

Q.P. Code : 16503

[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 three questions out of remaining five questions.

3. Draw neat diagrams wherever it is necessary.

- Q. 1** Answer the following questions. (20)
- a) Explain with neat diagram series and parallel magnetic circuits. (05)
 - b) Explain the fundamental principle involved in electromechanical energy conversion. (05)
 - c) Define hysteresis and eddy current losses. (05)
 - d) Give the significance of commutator and brushes In DC machine. (05)
- Q. 2**
- a) Explain the process of commutation in detail and state the methods to improve commutation. (10)
 - b) Explain speed control methods of dc shunt motor in detail. (10)
- Q. 3**
- a) Draw and explain the schematic of doubly excited system. (10)
 - b) Explain the effect of winding resistance and leakage reactance on transformer and draw the equivalent circuit referred to primary. (10)
- Q. 4**
- a) Give the advantages and disadvantages of Hopkinson's test. In Hopkinson's test on 250 V machines, the line current was 50 A and the motor current 400 A not including the field currents of 6 A and 5A. The armature resistance of each machine was 0.015Ω . Calculate efficiency of each machine. (10)
 - b) Why transformer rating is in kVA? Draw and explain the back to back test conducted on two identical transformers. (10)
- Q. 5**
- a) Derive the expression for torque developed in singly excited system. (10)
 - b) Two 1-phase transformers with equal voltage ratios have impedances of $(0.819 + j2.503)\Omega$ and $(0.8 + j2.31)\Omega$ with respect to the secondary. If they operate in parallel, how they will share a total load 2000k W at 0.8 lagging? (10)
- Q. 6**
- a) Explain the conditions for satisfactory parallel operation of transformer in detail. (10)
 - b) Explain the armature reaction in DC machine. (10)