Code No. : **6087/S**

FACULTY OF ENGINEERING
B.E. 3/4 (EEE) I Semester (Suppl.) Examination, July 2014
ELECTRICAL MACHINERY – II

Time: 3 Hours] [Max. Marks: 75

Notes : *Answer **all** questions from Part – **A** and **any five** questions from Part – **B**.*

PART – A **(25 Marks)**

1. What are the advantages when two or more 1-phase transformer connected in parallel ? **3**
2. Mention the various cooling methods for transformers. **2**
3. What are the conditions must be fulfilled for the successful parallel operation of 3-phase transformers ? **2**
4. Discuss relative merits and demerits of an auto-transformer. **3**
5. What is meant by standstill reactance of an 3-phase induction motor ? How does it vary with speed ? **3**
6. What is difference between excitation current and no-load current in 3-phase induction motor ? **2**
7. What are the advantages of inserting external resistance in the rotor circuit of a wound rotor induction motor at the time of starting ? **3**
8. Under what conditions is the direct-on-line starting of 3-phase cage induction motor preferred ? **2**
9. Mention various methods of speed control methods of 3-phase squirrel cage and slip-ring induction motors. **2**
10. What are probable causes for the rotor-circuit unbalance in a 3-phase induction motor ? **3**

PART – B

11. Explain on-load operation of two single phase transformers are connected in parallel for both equal and unequal voltage ratios. **10**

12. Two 6600/440 V transformers have ratings of 250 kVA and 600 kVA respectively. On short circuit test, the 250 kVA transformer requires 5% of normal voltage to circulate full load current, the p.f. being 0.23. The corresponding data for the 600 kVA transformer are 4% and 0.16. How will they share a load of 680 K.W. at 0.8 p.f. lagging. **10**

13. Explain the following in brief :
    a) No-load top charger
    b) Maintenance of transformer
    c) Cooling arrangement in transformer. **(4+3+3)**

14. The following data refers to a 12-pole, 420 V, 50 Hz, 3-phase mesh connected induction motor :

    $r_1 = 2.95\ \Omega$, $x_1 = 6.82\ \Omega$

    $r_2^1 = 2.08\ \Omega$, $x_2^1 = 4.11\ \Omega$

    On no load, the line value of magnetizing current is 6.7 A and the total core loss is 269 W. Determine the p.f., input current equivalent rotor current and torque developed by the motor at a slip of 3% using exact equivalent circuit. Determine the maximum torque developed and corresponding speed. **10**

15. 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.
    i) Calculate the maximum torque and the slip at which it would occur.
    ii) Calculate the starting torque.

    Also express torques in p.u. of the full load torque. **10**

16. a) Draw and explain slip-torque characteristics of an 3-phase induction motor. **5**
    b) Explain Kramer drive with neat schematic diagram. **5**

17. a) Explain how the operation of a 3-phase induction motor is effected when single-phasing occurs. **5**
    b) Explain single-phasing in 3-phase Δ / Y connected transformer with neat circuit diagrams. **5**