

16005(J) J-16

**B. Tech 2nd 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**

- (a) State Maximum power transfer theorem and also prove the condition when maximum power is transferred in a circuit. (8)
- (b) Determine the current supplied by each battery in the circuit shown in Fig. 1 by using mesh analysis. (4)

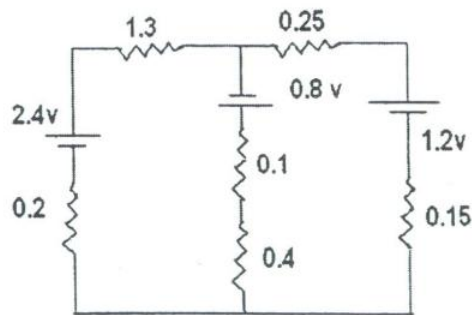


Fig. 1

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- (a) What is RMS value? Derive an expression for the RMS value of current of full wave rectifier. (6)
- (b) Obtain the equivalent resistance at the terminals A-B for circuit in Fig 2. (6)

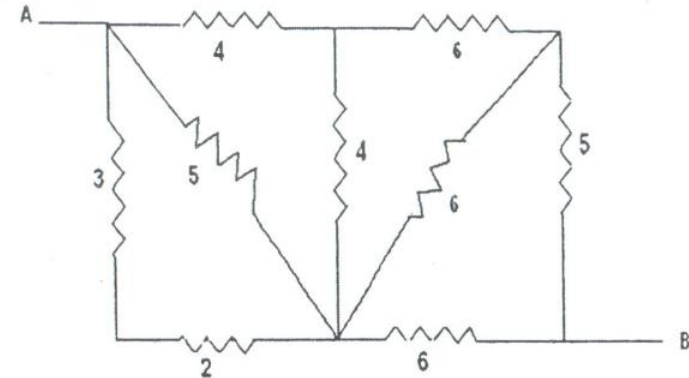


Fig. 2

**SECTION - B**

- (a) Explain the resonance in series R L C series circuit. (8)
- (b) A 3 phase 400V , 50 Hz , ac supply is fed in a 3 phase delta connected load with each phase having  $R= 25\text{ohms}$ , inductance of  $0.15\text{H}$  and  $C=120\mu\text{F}$  in series. Determine the line current , volt amperes, active power and reactive volt amperes (4)
- Draw and explain in detail the general structure of electrical power systems. (12)

**SECTION - C**

- (a) Draw the equivalent circuit of transformer, also explain the losses in the transformer. (6)

- (b) Give the working principle and constructional details of single phase induction motor. (6)
6. (a) Draw and explain in detail the characteristics of:
- (1) A shunt of separately excited DC motor.
- (2) Series DC motor. (9)
- (b) The armature resistance of 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 energy meter. (8)
- (b) Write short notes on domestic wiring. (4)
8. Explain in detail the working and construction of PMMC instruments. Give the advantages. Also derive the torque equation for the same. (12)

#### SECTION - E

9. (a) Differentiate between unilateral and bilateral network. (2)
- (b) Write the electrical analogous of reluctance. (2)
- (c) Define bandwidth of a resonant RLC circuit. (1)
- (d) Name different methods to reduce losses of transformers. (1)

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- (e) What is quality factor? (1)
- (f) Write the emf equation of transformer. (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 resistances connected for delta to star conversion. (1)