

Total No. of Questions : 12]

SEAT No. :

P1081

[Total No. of Pages : 3

[4163] - 253

May - June 2012

T.E. (Electrical)

ELECTRICAL MACHINES - II

(2008 Pattern) (Sem. - I)

Time : 3 Hours]

[Max. Marks : 100

Instructions to the candidates:-

- 1) Answer any 3 questions from each section.
- 2) Answers to the two sections should be written in separate answer books.
- 3) Figures to the right indicate full marks.
- 4) Assume suitable data, if necessary.

SECTION - I

- Q1) a) With a neat diagram explain constructional details of salient pole type alternator. [6]
- b) A 3 phase, 8 pole, 750 rpm star connected alternator has 72 slots on armature. Each slot has 12 conductors and winding is shorted by 2 slots. Find the coil pitch factor and distribution factor for the winding. Calculate induced emf in the lines if flux per pole is 0.06 weber. [6]
- c) What is meant by short circuit ratio in case of alternator? Elaborate its significance. [6]

OR

- Q2) a) Compare - Direct method, emf method, MMF method of Finding regulation of alternator. [6]
- b) Calculate percentage voltage regulation (up) of a 3 phase, 230 volt, star connected alternator operating at 0.8 p.f. lag supplying load current of 10 Amp. The opencircuit test and short circuit test data is as below. [6]

OC EMF	I_{sc}	Ra/ph
230 volt	12.5 Amp	
for If = 0.38 Amp	for If = 0.38 Amp	0.9 Ω

- c) Derive the mathematical expression for distribution factor (kd) for an alternator. [6]

P.T.O.

- Q3) a)** Describe any two methods of making the synchronous motor self start. [8]
- b)** A salient pole alternator is operated at 0.8 p.f. It is delivering rated current at rated voltage. Resistance of armature per phase is 0.02 per unit (PU), $X_d = 1.2$ PU, $X_q = 0.8$ PU. Find direct in a quadrature axis current, load angle (δ), emf (E). [8]

OR

- Q4) a)** A 3 phase star connected, 6.6 kV synchronous motor takes 72 Amp at 0.8 p.f. leading. Resistance and reactance per phase of the motor are 0.1Ω and 0.9Ω respectively. Determine emf induced and total power input. [8]
- b)** State and elaborate the conditions that must be fulfilled for satisfactory parallel operation of two alternators. [8]

- Q5) a)** Compare three phase induction motor with threephase synchronous induction motor. [8]
- b)** With a neat diagram explain construction and working of 3 phase induction voltage regulator. [8]

OR

- Q6) a)** Why V/f ratio is to be maintained constant for speed control of induction motor? With a suitable diagram explain speed control of induction motor using rotor resistance control. [8]
- b)** Write a short note on 3phase induction generator. [8]

SECTION - II

- Q7) a)** For plain ac series motor explain - direct axis and quadrature axis fluxes and different emfs induced due to these fluxes. [9]
- b)** A universal series motor has resistance of 30Ω and inductance of 0.5H. When connected to 250 volt DC supply, it takes 0.8 Amp and runs at 2000rpm. Determine the speed, torque and power factor when connected to a 250 volt, 50 Hz AC supply and taking same current of 0.8 Amp. [9]

OR

- Q8) a)** With a suitable diagram explain inductively compensated and conductively compensated series motor. [9]
- b)** Describe the procedure for drawing circle diagram of plain series motor. [9]

- Q9)** a) With a suitable diagram explain construction and working of brushless dc motor. [8]
- b) What are the effects of harmonics on performance of induction motor. State the remedies to reduce the harmonics. [8]

OR

- Q10)** a) Elaborate the concept of time and space harmonics incase of induction motors. [8]
- b) With a neat diagram explain construction and working of linear induction motor. State its applications. [8]

- Q11)** a) Explain double field revolving theory for single phase induction motor. [8]
- b) Explain construction and working of capacitor start single phase induction motor. Draw its torque - speed characteristics. State the applications of this motor. [8]

OR

- Q12)** a) Explain cross field theory for single phase induction motors. [8]
- b) Explain no load and blocked rotor test performed on single phase induction motor to determine its performance characteristics. [8]

