B.E. DEGREE EXAMINATIONS: NOV/DEC 2010

Third Semester

EEE 261: ELECTRICAL MACHINES AND POWER SYSTEMS

(Common to Electronics and Communication Engineering & Electronics and Instrumentation Engineering)

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

Answer ALL Questions:-

PART A (10 x 1 = 10 Marks)

1. The critical resistance of the DC generator is the resistance of
     a.armature   b.field   c. load   d. brushes

2. A DC shunt motor is found suitable to drive fans because they require

     a.small torque at start up   b. large torque at high speeds

     c. practically constant voltage   d. both A and B

3. A step up transformer increases

     a. voltage   b. current   c. power   d. frequency

4. A transformer has negative voltage regulation when its load power factor is

     a. zero   b. unity   c. leading   d. lagging

5. Skewing of rotor bars in squirrel cage induction motor

     a. prevents cogging   b. increases starting torque

     c. produces uniform torque   d. reduces the initial current

6. The starting winding of a single phase induction motor is placed in the

     a. rotor   b. stator   c. armature   d. field

7. In a synchronous motor damper winding is provided in order to

     a. stabilize rotor motion   b. suppress rotor oscillations

     c. develop necessary starting torque   d. both B and C

8. The rotor of a stepper motor has no

     a. windings   b. commutator   c. brushes   d. all of the above

9. In India the distribution level voltage for a 3 phase system is

     a. 66KV/400V   b.11KV/400V   c.11KV/230V   d.66KV/400V

10. _____ causes interference with the communication lines.

     a. underground cables   b. overhead lines   c. insulators   d. lightning arresters

PART B (10 x 2 = 20 Marks)

11. Mention any two conditions to be fulfilled for a DC shunt generator to buildup voltage.
12. State the merits and demerits of Swinburne's test.
13. Why is the rating of transformer given in KVA?
14. State the condition for the maximum efficiency of a transformer.

15. Mention the types of rotors employed in three phase induction motors.
16. Is single phase induction motor self starting? Why?
17. Define pitch factor and distribution factor.
18. Mention few applications of stepper motors.
19. What are the advantages of EHV transmission system?
20. List four desirable properties of cables.

PART C (5 x14=70 Marks)

21. a) (i)Derive the emf equation of a DC generator. (7)
    (ii) Draw and explain the load characteristics of a DC shunt and DC series generators. (7)
    (OR)
    b) (i)With relevant derivations explain the speed-torque characteristics of a DC shunt and DC series motors. (7)
    (ii) A 250V, 4 pole wave wound DC series motor has 782 conductors on its armature. It has a total armature and series field resistance of 0.75Ω.The motor takes a current of 40A.Determine its speed and gross torque developed if it has a flux per pole of 25mwb. (7)

22. a) Give the constructional details and classification of transformers.

    (OR)

    b) (i) With necessary phasor diagram explain the behavior of a transformer on no load. (7)
    (ii) A 10 KVA, 200/400V, 50Hz, single phase transformer gives the following test results:

    Open circuit test (HV winding open):200V, 1.3A, 120W
    Short circuit test (LV winding short circuited):22V, 30A, 200W

    Calculate the equivalent circuit parameters referred to low voltage winding. (7)

23. a) (i) Explain any two starting methods of single phase induction motors. (7)
    (ii) Explain the torque-slip characteristics of a three phase induction motor. (7)
    (OR)
    b) Discuss the different methods of speed control of three phase induction motors.

24. a) Explain the construction and principle of operation of a synchronous motor. Mention its starting methods
    (OR)
    b) Write short notes on
    (i) Hysteresis motor
    (ii) Reluctance motor

25. a) Draw the structure of an electric power system and explain the parts in detail.
    (OR)
    b) Discuss the different types of underground cables based on insulating materials and types of insulators used in power transmission systems.

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