

Electrical Machines-I

P. Pages : 2

NRT/KS/19/3366/3395

Time : Three Hours

0640

Max. Marks : 80

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- Notes :
1. All questions carry marks as indicated.
 2. Solve Question 1 OR Questions No. 2.
 3. Solve Question 3 OR Questions No. 4.
 4. Solve Question 5 OR Questions No. 6.
 5. Solve Question 7 OR Questions No. 8.
 6. Solve Question 9 OR Questions No. 10.
 7. Solve Question 11 OR Questions No. 12.
 8. Assume suitable data whenever necessary.
 9. Illustrate your answers whenever necessary with the help of neat sketches.
 10. Use of non programmable calculator is permitted.

- 1.** a) A 50KVA transformer has efficiency of 98% on full load at 0.8 power factor and 98.5% on half full load at 0.9 power factor. Determine all day efficiency of this transformer for the following load cycle: **7**
- 5 Hours - 5 - kW at power factor of 0.6.
12 Hours - 40 -kW at p. f. of 0.8
6 Hours - 30 -kW at p. f. of 0.85.

- b) Draw a phasor diagram of single phase transformer supplying a Leading power factor load. **6**

OR

- 2.** a) A 3 – ϕ 50KVA, 2000V/500V, 50Hz, Δ – Y transformer has following test results:- **8**
- O. C test (LV side) : 500 V; 3A; 500 W
S.C test (HV side) : 250V; I_{FL} ; 900 W.
Calculate:
- i) Parameter of shunt branch of equivalent circuit.
 - ii) Regulation of efficiency of transformer at full load 0.8 P. F. lagging.
 - iii) Maximum efficiency & load at which it occurs at unity power factor.

- b) Explain how to convert single phase transformer into an auto transformer. State advantages of auto transformer over two winding transformer. **5**

- 3.** a) Discuss different cooling methods of transformer. **6**

- b) Explain Back to Back test to determine regulation & efficiency of transformer. **7**

OR

- 4.** a) Explain Scott connection i. e 3 ϕ to 2 ϕ Conversion & its application. **6**

- b) A Scott connected transformer set is rated at 11000-V on 3-phase side, at 80V on two phase side. When teaser transformer is loaded upto 500kW, unity power factor and the main transformer, upto 800 kW at unity power factor, calculate the line to currents on 11-KV side. **7**

