Code: EC3T5

II B.Tech - I Semester – Regular Examinations - December 2014

ELECTRICAL TECHNOLOGY
(ELECTRONICS & COMMUNICATION ENGINEERING)

Duration: 3 hours   Marks: 5x14=70

Answer any FIVE questions.   All questions carry equal marks

1. a) Explain the construction and operating principle of DC Generator   7 M

   b) A shunt generator supplies 75 Amperes at 200 V through feeders of resistance 0.08 ohms. The armature and shunt field windings have resistances of 0.04 ohms and 80 ohms respectively. Find the terminal voltage and generated EMF.   7 M

2. a) Explain the significance of back EMF and derive the condition for maximum efficiency of DC Motor.   7 M

   b) A 220 V shunt motor is taking a current of 30 A. Armature and shunt field resistances are 0.2 and 100 ohms respectively. Iron and friction losses amount to 500 Watts, find the efficiency of the motor.   7 M

3. a) Draw the phasor diagram of transformer on no-load and load conditions.   7 M

   b) Draw the equivalent circuit of a transformer and explain the parameters of the circuit.   7 M

4. a) Explain the construction and principle of operation of single phase transformer.   7 M

   b) A 7.5 kVA, 2400 V/120 V transformer was tested by short circuiting the low voltage side and applying 100 V to the high voltage side. The measured power input was 145 W. Determine the regulation when the load has 0.8 lagging power factor.   7 M

5.   Explain the construction and operating principal of induction motor and draw its slip-torque characteristics.
                                                                    14 M

6. a) Derive E.M.F equation of an Alternator   4 M

   b) A 3-phase star-connected alternator on open circuit is required to generate a line voltage of 3600 V at 50 Hz when driven at 500 rpm. The stator has 3 slots per pole phase and 10 conductors per slot. Calculate
         i) The number of poles and

ii) Useful flux per pole. Assume all the conductors per phase to be connected in series and the coils to be full-pitched with $K_d = 0.96$ 10 M

7. a) Explain the construction and working of shaded pole single phase induction motor.   7 M

b) Mention the difference between stepper motor, universal motor and permanent magnet DC motor.   7 M

8. a) Discuss the classification of electrical instruments.   7 M

b) Explain the significance of controlling torque and damping torque relevant to the operation of indicating instruments.

     7 M