Code No: **R31025** **R10** **Set No. 1**

III B.Tech I Semester Supplementary Examinations, October/November-2017

ELECTRICAL MACHINES - III

(Electrical and Electronics Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks

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1 Explain why a single phase Induction motor is not self starting. Discuss its operation based on double field revolving theory.

2 a) Discuss the constructional details of a salient pole synchronous machine with neat sketch.
b) What are the advantages of short pitching? Derive an equation for distribution factor.

3 a) What are the causes of harmonics in the alternator? How can these be minimized?
b) Explain the effect of armature reaction with lagging power factor load with neat relevant phasor diagrams.

4 The OC and SC test results for a 3-ph 50Hz,1200kva ,2.2KV,Y-connected alternator are as follows

I_f	12	20	25	35	40	50
Voc	860	1500	1760	2200	2350	2600
Isc	--	200	250	310	---	---

The effective armature resistance/ph is 0.2ohms. Estimate the full load percentage regulation using mmf method at 0.8lagging and 0.6pf leading.

5 a) Discuss the use of synchroscope in the parallel operation of alternators.
b) A 3 MVA, 6-pole alternator runs at 1000rpm in parallel with other machines on 3.3 KV bus-bars. The synchronous reactance is 25%. Calculate the synchronizing power for one mechanical degree of mechanical displacement and the corresponding synchronizing torque.

6 Draw the phasor diagram of a synchronous motor. Explain the (i) effect of change in excitation if the load is constant and (ii) effect of change in load if the excitation is constant.

7 a) What is a constant power circle of a synchronous motor? Explain how it is derived?
b) List out the applications of synchronous motor.
c) What are the function of damper winding in a synchronous motor.

8 Explain the working principle of universal motor and mention its applications. Also describe its performance characteristics.

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