

8451

Your Roll No.....

B. Tech. (M) / I

A

Paper (EME - 106)  
ELECTRICAL TECHNOLOGY

Time : 3 hours

Maximum Marks : 70

(Write your Roll No. on the top immediately on receipt of this question paper)

Attempt any FIVE questions.

1. a) State and prove the maximum power transfer theorem in reference to electrical networks. 07
- b) Using Thevenin Theorem determine current in branch BD of the network as shown in fig. 1 07

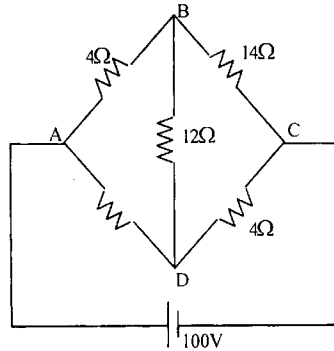


Fig. 1

2. a) A magnetic circuit comprising a toroid with 500 turns, cross section area of  $6\text{cm}^2$  and mean radius of 15cm carries a coil current of 4A. Find total ampere - turns, reluctance for magnetic circuit and total flux enclosed. 07
- b) Explain with the help of a neat sketch the working principle of moving iron instrument. Derive the expression for torque equation for moving iron instrument. 07
3. a) In the circuit shown in fig. 2 determine what 50Hz voltage must be applied across AB in order that a current of 10A may flow in capacitor. 07

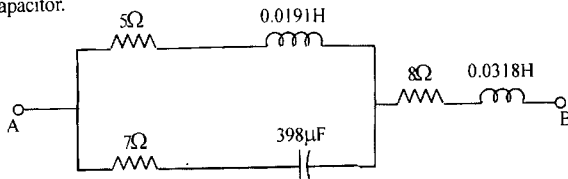


Fig. 2

- b) A delta connected balanced 3 -  $\phi$  load is supplied from a 3 -  $\phi$ , 400V supply. The line current is 20A and power taken by the load is 10KW. Find  
 (i) impedance in each branch  
 (ii) Line current, power factor, power consumed if the same load is connected in star. 07
- 4 a) Explain voltage buildup process in dc shunt generator. Explain the conditions for self voltage build-up process. 07
- b) A 240V shunt motor runs at 856rpm when armature current is 70A. The armature resistance is  $0.1\Omega$ . Calculate the resistance required to be placed in series with the armature to reduce the speed of 650rpm when armature current is 50A. 07
- 5 a) Explain the working of transformer under loaded condition. Draw a complete phasor diagram when load PF is lagging. 07
- b) A 10KVA, 200/400V, 50Hz single phase transformer gave the following test - results.  
 OC test (LV winding open) 200V 1.3A 120W  
 SC test (LV winding short) 22V 30A 200W  
 Find equivalent ckt parameters referred to LV side. Also mark the parameters on equivalent ckt. 07
- 6 a) Derive the expression for emf equation of synchronous alternator. Also explain the meaning of distribution factor and pitch factor. 07
- b) Derive torque - equation of 3 phase induction motor. Also draw the torque - slip characteristic of induction motor. 07
- 7 a) Draw single line diagram of AC supply system 05
- b) Explain the following w.r.t. distribution system  
 (i) Feeder  
 (ii) Distributor  
 (iii) Service main 03
- c) Compare the following  
 (i) Primary and Secondary distribution  
 (ii) Overhead and Underground distribution system. 06
- 8 Write short notes on any three of the following :  
 a) Resonance in series RLC circuit  
 b) Star - delta starter  
 c) Tariff  
 d) Auto transformer  
 e) Electric heating. (5, 5 4)