Register Number: ……………………..

B.E DEGREE EXAMINATIONS: APRIL/MAY 2014

(Regulation 2009)

Third Semester

EEE261: ELECTRICAL MACHINES AND POWER SYSTEM

(Common to ECE & EIE)

Time: Three Hours   **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Wave winding is suitable for------------------current, ----------------voltage d.c generators.

    a) high, low   b) low, high

    c) low, low   d) high, high

2. The direction of rotation of a D.C series motor can be changed by

    a) Interchanging supply terminals   b) Interchanging field terminals

    c) Either of (a) and (b) above   d) None of the above

3. A transformer cannot step up or step down the dc voltage because

    a) there is no need to change the dc   b) a dc circuit has more losses
       voltage

    c) Magnetic quality of core   d) Size of the core

4. A transformer can have a zero voltage regulation at

    a) Leading p.f   b) Lagging p.f

    c) Unity p.f   d) Zero p.f

5. Which of the following motor has high starting torque?

    a) squirrel cage induction motor   b) slip ring induction motor

    c) capacitor start induction motor   d) shaded pole induction motor

6. A 6 pole, 50Hz, 3 phase induction motor runs at 800 rpm at full load, then slip will be

    a) 0.2   b) 0.4

    c) 0.8   d) 1

7. A 50 Hz alternator will run at the greatest possible speed if it is wound for….. Poles

    a) 6   b) 8

    c) 4   d) 2

8. In reluctance motor, if the rotor is in un-aligned position, then the reluctance torque is,

    a) maximum   b) minimum

    c) zero   d) Medium

9. The layer of lead sheath in cable is used to restrict the

    a) corrosion   b) moisture

    c) mechanical injuries   d) dust

10. The shackle insulators are used for voltage lines

    a) Below 11KV   b) between11KV -33KV

    c) Above 11KV   d) between11KV -22KV

PART B (10 x 2 = 20 Marks)

11. Why is the emf not zero when the field current is reduced to zero in dc generator?

12. What is the function of HOLD ON coil in d.c. motor starter?

13. Mention the difference between core and shell type transformers?

14. Draw the no load phasor diagram of a transformer.

15. Why the slots on the induction motors are usually skewed?

16. Why single phase induction motors are not self starting?

17. An alternator has 24 poles, 216 slots each containing 5 conductors. The winding is distributed and full pitch. Determine the distribution factor?

18. What are advantages of hysteresis motor?

19. What are the requirements of good power system?

20. List out the properties of insulators.

PART C (5 x 14 = 70 Marks)

21. a) (i) Explain the construction of dc generator with neat diagram.   (8)

       (ii) A 4 pole generator with wave wound armature has 51 slots each having (6)
            24conductors.The flux per pole is 0.01 Weber. At what speed must the armature
            rotate to give an induced e.m.f. of 250V.What will be the voltage developed, if
            the winding is lap connected and the armature rotates at the same speed?

                                     (OR)

    b) (i) Draw and explain the working principle of three-point starter   (8)

       (ii) Explain the characteristics of dc shunt and series motors   (6)

22. a) (i) Explain the working principle of operation of transformer and derive an (8)
            expression for induced EMF in transformer.

(ii) The no load current of a transformer is 15A at a p.f. of 0.2,when connected to a (6)
460V, 50Hz supply. If the primary winding has 550 turns, calculate

     a. the magnetizing component of no load current

     b. the iron loss

     c. the maximum value of the flux in the core.

(OR)

b) (i) A 500/250 V, 50Hz, single phase transformer have the following readings,

     O.C. Test: 500 V, 1 A, 50 W (L.V. side open),

     S.C. Test: 25 V, 10 A, 60 W (L.V. side shorted)

Determine: (i) The efficiency on full load, 0.8 lagging p.f. (ii) The voltage regulation on full load, 0.8 leading p.f. (iii) The efficiency on 60% of full load, 0.8 leading p.f. (iv) Draw the equivalent circuit referred to primary & insert all the values in it.

23. a)   Explain any two different methods of speed control of three-phase induction motor.

(OR)

b) (i) Discuss in detail about the principle of operation of three phase induction motor. (8)

   (ii) Write short notes about single phase capacitor start induction motor. (6)

24. a) (i) Describe any one method to determine voltage regulation of synchronous (8) generator.

   (ii) A 3 phase 12 pole star connected alternator has 72 slots and 6 conductors per (6) slot. If it is driven at 500 rpm, calculate the induced emf (line to line). Assume coil span as 150 electrical and flux per pole 40 mWb.

(OR)

b) (i) Explain the operation of variable Reluctance stepper motor with neat diagram. (8)

   (ii) Describe the construction and operation of hysteresis motor. (6)

25. a) (i) Explain the structure of electrical power system with single line diagram. (8)

   (ii) With a neat diagram, explain the operation of EHVDC transmission (6) system.

(OR)

b) (i) Explain the following types of insulators with neat diagrams. (8)

     a) Pin-type insulators   b)   Suspension type insulators.

   (ii) Write short notes on construction of cables with neat diagram. (6)

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