

- Q4)** a) Define short circuit ratio of alternator. Elaborate its significance. [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]

- Q5)** a) Explain construction and working of brushless d.c. motor. [8]
b) Explain stator side speed control methods of three phase induction motor. [8]

OR

- Q6)** a) Explain construction and working of variable reluctance stepper motor. [8]
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]
b) A universal motor having resistance of 40Ω and inductance of 0.3H 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. [8]
b) With a suitable diagram explain no load and blocked rotor test on single phase induction motor. How equivalent parameters are obtained from these tests. Draw equivalent circuits of the motor under two test conditions. [10]

OR

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Q10)a) With neat diagram explain construction 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]

