

- N.B.:** (1) Question No. 1 is **compulsory**.
 (2) Attempt any **four** questions out of remaining **six** questions.
 (3) **Figures** to the **right** indicate **full** marks.
 (4) Assume any **suitable** data wherever **required**.

1. (a) Why single phase motor is not self starting ? 20
 (b) Explain speed control of dc shunt motor by means of variation of armature voltage.
 (c) Why D.C. series motor should not be started at no load.
 (d) What is creeping in energymeter ? How it can be overcome ?
 (e) Why three point starter can not be used for speed control of D.C. shunt motor ?
2. (a) A 250 V, dc shunt motor on no load runs at a speed of 1000 rpm and takes a current of 5 A. The armature and shunt field resistances are 0.2Ω and 250Ω respectively. Calculate the speed when the motor is on-load and is taking a current of 50 A. Assume that the armature reaction weakens the field by 3%. 10
 (b) Explain starting methods of 3- ϕ induction motor. 10
3. (a) Explain speed control methods of dc shunt motor. 10
 (b) Explain production of rotating magnetic field in 3- ϕ induction motor with neat diagrams. 10
4. (a) A 20-hp, 4 pole, 50 Hz, three phase induction motor has friction and windage losses of 2% of the output. The full load slip is 3%. Calculate for full load :— 10
 (i) the rotor $I^2 R$ loss
 (ii) the rotor input
 (iii) the output torque.
 (b) Explain characteristics of dc shunt and series motors. 10
5. (a) Explain operation of Kelvin's Double Bridge with expression. 10
 (b) Write note on recorders. 10
6. (a) Explain different types of torques in indicating instruments. 10
 (b) Explain operation of shaded pole motor with neat diagrams. 10
7. Write short notes on any **three** of the following :— 20
 (a) Applications of C. R. O.
 (b) Induction type energymeter
 (c) Schering Bridge
 (d) Working of DUM and DMM.