(DEE 316)

B.Tech. DEGREE EXAMINATION, MAY - 2015

(Examination at the End of Third Year)

ELECTRICALS AND ELECTRONICS ENGINEERING

Paper - VI : Electro Mechanics - III

Time : 3 Hours **Maximum Marks : 75**

Answer question No.1 compulsory ***(15)***

Answer ONE question from each unit ***(4 × 15 = 60)***

1) a) Define distribution factor.

b) What is meant by armature reaction of synchronous machine?

c) What is meant by synchronizing alternator?

d) Name the method giving the pessimistic value of regulation of an alternator.

e) Define synchronizing current.

f) Why a 3 phase synchronous motor always run at synchronous speed?

g) What is meant by V curves of synchronous machine?

h) What is the use of synchronous condenser?

i) How will you minimize Hunting?

j) Define pitch factor.

k) Does the change in excitation affect the synchronous speed and power factor?

l) What are the Integral slot winding?

m) Give the applications of Linear induction motor.

n) List the advantages of stepper motor.

o) Write equation of emf equation for alternator.

UNIT – I

2) a) Explain about experimental determination of synchronous reactance of an alternator and draw phasor diagrams.

b) A 3-phase, 6-pole, star connected alternator revolves at 1000 rpm. The stator has 90 slots and 8 conductors per slot. The flux per pole is 0.05 wb (Sinusoidally distributed)

Calculate the voltage generated by the machine if the winding factor is 0.96.

OR

3) a) Define voltage regulation of an alternator.

b) The open and short circuit readings for 3-ϕ, 1200kVA, 2.2kV, 50Hz star connected alternator having an effective per phase resistance of 0.22 Ω gave the following results.

1. I_f (A)	2. 10	3. 20	4. 25	5. 30	6. 40	7. 50
8. V_{oc} terminal (V)	9. 800	10. 1500	11. 1760	12. 2000	13. 2350	14. 2600
15. I_{SC} (A)	16. -	17. 200	18. 250	19. 300	20. -	21. -

Draw the characteristic and estimate the full load percentage regulation at 0.8 pf lagging.

UNIT - II

4) a) Draw and explain the phasor diagram of a salient pole alternator supplying a lagging p.f. load.

b) A 3phase, 25 MVA, 13.8 kv alternator delivers rated load at rated voltage and 0.8 pf lagging. The values of armature resistance, direct and quadrature axis synchronous reactances are 0.15 Ω, 7.6 Ω and 4.5 Ω per phase respectively. Compute percentage regulation of the machine.

OR

5) a) What are the conditions to be full filled for parallel operation of two synchronous machines? Give any one method of synchronizing.

b) A 3 MVA, 6 pole alternator runs at 1000 rpm on 3.3 kv bus-bars. The synchronous reactance is 25%. Calculate the synchronizing power and torque per mechanical degree of displacement when the alternator is supplying full load at 0.8 pf lagging.

UNIT - III

6) a) Why synchronous motor not self starting?

b) An Induction motor, driving a load, takes 350 kw, at 0.707 p.f lagging. An over excited synchronous motor is then connected in parallel with the induction motor, taking power of 190 kw. If the overall p.f. of the two motors combined is to be 0.9 lagging. Calculate KVA rating of synchronous motor.

OR

7) a) Explain the purpose of using damper winding in a synchronous machine.

b) What are V and inverted V curves? How they are determined?

UNIT - IV

8) a) Explain the operating characteristics of a ac series motor.

b) Explain working principle of permanent magnet motor.

OR

9) Write short notes on following :

a) AC series Motor.

b) Variable reluctance stepper Motor.

c) Hysteresis Motor.

d) Repulsion Motor.

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