Code No: RT22025 **R13** SET - 1

II B. Tech II Semester Supplementary Examinations, Dec/Jan-2015-16
ELECTRICAL MACHINES - II
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART – A

1. a) What is the purpose of performing O.C test on transformer? Explain. (4M)
   b) What are the necessary conditions for parallel operation of transformer? (4M)
   c) What are different types of three-phase transformers? Give their applications (4M)
   d) What is slip? A 3-phase, 4-pole, 50Hz induction motor is running at 1440 rpm. Determine the slip. (4M)
   e) What is the purpose of no-load and blocked-rotor tests on induction motors? (3M)
   f) What is specific magnetic loading? Explain briefly. (3M)

PART – B

2. a) Derive the emf equation of a single-phase transformer. (8M)
   b) The primary winding of a 50Hz, single phase transformer has 480 turns and it is fed from a 6400V supply, the secondary winding has 20 turns. Find the peak value of flux in the core and secondary voltage. (8M)

3. A 50 kVA, 2200/110V transformer when tested gave the following results: (16M)
   OC Test, measurements on the LV side: 400W, 10A, 110V
   SC Test, measurements on the HV side: 808W, 20.5A, 90V
   Compute all the parameters of the equivalent circuit referred to the HV and LV sides of the transformer. Also calculate % voltage regulation and efficiency at full load and 0.85 pf lagging.
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4. a) Explain the basic purpose of a tertiary winding in a transformer. (6M)
   b) Draw the equivalent circuit of a single-phase, 3-winding transformer. Also explain the procedure for obtaining its impedances. (10M)

5. a) Compare between squirrel cage and wound rotor induction motors. Also list their applications. (6M)
   b) A 6-pole, 50 Hz, 3-phase induction motor running on full-load develops a useful torque of 160 Nm and the rotor emf is observed to make 120 cycles/min. Calculate the net mechanical power developed. If the torque loss in windage and friction is 12 N-m, find the copper-loss in the rotor windings, the input to the motor and efficiency. Assume stator losses as 800W. (10M)

6. A squirrel-cage induction motor has a slip of 4% at full load. Its starting current is five times the full-load current. The stator impedance and magnetizing current may be neglected; the rotor resistance is assumed constant. a) Calculate the maximum torque and the slip at which it would occur and b) Calculate the starting torque Express torques in pu of the full-load torque. (16M)

7. Find the main dimensions of a 15 kW, 3-phase, 400V, 50Hz, 2810rpm squirrel cage induction motor having an efficiency of 0.88 and a full load power factor of 0.9. Assume: specific magnetic loading = 0.5 Wb/m^2; specific electric loading = 25000 A/m. Take the rotor peripheral speed as approximately 20 m/s at synchronous speed. (16M)