Total No. of Questions: 10]		SEAT No.:	
P 1709	[5058] - 342	[Total No. of Pages :	
	T.E. (Electrical)		

ELECTRICAL MACHINES-II

(2012 Pattern) (End Semester) (Semester - I) (303142)

Time : 2½ Hours a	nd 30 min:
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[Max. Marks: 70]

Instructions to the candidates:

- 1) Answer Q No1 or Q No2,QNo 3 or QNo 4, QNo 5 or QNo 6,QNo 7 or QNo 8, QN09 or QNo 10.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Use of electronic pocket calculator is allowed.
- 5) Assume Suitable data if necessary.
- **Q1)** a) With a neat diagram explain construction of three phase Alternator. [5]
 - b) Effective resistance of a 1200 kVA, 3300V, 50Hz three phase star connected alternator is 0.3Ω per phase. A field current of 35A produces a current of 200A on short circuit and 1100V across line on open circuit. Find the per unit change in terminal voltage when full load of 1200kW at 0.8 power factor lagging is thrown off. [5]

OR

Q2) a) Explain pitch factor with diagram.

[4]

- b) Explain the procedure to determine the regulation of three phase alternator by m.m.f, method. [6]
- Q3) a) Compare three phase synchronous motor with three phase induction motor on following point.[5]
 - i) Starting

ii) Speed

iii) Power factor

iv) Cost/kVA

- v) Size/kVA
- b) A three phase 10kW synchronous motor is connected to 1000V supplyand has synchronous reactance of 10Ω per phase. Find the value of minimum.current and the corresponding induced emf for full load condition the efficiency of the motor is 0.8 Neglect the armature resistance.

OR

P.T.O.

Define short circuit ratio of alternator. Elaborate its significance. *Q4*) a) [4] b) An alternator has direct axis synchronous reactance of 0.9 per unit and quadrature axis reactance of 0.55 per unit. Find the per unit open circuit voltage for full load at lagging power factor of 0.8. [6] Explain construction and working of brushless d.c. motor. **Q5)** a) [8] Explain stator side speed control methods of three phase induction motor. [8] b) OR Explain construction and working of variable reluctance stepper motor. [8] **Q6)** a) b) Draw complete slip-torque characteristics of three phase induction motor and explain working of induction generator. [8] *Q7*) a) Explain procedure to plot circle diagram of a.c. series motor. [8] b) Explain the working of universal motor with its operating characteristics. [8] OR **Q8**) a) Compare uncompensated a.c. series motor with compensated a.c. series motor. [8] A universal motor having resistance of 40 Ω and inductance of 0.3H b) connected to 240V d.c. supply and loaded draws 1A at 200rpm. Find the speed and torque when the motor is connected with 240V, 50Hz a.c.supply and loaded to draw the same value of current when connected with d.c. supply. [8] **Q9**) a) With neat diagram explain double revolving field theory. Hence draw torque-speed characteristics of single phase induction motor. With a suitable diagram explain no load and blocked rotor test on single b) phase induction motor. How equivalent parameters are obtained from

OR

these tests. Draw equivalent circuits of the motor under two test

[10]

conditions.

- Q10)a) With neat diagram explain constrution and working of split phase induction motor. Draw its torque speed characteristics. [8]
 - b) A 230V, 50Hz, 4pole single phase induction motor has the following equivalent circuit parameters $R_1 = 3\Omega R_2 = 5\Omega$, $X_1 = 3\Omega$, $X_2 = 2.5\Omega$ and $X_m = 75\Omega$. Friction, windage and core losses are 50W and slip is 0.025. Calculate:
 - i) Input current
 - ii) Power factor
 - iii) Developed power
 - iv) Output power
 - v) Efficiency [10]



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