

Total No. of Questions :12]

SEAT No. :

**P1617**

[Total No. of Pages :3]

**[5058] - 62****T.E. (Electrical)****ELECTRICAL MACHINES - II****(2008 Course) (Semester - I)***Time : 3 Hours]**[Max. Marks :100**Instructions to the candidates:*

- 1) *Answer 03 questions from Section I and 03 questions from Section II.*
- 2) *Answers to the two sections should be written in separate books.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Figures to the right indicate full marks.*
- 5) *Use of electronic pocket calculator is allowed.*
- 6) *Assume suitable data if necessary.*

**SECTION - I**

- Q1)** a) What is armature reaction? Explain the effect of armature reaction on synchronous machine at different power factors. [8]
- b) Compare salient pole & non salient pole synchronous machines. [4]
- c) The 3 phase star connected, 16 poles alternator has 192 slots with 8 conductors per slot. The actual coil span is  $160^\circ$  electrical. The alternator is driven at 375 rpm having flux per pole 55 mWb. Calculate line value of emf induced. [6]

**OR**

- Q2)** a) A 2400 kVA,  $8000 \sqrt{3}$  volts, 3 phase star connected alternator has synchronous impedance of  $1.5 + j 30 \Omega$  per phase. Calculate the full load % regulation at. [8]
- i) 0.866 lag pf &
  - ii) 0.866 lead pf
- b) Define short circuit Ratio in case of alternator. State its significance. [4]
- c) Explain emf method for finding out voltage regulation & 3  $\phi$  alternator. [6]

**P.T.O.**

- Q3) a)** State the conditions for parallel operation of 3 phase alternators. Explain 2 bright & 1 dark lamp method. [8]
- b)** A 3 phase star connected, 6.6 kV synchronous motor takes 72 Amp at 0.8pf leading. Resistance & reactance per phase of the motor are  $0.1\Omega$  &  $0.9\Omega$  respectively. Calculate induced emf & total power input. [8]

OR

- Q4) a)** A 5 kVA, 200V, 3 phase star connected salient pole alternator has direct axis & quadrature axis reactance of  $12\Omega$  &  $7\Omega$  respectively. Calculate the excitation voltage & full load voltage regulation at unity power factor. Neglect resistance. [8]
- b)** What do you mean by V curve & inverted V curve & synchronous motor. Give experimental set-up for the same & describe in detail. [8]

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

OR

- Q6) a)** Explain operation of 3 phase Induction generator. State its advantages & applications. [8]
- b)** Write a short note on 3 phase Induction voltage regulator. [8]

- Q7) a)** Discuss in detail the problems associated with DC series motor when it is connected to AC supply. [8]
- b)** Draw and explain the exact phasor diagram of AC series motor. [8]

OR

- Q8) a)** An AC series motor is wound with 960 armature conductors with 2 poles. It draws a current of 4.6 Amp while running at 5000 rpm. The motor is connected to 100 volt ac supply and the input power is 300 watt. The armature winding resistance is  $3.5\Omega$ . Find out-. [8]
- i)** Effective armature reactance
- ii)** Useful flux per pole

- b) What modifications are made in DC series motor so that it can work satisfactorily on AC supply? [8]

**Q9) a)** Explain construction and working of brushless DC motor with suitable diagrams. State its applications. [8]

- b) What is meant by slot harmonics in case of induction motor? What are its effect on performance of induction motor? How these are mitigated? [8]

OR

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

- b) Explain the concept of time and space harmonics. [8]

**Q11) a)** Explain crossfield theory in detail for single phase induction motor. [9]

- b) With suitable diagram explain construction and working of capacitor star capacitor run motor. Draw its speed torque characteristics. State applications of this motor. [9]

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OR

**Q12) a)** Draw equivalent circuit of single phase induction motor. Explain each parameter involved in the equivalent circuit. [9]

- b) With suitable diagram explain construction and working of shaded pole motor. Draw its speed torque characteristics. State applications of this motor. [9]

