Code No.: **10014**

FACULTY OF ENGINEERING
B.E. II/IV Year (ECE) I Semester (Supplementary) Examination, April 2006
ELECTRICAL TECHNOLOGY

Time : 3 Hours]   [Max. Marks : 75

*Answer **all** questions of Part A.*
*Answer **five** questions from Part B.*

Part A – (Marks : 25)

1. List the various parts of DC machine.

2. Mention the various applications of DC shunt motor.

3. Give the relationships between phase and line quantities of voltage and current for a star connected system.

4. Define the term 'Regulation' of a transformer.

5. Define the term "pitch factor". Give its expression.

6. Draw the no-load vector diagram of a single-phase transformer.

7. Define the terms 'slip' and 'synchronous speed' of an Induction motor.

8. Why a single phase Induction motor is not a self-starting one?

9. What is the basic function of a relay?

10. Why a starter is necessary for a DC motor?

Part B – (Marks : 5 × 10 = 50)

11. (a) Derive the expression for torque developed by a DC motor.

    (b) A 4 pole shunt generator with lap connected armature having field and armature resistances of 50 ohm and 0.1 ohm respectively supplies sixty 100 V, 40 W lamps. Calculate the total armature current, the current per armature path and the generated electro motive force. Allow a contact drop of 1 volt per brush.

12. (a) Starting from fundamentals derive the expression for the emf generated in an A.C generator. What are the various factors which are taken into consideration while developing the expression.

(b) Two wattmeters are being used to measure power of a balanced load of 30A at power factor 0.8 lagging being supplied by a 3 phase, 3 wire, 440 V supply. Calculate power consumed and the readings of two wattmeters.

13. (a) Mention the importance of performing short circuit test and open circuit test on single phase transformers.

(b) Find the efficiency of a 150 kVA transformer at 25% and 100% full load at unity power factor, if the copper loss is 1600 W at full load and the iron loss is 1400 W.

14. (a) Show that rotating magnetic field can be developed in an Induction motor by using 3 phase currents of equal magnitude.

(b) If the electromotive force in the stator of a 8 pole Induction motor has a frequency of 50 Hz and that in the rotor 1½ Hz at what speed is the motor running and what is the slip?

15. (a) Explain with suitable diagrams the principle of operation of shaded pole motor.

(b) With a schematic diagram explain how the speed of a separately existed DC motor is controlled by using a single phase controlled rectifier bridge.

16. Discuss briefly about the following generating systems.

(a) Thermal

(b) Hydro.

17. (a) What is a protective relay? Explain its function in an electrical system.

(b) Discuss the principle of operation and applications of single phase auto-transformer.