

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]

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- 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]

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