

Total No. of Questions : 12]

[Total No. of Printed Pages : 4

[3761]-103

F. E. (Semester - I) Examination - 2010

BASIC ELECTRICAL ENGINEERING

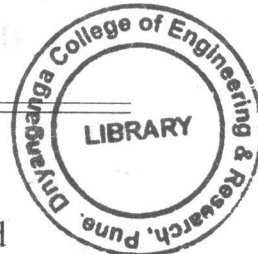
(June 2008 Pattern)

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 pocket calculator is allowed.
- (6) Assume suitable data, if necessary.



SECTION - I

- Q.1) (A) How materials are classified as Conductor, Insulator and Semiconductor. Give two examples of each. [06]
- (B) An electric pump lifts 60 m³ of water per hour to a height of 25 meter. The pump efficiency is 86% and motor efficiency is 78%. The pump is used for three hours daily. Find energy consumed per week, if one m³ of water is 1000 kg. [06]
- (C) Explain the charging of Lead Acid Battery with chemical reaction. What are the changes taking place during charging? [06]

OR

- Q.2) (A) Obtain the expression for $\alpha_2 = \alpha_1/1 + \alpha_1 (t_2 - t_1)$. [06]
- (B) An electric furnace is used to melt aluminum. Initial temperature of the solid aluminum is 32°C and its melting point is 680°C. Specific heat capacity of aluminum is 0.95 kJ/kg°C and the heat required to melt 1 kg of aluminum at its melting point is 450 kJ. If the input power drawn by the furnace is 20 kW and its overall efficiency is 60%. Find the mass of aluminum melted per hour. [06]
- (C) What is Insulation Resistance? What are the factors on which insulation resistance of a single core cable depends? [06]

Q.3) (A) State and explain Superposition Theorem. [08]

(B) Using Kirchoff's Laws, find the current delivered by 12V battery as shown in the Fig. 1. [08]

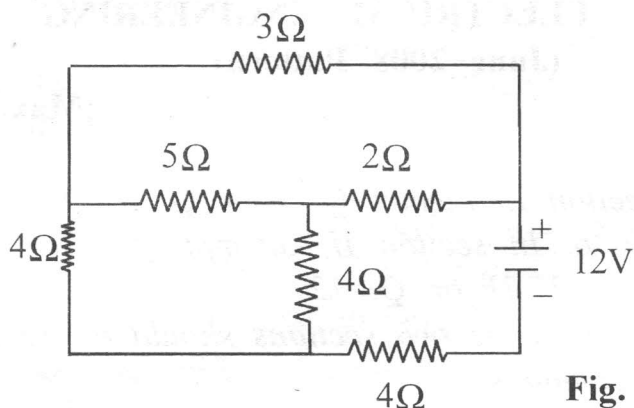


Fig. 1

OR

Q.4) (A) Derive an expression to convert Star Connected Network into its Equivalent Delta Network. [08]

(B) Using Thevenin's Theorem find the current flowing through 1 ohm resistance connected between A-B, as shown in the Fig. 2. [08]

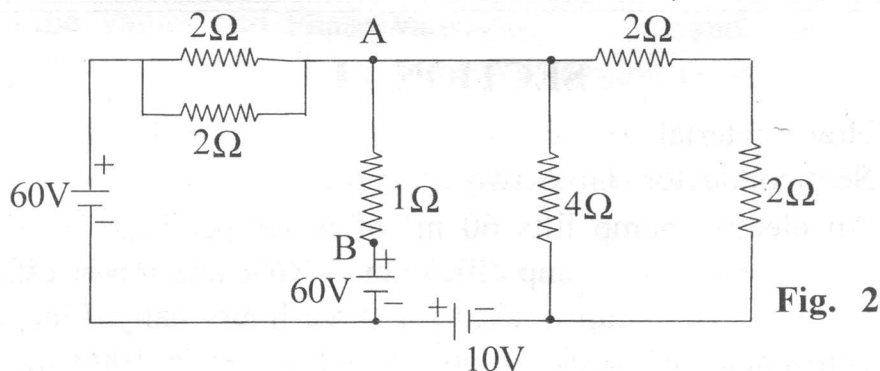


Fig. 2

Q.5) (A) Explain the following terms : [08]

- (1) MMF
- (2) Reluctance
- (3) Pearmeance
- (4) Flux Density

(B) A coil M is wound around a magnetic circuit. Explain the phenomenon of self induced emf in it. Define its self inductance and state its unit. Another coil N is wound around the same magnetic circuit. Explain the phenomenon of mutual inductance between the coils and define 'coefficient of coupling' between them. [08]

OR

