

Total No. of Questions : 8]

SEAT No. :

P1733

[Total No. of Pages : 3

[5460] - 562

T.E. (Electrical)

ELECTRICAL MACHINES - II
(2015 Pattern)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6 , Q.7 or Q.8.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Use of electronic pocket calculator is allowed.
- 5) Assume suitable data, if necessary.

Q1) a) With neat diagram explain slip test to determine direct & quadrature axis reactance. **[6]**

b) What is hunting in synchronous motor. Explain how it can be reduced. **[6]**

c) A 1200 kVA 3300 V 50 Hz star connected alternator has effective armature resistance of 0.25Ω per phase. A field current of 40 A produces a short circuit current of 200 A and an open circuit emf of 1100 V line to line. Calculate the voltage regulation at full load. **[8]**

i) 0.8 pf lag

ii) 0.8 pf lead

OR

Q2) a) A 3 phase 8 pole 750 rpm star connected alternator has 72 slots on the armature. Each slot has 12 conductors and winding is shorted by 2 slots. Calculate the induced emf between the lines if flux per pole is 0.06 weber. **[6]**

b) With neat diagram explain bright lamp method of synchronization of 3 phase alternators. **[6]**

c) Justify - 'Three phase synchronous motor is not self starting'. Explain any one method of starting 3 phase synchronous motor. **[8]**

P.T.O.

- Q3)** a) Explain with neat diagram following speed control methods in 3 ϕ I.M. [8]
i) Rotor resistance control
ii) V/F method
b) Explain with neat diagram construction & working of variable reluctance stepper motor. [8]

OR

- Q4)** a) With suitable diagram explain construction & working of linear induction motor. [8]
b) Write short note on - 3 phase Induction Generator. [8]

- Q5)** a) What are the problems experienced by dc series motor operated on a.c. supply. What are the modifications necessary to improve the performance of motor. [8]
b) Draw the circle diagram of plain A.C. series motor. Describe how to find out motor Input, motor output and speed scale. [8]

OR

- Q6)** a) Compare the performance of universal motor on A.C. and D.C supply. Draw torque vs. armature current and speed vs. torque characteristics on a.c. & d.c. operation. [8]
b) With neat diagram explain working of [8]
i) Inductually compensated a.c series motor.
ii) Conductually compensated a.c series motor

- Q7)** a) With neat diagram, explain construction & working of permanent capacitor induction motor. Draw its phaser diagram. [10]
b) With suitable diagram explain no load test and blocked rotor test on single phase induction motor. How equivalent circuit parameters are obtained from these tests. [8]

OR

- Q8)** a) A 230 V, 1 HP, 2 pole single phase Induction motor has following parameters -

$$R_1 = 2.2 \, \Omega, X_1 = 3 \, \Omega, R'_2 = 3.8 \, \Omega, X'_2 = 2.1 \, \Omega, X_m = 86 \, \Omega$$

Calculate current, Input power, power factor & efficiency when operating at slip, $s = 6\%$ [10]

- b) With neat diagram, explain construction & working of split phase induction motor. [8]

