15009

B. Tech 1st Semester Examination

Principles of Electrical Engineering (CBS)

EE-101

Time : 3 Hours   Max. Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt five questions in all, selecting one question each from section A, B, C & D. Section-E is compulsory.

SECTION - A

1. (a) State Thevenin theorem and explain the steps involved in this theorem in detail.   (7)

   (b) Define Kirchoffs laws. Also determine the current I in the given network (Fig. 1) when all branch resistances are in ohms, using nodal analysis.   (5)
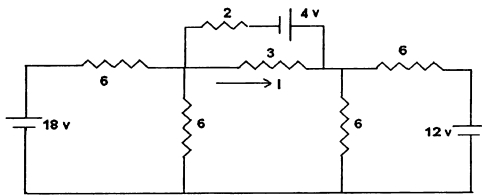

Fig. 1

[P.T.O.]

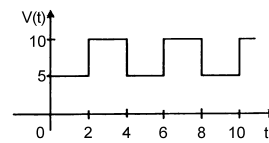2. (a) Find the rms value of the periodic signal in Fig 2.   (6)

Fig. 2

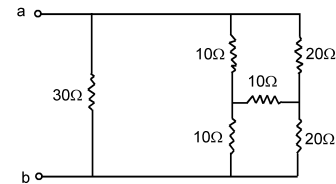   (b) Obtain the equivalent resistance at the terminals a-b for circuit in Fig. 3.   (6)

Fig. 3

SECTION - B

3. (a) Explain the behavior of ac through a RL parallel network. Also find the values of voltage, current and power through RL series network.   (7)

   (b) A balanced 3 phase star connected load is fed from a 400V, 3 Phase, 50Hz supply . The current per phase is 25A(lagging) and the total active power absorbed by the load is 13.856kW, determine (a) resistance and inductance of load per phase (b) total reactive power.   (5)

4. Draw and explain in detail the general structure of electrical power systems. (12)

SECTION - C

5. (a) Draw the equivalent circuit of transformer, also derive the condition for maximum efficiency of transformer. (6)

   (b) Give the working principle and constructional details of dc motor. (6)

6. (a) Draw and explain in detail the characteristics of

   (i) A shunt or separately excited DC motor.

   (ii) Series DC motor. (9)

   (b) The armature resistance a 200 V shunt motor is 0.4ohms and no load current is 2A. When loaded and taking an armature current of 50A, the speed is 1200 r.p.m. Find approximate no load speed. (3)

SECTION - D

7. (a) Draw the constructional features and explain in detail the working of a AC watthour meter. (7)

   (b) Write short notes on domestic wiring. (5)

8. (a) Explain the construction and working of attraction type of moving iron instrument in detail. (7)

   (b) Differentiate between moving iron and PMMC type instruments. (5)

SECTION - E

9. (a) Short note on underground cables. (2)

   (b) Write the electrical analogous of permeability. (2)

[P.T.O.]

(c) Define bandwidth of a resonant RLC circuit. (1)

(d) Name different losses of transformers. (1)

(e) What is power factor? (1)

(f) Define maximum power transfer theorem. (1)

(g) Differentiate between mesh and a loop in an electric circuit. (1)

(h) Give the importance of shunts and multipliers in measuring instruments. (1)

(i) Give the units of following:

   (1) Active power (2) Apparent power (3) Impedance (4) Bandwidth. (1)

(j) Give the relation between line current and phase current in a delta connected three phase circuit. (1)