TE - sem V - Electrical - CBGS 19/5/15

EM - III

**(3 Hours)** **QP Code : 3273**
**[Total Marks : 80**

Note: 1) Question No.1 is compulsory.
2) Attempt any three questions out of remaining five question.
3) Assume suitable data if required.

| | | Marks |
|---|---|---|
| Q. 1 | | 20 |
| (a) | Define inrush current in three phase transformer | 05 |
| (b) | Explain the Dd0 phasor group of three phase transformer connection along with connection diagram and phasor diagram | 05 |
| (c) | Name the different methods of starting of single phase induction motor and explain any one | 05 |
| (d) | Explain the working principle of three phase induction motor | 05 |
| Q.2 | | 20 |
| (a) | A three phase , star connected , 400V, 50Hz, 4 pole induction motor has the following per phase constants in ohm referred to stator $R_1$=0.15, $X_1$=0.45, $R_2$=0.12, $X_2$=0.45, $X_m$=28.5 Fixed losses (core and friction and windage losses )= 400 w. compute stator current , rotor speed , output torque and efficiency when motor is operated at rated voltage and frequency at a slip of 4% | 10 |
| (b) | Explain star-delta starter for a 3 phase induction motor. Derive the expression for starting current and starting torque. | 10 |
| Q.3 | | 20 |
| (a) | Explain the necessity of controlling voltage along with frequency for speed control of an induction motor for v/f control method. Also draw torque-speed characteristic for constant v/f ratio at different frequencies. | 10 |
| (b) | Explain double field revolving theory for a single phase induction motor. | 10 |
| Q.4 | | 20 |
| (a) | A 500 KVA, 3 phase transformer, having per phase leakage impedance of 0.004 + j0.018 ohm is connected in parallel with another transformer of the same voltage ration having a rating of 1000KVA and per phase leakage impedance of 0.002 + j0.012 ohm. Find the load shared by each transformer and their operating power factors for a load of 1500KVA at 0.8 pf lagging. | 10 |
| (b) | Conditions required for successful parallel operation of three phase transformers | 10 |
| Q.5 | | 20 |
| (a) | Draw & explain torque-speed characteristics of 3 phase induction motor at variable rotor resistance. | |
| (b) | Develop equivalent circuit for a single phase induction motor. | |
| Q.6 | Write a short note on (any two) | 20 |
| (a) | Excitation phenomenon in 3 phase transformer | |
| (b) | Oscillating neutral | |
| (c) | Double cage induction motor | |