D 30907

(Pages : 2)

Name.....................

Reg. No.....................

THIRD SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION OCTOBER 2012

EC 09 306—ELECTRICAL ENGINEERING

(2009 Admissions)

Time : Three Hours

Maximum : 70 Marks

Part A

All questions are compulsory.

1. What is the purpose of brushes and commutators in a DC generator ?

2. What are the losses occurring in a d.c. machine.

3. How transformers are classified according to their construction ?

4. Mention the different types of starting mechanism employed for synchronous motors.

5. A 3-phase, 50 Hz induction motor has a 2 poles. If slip is 2 percent at a certain load, determine the speed of the rotor.

(5 × 2 = 10 marks)

Part B

*Answer **four** questions out of 6.*

1. A 4 pole, wave-wound generator have 40 slots and 10 conductors placed per slot. The flux per pole is 0.02 Weber. Calculate the generated E.M.F. when the generator is driven at 1200 r.p.m.

2. Explain the principle of operation of DC motor.

3. A 500 kVA transformer has 2500 watts iron loss and 7500 watts copper loss at full load. Calculate the efficiency at full load and half load output at unity power factor.

4. Name the important characteristics of a synchronous motor that is not found in an induction motor.

5. How can you reverse the direction of split-phase motor and capacitor start induction motor ?

6. If frequency of the supply voltage applied to the stator is 50 Hz while the frequency of the induced e.m.f. in the rotor is observed to be 90 cycles per min. Calculate the slip and speed of the motor, assuming that the stator is wound for 6 poles.

(4 × 5 = 20 marks)

Part C

*Answer **one** question from each module.*

1. Derive the equation for induced E.M.F. of DC machine.

Or

Turn over

2. A 25 kW, 250 V, d.c. shunt generator has armature and field resistance of 0.06 ohm and 100 ohm respectively, determine the total power developed when working (i) as a generator delivering 25 kW output ; and (ii) as a motor taking 25 kW.

3. Explain the construction and principle of operation of single phase energy meter.

Or

4. Explain the construction and working of autotransformer and star-delta starters.

5. (i) What is the importance of voltage regulation in alternator ? Explain any one pre-determination method for voltage regulation.

(5 marks)

(ii) An alternator has direct axis synchronous reactance of 0.7 per unit and quadrature axis synchronous reactance of 0.4 per unit. It is used to supply load at rated voltage at 0.8 p.f. Find the total induced E.M.F. on open circuit.

(5 marks)

Or

6. Explain the phenomenon of Hunting in a synchronous motor. How it is remedied ?

7. (i) How revolving magnetic theory is produced when three phase supply is given to 3-phase induction motor ?

(5 marks)

(ii) A squirrel-cage induction motor has full load slip of 5 %. The motor starting current at rated voltage is 6 times its full load current. Find the tapping on the autotransformer starter which would give full load torque at start. What would then be the supply starting current ?

(5 marks)

Or

8. Explain the construction and principle of operation of single phase induction motor.

[4 × 10 = 40 marks]