

Total No. of Questions : 4]

SEAT No. :

P-5035

[Total No. of Pages : 2

[6187]-435

**T.E.(Electrical Engineering) (Insem.)  
ELECTRICAL MACHINES - II  
(2019 Pattern) (Semester - I) (303143)**

*Time : 1 Hour]*

*[Max. Marks : 30*

*Instructions to the candidates:*

- 1) *Solve Q1 or Q2, Q3 or Q4.*
- 2) *Figures to the right indicate full marks.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Assume suitable additional data, if necessary.*
- 5) *Use of non-programmable calculator is allowed.*

**Q1) a)** Compare the salient pole rotor construction with non salient pole rotor construction in case of synchronous machine. (any 7 points) [7]

b) A 3 phase, 50 Hz, 8 pole 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 the flux per pole is 0.06 Weber. [8]

OR

**Q2) a)** What is armature reaction in case of 3 phase synchronous machine? Elaborate its effect at zero lagging power factor with the help of neat waveform and vector diagram. [7]

b) Test results of Slip test conducted on 3 phase, 415 V, 3 kVA star connected salient pole alternator are shown below. [8]

V max (line)	V min(line)	Ia max	Ia min
45 V	40 V	1.3 A	1.1A

Assume  $R_a = 0$  ohms per phase. Determine direct axis synchronous reactance, quadrature axis synchronous reactance. Hence determine voltage regulation at full load 0.8 pf lagging.

**Q3) a)** Explain the need of synchronisation of alternators. State the conditions of parallel operation of alternators. [7]

**P.T.O.**

- b) A 1200 kVA, 3300 volts 50 Hz 3 phase star connected alternator has armature resistance of 0.25 ohm per phase. A field current of 40 A produces a short circuit current of 209.95 A and the same field current of 40 A produces an open circuit emf of 1100 V (line). Calculate the voltage regulation of alternator on - full load 0.8 lagging power factor. [8]

OR

- Q4)** a) What is Short Circuit Ratio in case of alternator? Elaborate its significance. State its value for turbo alternators and hydro generators. [7]
- b) Sketch and label OCC, ZPFC & Potier triangle. Based on this information, how voltage regulation can be calculated analytically at lagging power factor by Potier method? [8]

