Total No. of Questions : 10]

SEAT No. :

P2873

[Total No. of Pages : 3

[4958]-1062
T.E.(Electrical)
ELECTRICAL MACHINES-II
(2012 Pattern) (End Semester)(Semester-I)

Time :2 ½Hours] *[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, Q.9 or Q.10.***
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) Compare salient pole type rotor construction with nonsalient pole type construction in case of 3 phase alternator. **[4]**

b) A 1000 kVA star connected, 3 phase 2300 volts salient pole alternator has direct axis reactance of 1.95 Ω and quadrature axis reactance of 1.40 Ω. Calculate excitation voltage & voltage regulation at rated kVA, 0.6 pf lag. Neglect armature resistance. **[6]**

OR

Q2) a) Explain one dark & two equally bright lamp method of synchronizing 3 phase alternators. **[4]**

b) A 3 phase star connected, 1000 kVA, 11000 V alternator has rated current of 52.5 A .The armature resistance per phase is 0.45Ω. The test results are given below

O.C. Test - field current = 12.5A, volt. bet^{n} lines = 422 V.

S.C. Test - field current = 12.5 A, line current = 52.5 A

Determine the full load voltage regulation of alternator at 0.8 pf lag. **[6]**

Q3) a) Explain any one method of starting three phase synchronous motor. **[4]**

b) A 10 HP, 400V star connected 3 phase synchronous motor has synchronous reactance of 10Ω /phase & armature resistance of negligible value. Calculate the minimum current and corresponding induced emf at full load. Assume efficiency = 85% **[6]**

OR

P.T.O.

Q4) a) With neat diagram explain the slip test to determine direct & quadrature axis reactance. **[6]**

b) Compare 3 phase synchronous motor with 3 phase induction motor. **[4]**

Q5) a) State different methods of controlling speed of 3 phase induction motor. Explain v/f method. **[8]**

b) Explain the operation of 3 phase induction motor as induction generator. State advantages & applications of 3 ph. induction generator. **[8]**

OR

Q6) a) Explain construction & working of linear induction motor. State its applications. **[8]**

b) Explain construction & working of permanent magnet D.C. motor. State its applications. **[8]**

Q7) a) Compare compensated a.c. series motor with noncompensated a.c. series motor. **[4]**

b) Draw & explain briefly phasor diagram of noncompensated a.c. series motor. **[4]**

c) What are the problems experienced by d.c. series motor operated on a.c. supply. Explain the remedies for a.c. operation. **[8]**

OR

Q8) a) A blocked rotor test is conducted on 1 phase, 50Hz, 230V, 6.2A, 0.75kW, 6000rpm series motor. The test results are as below.

Vsc	Isc	Wsc
130V	4A	160W

Taking voltage scale of 1 cm = 20V. Draw circle diagram. Determine full load efficiency, full load power factor torque scale. **[10]**

b) Explain briefly-

i) Transformer emf

ii) Rotational emf

in case of a.c. series motor. **[6]**

Q9) a) A 220 V single phase induction motor gives following test results.

Blocked rotor test 110 V, 10A, 400 W

No load test 220 V, 4A, 100 W

The stator winding resistance is 2Ω. Neglecting R_0 find the parameters of equivalent circuit. Also find core, frictional & windage losses. **[8]**

b) With neat diagram explain the construction & working of capacitor start induction motor. Draw its torque-speed characteristics & phasor diagram. **[10]**

OR

Q10) a) The following data pertains to a 230V, 50Hz capacitor start single phase induction motor at stand still.

Main winding excited = 100V, 2A, 40 W

Auxiliary winding excited alone = 80V, 1A, 50W.

Determine the value of capacitance for determining the maximum starting torque. **[8]**

b) With neat diagram explain the construction and working of shaded pole induction motor. Draw torque speed characteristics. State its applications. **[10]**