

Total No. of Questions : 12]

SEAT No. :

P4589

[Total No. of Pages : 3

[4957] - 118

S.E. (Mech., Mech. S/W, Prod., Prod. S/W, Auto)

ELECTRICAL TECHNOLOGY

(2008 Pattern)

Time : 3 Hours]

[Max. Marks :100

Instructions to the candidates:

- 1) Answer any three questions from each section.*
- 2) Answers to the two sections should be written in separate books.*
- 3) Neat diagrams must be drawn wherever necessary.*
- 4) Figures to the right indicate full marks.*
- 5) Use of electronic pocket calculator is allowed.*
- 6) Assume suitable data if necessary.*

SECTION - I

- Q1)** a) Explain one wattmeter method for measurement of reactive power in a three phase balanced load with the help of connection diagram and phasor diagram. [6]
- b) Explain electricity tariff and its objectives. Discuss HT and LT tariff. [6]
- c) A three phase, 400 V load has a power factor of 0.7 lag. Two wattmeters are used to measure power which shows the input to be 10 KW. Find the reading of each wattmeter. [6]

OR

- Q2)** a) Discuss two wattmeter method for measurement of active power in a three phase balanced load with the help of connection diagram and phasor diagram. [6]
- b) Explain the construction and working of single-phase energy meter with the help of neat diagram. [6]
- c) What are demerits of low power factor? State power factor improvement methods and explain any one of them. [6]

P.T.O.

- Q3)** a) Derive an expression for torque developed in a three phase induction motor under running conditions. Hence obtain the condition for maximum torque. [8]
b) Discuss three phase transformer connections with the help of suitable diagrams. Mention possible applications of these connections. [8]

OR

- Q4)** a) Discuss the typical layout of distribution transformer substation with the help of single line diagram. Mention specifications of distribution transformer in your backyard. [8]
b) A 6-pole, 50 Hz, 3-phase induction motor runs at 960 rpm when the torque on the shaft is 200 N-m. If the stator losses are 1500 W and friction and windage losses are 500 W, find (i) rotor copper loss (ii) efficiency of the motor. [8]

- Q5)** a) Explain the construction and working of a shaded pole induction motor with the help of neat sketches. Mention its applications. [8]
b) Derive equation of induced E.M.F. in an alternator. Mention typical specifications of an alternator of your choice. [8]

OR

- Q6)** a) Why is a single phase induction motor not self starting? How is it made self started? State its types and applications. [8]
b) Define the term: Voltage regulation of an alternator. Discuss the synchronous impedance method of determining voltage regulation of an alternator for various types of loads. [8]

SECTION - II

- Q7)** a) State only two applications of each following d.c. motor. [$3 \times 1 = 3$]
i) D.C. shunt
ii) D.C. series
iii) D.C. compound
b) Explain with neat circuit diagram of 'Field Control' method of speed control of d.c. shunt motor. [6]
c) State need of starter for d.c. motor starting. With the help of neat circuit diagram explain three point starter used for D.C. shunt motor. Also explain function of following parts : [9]
i) NVC
ii) Hold on coil
iii) Overload coil

OR

- Q8)** a) Why d.c. series motor is never started on no load condition? [3]
 b) A 200V, 4 pole, lap wound armature d.c. shunt motor has 200 armature conductors and flux per pole of 25 mwb. Determine the back emf and speed of operation of the motor when draw 22A current from the supply. [6]
 (Given : armature resistance = 0.4Ω and shunt field resistance = 100Ω)
 c) Explain construction, working features, characteristic and industrial three applications of 'Universal Motor'. [9]
- Q9)** a) Construction, output characteristics of IGBT. Also state two applications of IGBT. [8]
 b) Construction, working, symbol and applications of TRIAC. [8]

OR

- Q10)** a) Draw V.I characteristic, symbol and state applications of [8]
 i) GTO
 ii) DIAC
 b) Construction details V-I characteristic, symbol, methods to turn ON and applications of SCR. [8]
- Q11)** a) Compare Individual Drive and Group Drive method used in industry. [8]
 b) Explain V/F control of three phase induction motor. [8]

OR

- Q12)** a) What is chopper circuit? With the help of suitable diagram : [8]
 i) Step down chopper (Type A chopper)
 ii) Step-up chopper (Type B chopper)
 b) State and explain advantages of electrical drive. [8]

