

- j) What is voltage regulation of alternator? Explain synchronous impedance voltage regulation method.
- k) Explain speed control methods of DC shunt motor.
- l) How to get continuous unidirectional torque in synchronous motor? Explain the procedure to make it self-starting.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

- Q3** Discuss the armature winding of D.C machine. With neat sketch show $Y_F, Y_B, Y_R, Y_C, Y_S, Y_A, N_C, C_S$ and write the relations between them for both lap and wave winding. **(16)**
- Q4** Describe commutation of D.C. generator. Explain various methods for improving commutation. **(16)**
- Q5** A 3300V, 3phase star connected alternator has a full load current of 100A. On short circuit a field current of 5A was necessary to produce full load current. The emf on open circuit for the same excitation was 900V. The armature resistance was 0.8Ω /phase. Determine the fullload voltage regulation for (i) 0.8pf lagging (ii) 0.8pf leading **(16)**
- Q6** Describe the Operating principle and one starting method of three phase synchronous motor. Draw the Phasor diagram for normal, under and over excited condition. **(16)**