

**(03 Hours)****Total marks:80**

- N.B.:-** (1) Question No.1 is compulsory.  
 (2) **Attempt** any **three** questions out of remaining **five** questions.  
 (3) Assume suitable data if necessary and justify the same.

**Q.1 Solve any four**

- a. Explain various losses taking place in a single-phase transformer **05M**  
 b. List out the advantages, Disadvantages and applications of autotransformer **05M**  
 c. Explain connection and phasor diagram of yy0 transformer. **05M**  
 d. Explain the applications of single-phase induction motor. **05M**  
 e. Describe torque-speed characteristics of a three phase IM in braking, motoring and generating regions. **05M**

**Q.2. Answer the following questions.**

- a. Explain the need of starter in three phase IM. Describe Direct On Line (DOL) starter in Detail. **10M**  
 b. Explain the power stages with neat labeled diagram and expression in three phase IM. **10M**

**Q.3 Answer the following questions.**

- a. Explain saving of cu in auto transformer. **10M**  
 b. Describe the V - connection with diagram. **10M**

**Q.4. Answer the following questions.**

- a. Explain construction, working of capacitor start Single phase Induction Motor. **10M**  
 b. An 18.64 KW, 4 pole 50 Hz 3-phase induction motor has friction and windage losses of 2.5 % of output. The full load slip is 4%. Find for full load (i) rotor Cu loss (ii) the rotor input (iii) the shaft torque. (iv) the gross electromagnetic torque.

**Q.5. Answer the following questions.**

- a. Discuss the necessary conditions required for parallel operation of three phase transformers, **10M**  
 b. A 200 kVA, 2000/440 V, 50 Hz single-phase transformer gave the following test results: **10M**  
 O.C. test: 2000 V, 1.8 A, 175 kW .....on H.V. side  
 S.C. test: 13 V, 300 A, 1kw ..... on L.V. side  
 Obtain the equivalent circuit parameters as referred to H.V. side.

**Q.6. Answer the following questions**

- a. Explain Double field revolving theory, in single phase Induction motor. **10M**  
 b. What is the Oscillating neutral phenomenon in three phase transformers. **10M**