

Total No. of Questions : 6]

SEAT No. :

P5079

[Total No. of Pages : 2

T.E./Insem.-627

T.E. (Electrical) (Semester - I)

ELECTRICAL MACHINES - II

(2015 Pattern)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

- 1) Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.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.

Q1) a) Differentiate between smooth cylindrical & salient pole rotor used in large alternators. **[4]**

- b) A 3 phase 16 pole synchronous generator has resultant air gap flux of 0.06 wb per pole. The flux is distributed sinusoidally over the pole. The stator has 2 slots per pole per phase. And 4 conductors per slot are accommodated. The coil span is 150° electrical. Calculate the phase value of induced emf when the machine runs at 375 rpm. **[6]**

OR

Q2) a) A 5 kVA 200V star connected 3 phase salient pole alternator with direct axis & quadrature axis reactance of 12Ω & 7Ω respectively, delivers full load current at unity p.f. calculate the excitation voltage. Neglect armature resistance. **[4]**

- b) In case of synchronous generator, explain the effect of armature reaction at **[6]**

- i) Zero p.f. lag.
- ii) Zero p.f. lead.

P.T.O.

- Q3) a)** A 1200 kVA, 3300V, 50Hz 3 phase star connected alternator has effective armature resistance of $0.25\ \Omega$ per phase. A field current of 40A produces a short circuit current of 200 A and an open circuit emf of 1100V line to line. [8]

Calculate the voltage regulation at full load

- i) 0.8 p.f. lag.
 - ii) 0.8 p.f. lead
- b) Define short circuit ratio (SCR) in case of synchronous generator. [2]

OR

- Q4) a)** Explain synchronization of 3 phase alternator by dark lamp method. [4]
- b) A 2 mVA, 3 phase, 8 pole alternator is connected to 6000 V, 50 Hz busbar & has synchronous reactance of $4\ \Omega$ /phase. Calculate synchronising torque & synchronizing power per mechanical degree of rotor displacement at no load. Consider normal excitation. [6]

- Q5) a)** State different methods of starting 3 phase synchronous motor. Explain any one. [4]
- b) A 3 phase 6600 V, 50Hz star connected synchronous motor takes 50A current. The resistance & synchronous reactance per phase are $1\ \Omega$ & $20\ \Omega$ respectively. Calculate the power supplied to the motor & induced emf at 0.8 p.f. lag. [6]

OR

- Q6) a)** Compare 3 phase synchronous motor with 3 phase Induction motor. [4]
- b) With neat phasor diagram, explain the operation of synchronous motor at constant load and variable excitation condition. [6]

