Total No of Questions: [12] **SEAT NO. :** [ ]

[Total No. of Pages : 2]

T.E. 2008 (Electrical)

303142: ELCTRICAL MACHINES - II

(Semester - II)

Time: 3 Hours **Max. Marks : 100**

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Answer three questions from each section.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right side indicate full marks.***
5) ***Use of Calculator is allowed.***
6) ***Assume Suitable data if necessary***

SECTION I

Q1) a) Define voltage regulation of alternator at full load. Can voltage regulation be positive or negative? When? **[4]**

b) From the following test result determine the voltage regulation of a 2000 V 1 phase alternator delivering a current of 100 A at i) 0.71 lag pf ii) 0.8 lead pf **[8]**

Test result- full load current of 100 A is produced on short circuit by a field excitation of 2.5 A . An emf of 500 V is produced on open circuit by the same excitation. Given armature resistance = 0.8 ohms

c) What is meant by short circuit ratio in case of alternator? Elaborate its significance. **[6]**

OR

Q2) a) Compare salient pole type rotor construction with non salient pole type construction in case of 3 phase alternator. **[4]**

b) Explain the ZPF method for determining voltage regulation of alternator. **[8]**

c) A 3 phase 16 pole alternator has star connected full pitch winding with 144 slots & 10 conductors per slots. The flux per pole is 0.03 Wb sinusoidally distributed & the speed is 375 rpm. Calculate the phase value of induced emf. **[6]**

Q3) a) Explain any two methods of starting 3 phase synchronous motor. State applications of 3 phase synchronous motor. **[8]**

b) A 2 MVA 3 phase 8 pole alternator is connected to 6000 V, 50 Hz busbars & has synchronous reactance of 4 ohms per phase. Calculate the synchronizing power and synchronizing torque per mechanical degree of rotor displacement at no load. Assume **[8]**

OR

Q4) a) What is synchronizing of alternator? what are different methods of synchronizing? Explain dark lamp method of synchronizing **[8]**

b) Explain the operation of synchronous motor at **[8]**

1) Constant load & variable excitation
2) Constant excitation & variable load

Q5) a) With neat diagram explain construction & working of 3 phase synchronous induction motor. **[8]**

b) Write a short note on 3 phase induction generator **[8]**

OR

Q6) a) Explain testing of 3 phase induction motor as per IS 325 & IS 4029 **[8]**

b) Explain V/f method of speed control of 3 phase induction motor. Why the ratio V/f is to be kept constant? **[8]**

SECTION II

Q7) a) With the help of suitable waveforms, explain the nature of torque developed for DC series motor if it is connected to ac supply. **[8]**

b) A 2 pole, 50 Hz, 230 volt universal motor has 1200 armature turns and 400 series field turns. When operated on ac supply, the full load current is 1 Amp, field flux is 0.8 m Wb and speed is 7000 rpm. The total resistance and leakage reactance are 20 Ω and 30 Ω. Neglect iron loss of motor. Find – **[8]**

(i) Transformer emf induced in armature by quadrature flux.

(ii) Quadrature flux

Full load output

OR

Q8) a) With suitable diagram explain inductively compensated AC series motor **[8]**

b) Explain the procedure to plot circle diagram of AC series motor. How to get following parameters from circle diagram- 1)Net mechanical output 2)Motor efficiency **[8]**

Q9) a) What are slot harmonics? What are their effects on performance of machine? How these can be mitigated? **[8]**

b) Explain construction and working of permanent magnet DC motor. State its applications. **[8]**

OR

Q10) a) Explain construction and working of linear induction motor. State its applications. **[8]**

b) Explain construction and working of brushless DC motor. State its applications. **[8]**

Q11) a) Explain cross field theory with suitable diagrams. **[9]**

b) Explain construction, working and speed torque characteristics of capacitor start-capacitor run motor. **[9]**

OR

Q12) a) With suitable circuit diagram explain –No load test and blocked rotor test on single phase induction motor. How equivalent circuit parameters are obtained from these tests? **[9]**

b) Explain double field revolving theory with suitable diagrams. **[9]**

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