Time: 3 hrs. **Total Marks:80**

N.B.(1) Question No.1 is compulsory.

(2) Attempt any three from the remaining questions

(3)Assumptions made should be clearly stated.

(4) Figure to the right indicates full Marks.

Q1	Attempt any four	20 Marks
a.	State the advantages of keeping armature stationary in synchronous machine.	5
b.	Elaborate classification of synchronous machine on the basis of rotor construction.	5
c.	What is Armature Reaction? Explain the effect of Armature reaction on the terminal voltage of Alternator at unity power factor load.	5
d.	"Synchronous Motor is not self starting" Justify the statement	5
e.	Draw P-ɗ curve for salient pole alternator with active power equation.	5
Q2.		
a.	Derive the expression for EMF induced in alternator.	10
b.	A 3-phase, 50 Hz alternator is running at 600 rpm has a 2-layer winding, 12 turns/coil, 4 slots/pole/phase, and coil-pitch of 10 slots. Let us find the induced EMF per phase if the flux/pole is 0.035 webers.	10
Q3.		
a.	Illustrate MMF method with advantages and limitations.	10
b.	Derive the expression for pitch factor and distribution factor and derive formula for Kp and Kd.	10
Q4.		
a.	Two station alternators A and B operate in parallel. The Station capacity of A is 30 MW and that of B is 60 MW. The full-load speed regulation of station A is 4% and full-load speed regulation of B is 4.5%. Calculate the load sharing if the connected load is 60 MW. No-load frequency is 50 Hz.	10
b.	State and explain conditions for satisfactory synchronisation with grid.	10

Q5.

a. Elaborate 'V' and 'inverted V' curve in synchronous motor. 10

b. State various starting methods of synchronous motor and explain any one in brief

Q6

a. Explain steady state analysis 3 phase synchronous machine. 10

b. Elaborate slip test on synchronous machine and comment on direct and quadrature axis reactance. 10

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