T.E./Insem. - 123
T.E. (Electrical) (Semester - I)
Electrical Machines - II
(2012 Pattern)

Time : 1 Hour]   *[Max. Marks : 30*

Instructions to the candidates:
1) *Answer Q. No. 1 or 2, Q. No. 3 or 4, Q. No. 5 or 6.*
2) *Neat diagrams must be drawn wherever necessary.*
3) *Figures to the right indicate full marks.*
4) *Use of electronic pocket calculator is allowed.*
5) *Assume suitable data, if necessary.*

Q1) a) What are the advantages of rotating field type construction over rotating armature type construction in case of alternators. (any 4 advantages).
[4]

b) A three phase 2 pole, 50 Hz star connected alternator generates 6 kV between lines on open circuit. It has 54 slots with 4 conductors per slot. The pitch of the coils is less than the pole pitch by 2 solts. Assuming sinusoidal flux distribution, find the flux per pole. **[6]**

OR

Q2) a) What is armature reaction in case of 3 phase alternator? Explain its effect at zero power factor lag. **[4]**

b) Slip test is conducted on a 3 phase, 3 kvA, 415V star connected alternator with following observations.

Vmax (line) volts	Vmin (line) volts	Imax (Amp)	Imin (Amp)
44.3	39.9	1.1	0.8

Take armature resistance per phase as 5Ω calculate regulation of alternator at full load 0.8 pf lead. **[6]**

P.T.O.

Q3) a) A 100 kvA, 3000v, 50Hz, 3 phase star connected alternator has effective armature resistance of 0.2Ω. The field current of 40 Amp produces short circuit current of 200 A and an open circuit voltage of 1040 v (line). Calculate the full load voltage regulation at 0.8 pf lag. **[6]**

b) Explain the dark lamp method used for synchronization of alternators.

[4]

OR

Q4) a) Derive the expression for synchronizing power when two alternators are connected in parallel & running at no load. **[6]**

b) What is meant by short circuit ratio in case of alternator. Elaborate its significance. **[4]**

Q5) a) A 3 phase 11 kv star connected synchronous motor takes full load current of 60 Amp. The effective armature resistance & synchronous reactance per phase are $1\Omega \& 30\Omega$ respectively calculate the line value of induced emf at 0.8 pf lag. **[6]**

b) Explain briefly 'v' curves & inverted 'v' curves in case of 3 phase synchronous motor. **[4]**

OR

Q6) a) Explain operation of synchronous motor at constant load & variable excitation. **[5]**

b) Compare 3 phase synchronous motor with 3 phase induction motor.

[5]

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