

[4658] - 542

Seat	
No.	

T.E. (Electrical) (Semester – I) Examination, 2014 ELECTRICAL MACHINES – II (2012 Course)

Time : 3 Hours

Max. Marks : 70

Instructions : 1) Neat diagrams must be drawn wherever necessary.

- 2) Black figures to the **right** indicate **full** marks.
- 3) Use of electronic pocket calculator is allowed.
- 4) Assume suitable data, if necessary.
- 5) Answer Q. No. 1 or 2, Q. No. 3 or 4, Q. No. 5 or 6, Q. No. 7 or 8, Q. No. 9 or 10.
- 1. a) A 3 phase 4160 V, 3.5 MVA, 50 Hz star connected alternator has open circuit characteristics given by following data :

I _, (A)	50	100	150	200	250	300	350	400
V_(V)	1620	3150	4160	4750	5130	5370	5550	5650

A field current of 200A is found necessary to circulate full load current on short circuit of alternator. Using MMF method, calculate voltage regulation at 0.8 pf lag. Negglect armature resistance.

b) What is meant by short circuit Ratio in case of alternator ?

OR

- 2. a) With neat diagram describe the slip test. How X_d and X_a can be determined ?
 - b) Explain :
- Coil span factor
 Distribution factor
 Define voltage regulation of alternator. If the alternator is loaded using resistive load, weather its terminal voltage will increase or decrease ? Why ?
 Write a short note on 'synchroscope'.

OR

- 4. a) A 400 V, 7.46 KW 3 phase synchronous motor has negligible armature resistance and has synchronous reactance of 10Ω/phase. Determine the minimum armature current and compounding induced emt for full load conditions. Assume efficiency at full load = 85%.
 - b) Compare 3 phase synchronous motor with 3 phase induction motor (any 8 points). 4

P.T.O.

8

2

6

[4658] – 542

5.	a)	 Explain following speed control methods of 3 phase induction motor 1) Cascade control method 2) V/f control method. 	8
	b)	Describe with neat diagram, construction and working of permanent magnet stepper motor.	8
6.		Explain the operation of 3 phase induction motor as Induction Generator. State its advantages and applications.	8
		Explain the construction and working of Linear Induction Motor state its applications.	8
7.	a)	What are the types of compensated a.c. series motor ? Describe each with diagram.	8
	b)	A universal motor has resistance of 30Ω and inductance of 0.5 H. When connected to 250V d.c. supply and loaded to take 0.8A, it runs at 2000 rpm. Determine the speed, torque and power factor when connected to 250 V, 50 Hz ac supply and loaded to take same current.	8
		OR	
8.	a)	Explain the procedure to plot circle diagram of a.c. series motor. How full load efficiency torque scale and speed scale can be determined ?	10
	b)	Explain modifications necessary in the construction of d.c. series motor to operate it satisfactorily on a.c. supply.	6
9.	a)	With neat diagram explain the construction and working of 1 phase capacitor start induction motor. State its applications.	8
	b)	A 230 V, 800 W 2 pole 50 Hz 1 ph I.M. have following parameters \rightarrow R_1 = 2.2 $\Omega,$	
		$X_1 = 3\Omega, R_2^1 = 3.8\Omega, X_2^1 = 2.1\Omega, X_m = 86\Omega.$	
		Calculate current, power factor and efficiency when operating at slip of 6% draw equivalent circuit and show all the terms in it. OR	10
10.	a)	With neat diagram, explain double revolving field theory. Hence draw torque-speed characteristics of single phase induction motor.	8
	b)	With neat diagram, explain construction and working of shaded pole induction motor. Draw its torque-speed characteristics. State applications of this motor.	10

B/II/14/