Oct.-16/T.E./Insem. - 17
T.E. (Electrical)
ELECTRICAL MACHINES - II
(2012 Pattern)

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

Instructions to the candidates:

1) *Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6.*
2) *Neat diagrams must be drawn wherever necessary.*
3) *Figures to the right indicate full marks.*
4) *Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*
5) *Assume suitable data, if necessary.*

Q1) a) Compare salient & non salient pole rotor construction in case of 3 phase synchronous machines. **[4]**

b) A 3 phase 16 pole alternator has λ connected winding with 144 slots & 10 conductors per slot. The flux per pole is 0.03 wb & the speed is 375 rpm. Calculate the frequency & the phase value of induced emt. Consider full pitch winding. **[6]**

OR

Q2) a) What is armature reaction in case of 3 phase synchronous machine? Explain its effect at zero p.f. lead. **[4]**

b) A 3 phase star connected alternator supplies a current of 10A having phase angle of 20° lagging at 400 volts. Calculate its voltage regulation if its direct axis synchronous reactance & quadrature axis synchronous reactance is 10Ω & 6.5Ω respectively. Neglect armature resistance.**[6]**

Q3) a) Explain the need of synchronization of alternators. **[4]**

b) A 550V, 55kVA-1Phase alternator has effective resistance of 0.2 Ω. A field current of 10A produces an armature current of 200A on short circuit & emt of 450V on open circuit. Calculate full load voltage regulation at 0.8 pf kg. **[6]**

OR

P.T.O.

Q4) a) Explain bright lamp method of synchronization. **[4]**

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

Q5) a) State different methods of starting 3 phase synchronous motor. Explain any one. **[4]**

b) A 220V, 3 phase star connected synchronous motor has resistance of $0.3\,\Omega$ & synchronous reactance of $3\,\Omega$ per phase. Determine induced emt per phase if motor works on full load at 0.8 leading pf. taking current of 130Amp. Also find angle of retard. **[6]**

OR

Q6) a) Explain operation of synchronous motor at constant excitation & variable load condition. **[4]**

b) Compare 3 -phase Synchronous motor with 3-phase induction motor. **[6]**

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