGINEERING
(2008 Pattern)

Time : 3 Hours | Max. Marks : 100

Instructions:
1) *In Section – **I**, attempt Q. **1** or Q. **2**, Q. **3** or Q. **4**, Q. **5** or Q. **6**. In Section – **II**, attempt Q. **7** or Q. **8**, Q. **9** or Q. **10**, Q. **11** or Q. **12**.*
2) *Answers to the **two** Sections should be written in **separate** answer books.*
3) *Figures to the **right** indicate **full** marks.*
4) *Neat diagrams must be drawn **wherever** necessary.*
5) *Use of non-programmable electronic calculator is **allowed**.*
6) *Assume suitable data, if **necessary**.*

SECTION – I

1. a) With usual notations prove that **6**

$$(\alpha_1 - \alpha_2) = \alpha_1 \alpha_2 (t_2 - t_1)$$

b) Two coils connected in series have resistances of $600\,\Omega$ and $300\,\Omega$ and temp. coefficient of resistance of 0.1% and 0.4% respectively at 20° C. Find the resistance of combination at a temperature of 50° C. What is the effective temperature coefficient of combination ? **6**

c) What are the indications which confirm that a lead acid cell is fully charged ? **6**

OR

2. a) Define insulation resistance and obtain an expression for insulation resistance of a single core cable. **6**

b) A diesel-electric generating set supplies an output of 50 kW. The calorific value of fuel used is 12,500 k cal/kg. If the overall efficiency of the unit is 35%. (i) Calculate the mass of oil required per hour and (ii) The electrical energy generated per tonne of the fuel. **6**

c) Compare lead acid cell and Nickel cadmium cell. **6**

3. a) Explain the following terms with reference to dc resistive networks :
   1) Unilateral and bilateral networks
   2) Linear and non linear networks
   3) Lumped and distributed networks
   4) Active and passive networks. **8**

P.T.O.

b) Formulate the Kirchhoff's voltage law equations for the ckt of Fig. 1 and find the values of I_1, I_2 and I_3. **8**

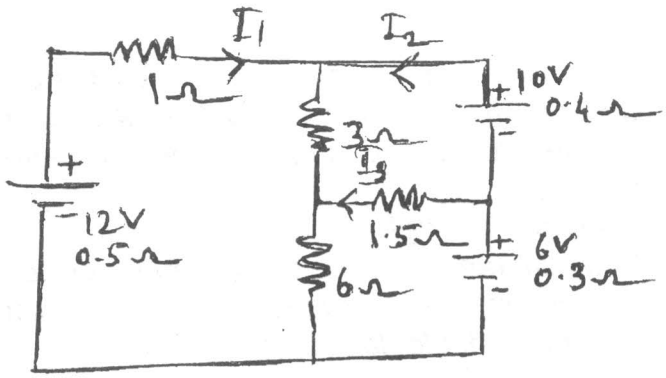

Fig. 1

OR

4. a) Derive an expression to convert Delta connected network into its equivalent star network. **8**

b) Find the current in 20 Ω resistor connected across AB using Thevenin's Theorem. **8**

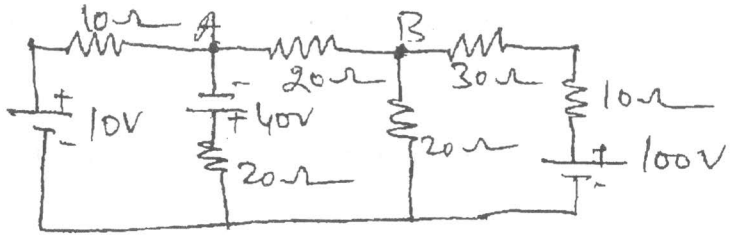

Fig. 2

5. a) Compare electric and magnetic circuits clearly stating similarities and dissimilarities between them. **8**

b) A coil of 2000 turns is wound uniformly over a nonmagnetic ring of mean circumference of 80 cm and cross sectional area of 0.6 cm^2. If the current through the coil is 2 amperes, calculate (i) Magnetising force (ii) Reluctance (iii) Total flux (iv) Flux density. **8**

OR