

[Time: Three Hours]

[Marks:80]

Please check whether you have got the right question paper.

- N.B:**
1. Question.No.1 is compulsory.
 2. Attempt any 3 from the remaining questions.
 3. Assume suitable data if necessary.
 4. Draw neat diagram, wherever necessary.

- Q. 1** Attempt any four questions.
- a) Derive e.m.f equation of transformer. (05)
 - b) Explain the principle of energy conversion and develop the model of electromechanical energy conversion device. (05)
 - c) Explain the rheostatic braking of d.c. shunt motor. (05)
 - d) Explain the necessary the required to connect two transformer in parallel. (05)
 - e) List down the different application shunt, series and compound motor. (05)
- Q. 2**
- a) Explain the different electrical braking methods for separately excited DC motor. (10)
 - b) Two single phase transformer with equal voltage ratio having impedance of $(0.5+j3)$ ohm and $(0.6+j10)$ ohm with respect to the secondary. If they operate in parallel determine how they will share a total load of 100kw at p.f 0.8 lagging. (10)
- Q. 3**
- a) Explain the process of commutation and mention the method to improve the commutation (10)
 - b) Consider a 5 KVA 200/400 V, 50 Hz, single phase transformer gave following result. (10)
O.C test : 200 V, 0.74A, 60 W (L.V side)
S.C. test : 10 V, 5A, 22W (H. V. side)
Calculate (i) efficiency and voltage regulation at full load 0.8 pf lagging.
(ii) The efficiency at half load at unity power factor.
- Q. 4**
- a) What is armature reaction? What are the effects of armature reaction and how the armature reaction is minimized? (10)
 - b) A 220 V, 6 pole shunt motor has wave winding with 720 conductor having armature resistance 0.2 ohm and field resistance is 120 ohm and flux per pole is 0.025 Wb, if motor draws 15A from mains then calculate speed and torque developed. (10)
- Q. 5**
- a) Explain the necessities of starter in DC motor and hence explain 3 point starter. (10)
 - b) What do you mean by ideal transformer? Draw explain in detail transformer phasor diagram for lagging and leading P.F load. (10)
- Q. 6** Write the Short Notes :
- a) Doubly excited magnetic field. (10)
 - b) All day efficiency in transformer. (10)