



11. (a) (i) Give short notes on the features of a Synchronous motor. (8)  
 (ii) Explain how Synchronous motor can be operated as a synchronous condenser. (10)

Or

- (b) (i) Derive the torque equation of a 3 Phase induction motor. (8)  
 (ii) A 4 Pole, 3 Phase induction motor runs at 1440 rpm on a 50 Hz supply. Find slip speed, slip and frequency of rotor e.m.f. (8)
12. (a) A 4-pole, 50 Hz star-connected alternators have a flux per pole of 0.12 Wb. It has 4 slots per pole per phase, conductors per slot being 4. If the winding coil span is 150° find the e.m.f.

Or

- (b) (i) Explain the effect of change in rotor resistance on the torque-slip characteristics. (8)  
 (ii) A 8 Pole, 3 Phase induction motor is supplied from 50 Hz, a.c. supply. On full load, the frequency of induced e.m.f in rotor is 2 Hz. Find the full load slip and the corresponding speed. (8)
13. (a) Write short notes on : (16)  
 (i) Universal motor  
 (ii) Hysteresis motor.

Or

- (b) Explain the methods of starting of induction motor with neat sketches. (16)
14. (a) Draw and explain the phasor diagram of salient pole Alternator supplying full load power current. Show that the power output per phase is given by

$$P = \frac{EV}{X_d} \sin \alpha + \frac{V^2}{2} \left[ \frac{1}{X_q} - \frac{1}{X_d} \right] \sin 2\alpha. \quad (16)$$

Or

- (b) Write a descriptive note on the effect of torque angle on power developed by synchronous motor with relevant phasor diagram. (16)

15. (a) Explain the speed control of induction motor from stator side. (16)

Or

(b) What modifications are necessary in a dc series motor, so that it may work satisfactorily on ac? Explain its operation. (16)

(6)

(8)

50 Hz  
(8)

pole of  
being 4.

re-slip  
(8)

z, a.c.  
2 Hz.  
(8)

(16)

(16)

ator  
ruse

(16)

red  
(16)

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