THIRD SEMESTER B.TECH. (ENGINEERING) [14 SCHEME] DEGREE EXAMINATION, NOVEMBER 2015

EC 14 306—ELECTRICAL ENGINEERING

Time : Three Hours　　　　　　　　　　　　　　　　　　Maximum : 100 Marks

Part A

*Answer any **eight** questions.*

1. Sketch and explain the Phasor diagrams of transformer with inductive and capacitive load.

2. A permanent magnet moving coil instrument has a coil of dimensions 15 mm × 12 mm. The flux density in the air gap is 1.8×10^{-3} Wb/m^2 and the spring constant is 0.14×10^{-6} Nm/rad. Determine the number of turns required to produce an angular deflection of 90 degrees when a current of 5 mA is flowing through the coil.

3. Which materials are used for the construction of yoke, poles, armature, armature winding and commutator in a DC machine ?

4. Explain the applications of various types of DC generators ?

5. Draw and explain the equivalent circuit of an alternator.

6. For a three-phase alternator, there are 120 slots and 8 poles. Find the value of distribution factor.

7. Explain the applications of synchronous motors.

8. Explain slip. For 4 pole induction motor the supply frequency is 50 Hz and it is rotating at a speed of 1440 r.p.m. Find its slip and slip speed.

9. Explain the four starters used for three-phase induction motor.

10. "Induction motor is a rotating transformer". Explain the statement.

(8 × 5 = 40 marks)

Part B

11. (a) Explain Δ -Y and Y-Δ connections.

Or

(b) Explain the principle and working of induction type of energy meter.

12. (a) Explain the no-load and open circuit characteristics of a DC generator.

Or

(b) Briefly explain the characteristics and compare the performances of Shunt, Series and Compound Motors.

Turn over

13. (a) From the first principle, derive an expression for the e.m.f. equation of an Alternator.

Or

(b) A 3-phase star connected alternator supplies a load of 1000 kW at a power factor of 0.8 lagging with a terminal voltage of 11 kV. Its armature resistance is 0.4 ohms per phase while synchronous reactance is 3 ohms per phase. Calculate the line value of e.m.f. generated and the regulation at this load.

14. (a) Explain the construction and working of a three-phase induction motor.

Or

(b) Derive the expression for the starting torque of an induction motor.

(4 × 15 = 60 marks)