

Total No. of Questions : 6]

P29

SEAT No. :

[Total No. of Pages : 2

Oct./TE/Insem.-143

T.E. (Electrical)

ELECTRICAL MACHINES - II

(2015 Pattern) (Semester - I)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

- 1) Answer Q. No. 1 or 2, Q. No. 3 or 4, Q. No. 5 or 6.
- 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 and non-salient pole type rotor construction in case of 3 phase synchronous machines. **[4]**

b) A 3 phase, 12 poles, 60 Hz star connected alternator has single layer winding housed in 180 slots. There are 10 conductors per slot. The coil pitch is two slots less than full pitch. The flux per pole is 0.5 wb distributed sinusoidally. Calculate RMS value of emf induced per phase. **[6]**

OR

Q2) a) Draw per phase equivalent circuit of 3 phase alternator. Hence draw phasor diagram of alternator at 0.8 p.f. lagging. **[4]**

b) A 10 kVA, 380 V 50 Hz star connected salient pole alternator has direct axis & quadrature axis synchronous reactance of 12 Ω & 8 Ω respectively. The resistance of armature per phase is 1 Ω . Calculate excitation emf & full load voltage regulation at 0.8 pf lag. **[6]**

Q3) a) Define voltage regulation of alternator? Can voltage regulation be positive or negative? When? **[4]**

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

OR

P.T.O.

Q4) a) A 1200 kVA, 3300 V, 50 Hz, 3 phase star connected alternator has effective armature resistance of 0.25 ohm 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 p.f. lag and ii) 0.8 p.f. lead
- b) Define short circuit ratio in case of alternator. **[2]**

Q5) a) Draw power flow (power stage) diagram of 3 phase synchronous motor. What are different losses occurring in 3 phase synchronous motor. **[4]**

b) Explain the following terms in relation with loading of 3 phase synchronous motor- **[6]**

- i) Load angle ii) Internal angle iii) Power factor angle

Show these angles by drawing a phasor diagram for lagging power factor.

OR

Q6) a) Compare 3 phase synchronous motor with 3 phase Induction motor. **[4]**

b) A 2300 V, 3 phase star connected synchronous motor has resistance of 0.2 Ω /phase and synchronous reactance of 2.2 Ω /phase. The motor is operating at 0.5 p.f. lead with line current of 200 Amp. Calculate the value of induced emf per phase. **[6]**



TE/Insem.-143

2