

Total No. of Questions : 10]

SEAT No. :

P2388

[4758]-547

[Total No. of Pages : 3

T.E. (Electrical)

ELECTRICAL MACHINES-II

(2012 Course) (Semester-I) (End-Semester)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Attempt 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.*
- 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.*

SECTION-I

- Q1)** a) With suitable diagrams explain Blondel's two reaction theory. [6]
b) Explain parallel generator theorem. [4]

OR

- Q2)** a) A 1200 kVA, 3300 volt, 50Hz, 3 phase, star connected alternator has armature resistance of 0.25Ω per phase. A field current of 40 Ampere produces a short circuit current of 209.95 Ampere and the same field current of 40 ampere produces an open circuit emf of 1100 volt.

Find the voltage regulation of alternator on-

- i) Full load 0.8 lagging power factor.
 - ii) Full load 0.8 leading power factor. [8]
- b) Draw equivalent circuit of synchronous generator and mark all parameters in it. [2]

- Q3)** a) A star connected synchronous motor is rated 10 HP 400 volt. The synchronous reactance of the motor is 10Ω per phase. The armature resistance is negligible. The motor operates at unity power factor. Find current taken by the motor and back emf. Assume motor efficiency as 85%. [6]
- b) Explain dark lamp method of synchronising the two alternators. [4]

OR

P.T.O.

- Q4) a)** Open circuit test and short circuit test is conducted on 3 phase alternator rated 6600 volt. Following observations are noted- [8]

Open circuit voltage (volt)	3100	5000	6600	7500	8300
Field current (ampere)	16	25	37.5	50	70

A field current of 20 Ampere produces full load current on short circuit plot occ. Calculate voltage regulation on full load at 0.8 power factor lagging. Use ampere turn (MMF) method.

- b) State any four applications of synchronous motor. [2]

- Q5) a)** With suitable diagram explain speed control of slip ring induction motor by varying the rotor resistance. [8]

Draw speed torque characteristics for different values of rotor resistance.

- b) With suitable diagram explain construction and working of permanent magnet DC motor. [8]

OR

- Q6) a)** Explain speed control of three phase induction motor by cascade connection with suitable diagram. [8]

- b) Explain construction and working of single phase induction type voltage regulator. [8]

- Q7) a)** Compare uncompensated AC series motor with compensated AC series motor. [9]

- b) A 2 pole universal motor operates on AC supply drawing a current of 4.6 Ampere. It runs at 4500 rpm. It draws input power of 320 watt from supply of 100 volt. Evaluate the maximum value of flux per pole and armature reactance. Assume armature resistance of 3.6Ω . [9]

OR

- Q8) a)** Draw circle diagram of AC series motor. Mark respective voltage drop intercepts on the circle diagram. State the meaning of each intercepts. Also write how output power, efficiency is obtained from these intercepts. [9]

- b) Explain operation of DC series motor on AC supply. State the modifications necessary to improve the performance of motor. [9]

- Q9) a)** With suitable diagram, explain construction and working of capacitor start-capacitor run motor. Draw its speed-torque characteristics. [8]
- b) Explain construction and working of shaded pole motor with suitable diagrams. State applications of this motor. [8]

OR

- Q10)a)** A 200 watt, 230 volt, 50 Hz capacitor start motor has following winding parameters-
- Main winding $R = 4.5\Omega$, $X_L = 3.7\Omega$
- Starting winding $R = 9.5\Omega$, $X_L = 3.5\Omega$
- Find the value of starting capacitance that will give maximum starting torque. [8]
- b) Explain double field revolving theory for single phase induction motor with suitable diagrams. Also plot torque speed characteristics. [8]

●●●●●