B.E/B.TECH. DEGREE EXAMINATIONS: NOV/DEC 2010

Third Semester

EEE223: ELECTRICAL MACHINES AND DRIVES

(Common to Mechanical Engineering and Mechatronics Engineering)

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

Answer ALL Questions:-

PART A (10 x 1 = 10 Marks)

1) The direction of electro magnetically induced emf is determined by

   (a) Fleming`s right hand rule               (b) Lenz`s law

   (c) Right hand thumb rule   (d) Both (a) and (b)

2) The DC series motors are preferred for traction applications because

   (a) Torque is proportional to armature current

   (b) Torque is proportional to square root of armature current

   (c) Torque is proportional to armature current and speed is inversely proportional to torque

   (d) Torque and speed are inversely proportional to armature current

3) Starters are essential for DC motors for

   (a) Limiting the starting current to a safe value   (b) Controlling the starting voltage

   (c) Limiting the load resistance   (d) None of the above

4) Plugging is braking of DC motors by

   (a) Reversing the torque by reversing the armature connections

   (b) Reversing the field connections

   (c) Reversing the armature and field connections

   (d) None of the above

5) Impact loads are

   (a) Periodical loads   (b) peak load at regular intervals

   (c) Constant loads   (d) None of the above

6) The type of motor required for centrifugal pump is

   (a) Slip ring induction motor   (b) Standard squirrel cage induction motor

   (c) DC shunt motor   (d) DC series motor

7) In rheostat control method of DC motors for constant load torque

   (a) N directly proportional to Va   (b) N inversely proportional to Va

   (c) N directly proportional to If   (d) N inversely proportional to If

8) In choppers the output ripple depends on

(a) Input supply   (b) Rectifier   (c) Switching frequency   (d) All of the above

9) The speed of the induction motor is controlled on

    (a) Stator side   (b) Rotator side   (c) Both (a) and (b)   (d) None of the above

10) In a voltage source inverter

    (a) Input current is constant   (b) Input DC voltage is constant

    (c) Both current and DC voltage are constant   (d) None of the above

Part B (10 x 2 = 20 Marks)

11) State Faraday`s law of electromagnetic induction.

12) Write the voltage equation of a DC motor and also the condition for maximum power.

13) What is the necessity of starter for DC motor?

14) What are the different electric braking methods of DC series motor?

15) What is electric drive?

16) What are the different classes of duty and draw their curves?

17) What are the factors affecting the speed of DC motor?

18) Compare the performance of choppers with controlled rectifiers.

19) Draw the torque slip characteristics of V/F control method.

20) How are AC voltage regulators classified?

Part C (5 x 14 = 70 Marks)

21. a) With neat sketches explain the principle of operation of a DC motor and how back emf is developed in it.

(OR)

   b) Explain in detail about the construction and principle of operation of a three phase induction motor.

22. a) Why a starter is needed for starting a DC motor and explain the operation of a three point starter with neat sketch.

(OR)

   b) What are the different electrical braking methods used in electrical drives. Explain any one of them applied to DC shunt motor.

23. a)(i)What are the factors governing the selection of motor for a particular application.(8)

    (ii) At full load of 10 HP temperature rise of a motor is 30 degrees after one hour and 40 degrees after two hours. Find   (8)

     (a) Final temperature rise on full load.

(b) Heating time cost of motor

(OR)

b) Discuss about the selection of power rating for drive motors and explain the method based on average losses.

24. a) (i) What are the advantages and disadvantages of rheostatic control method   (6)

   (ii) The armature and shunt field resistances of a 230V DC shunt motor are 0.1 ohm and 230 ohm respectively. It takes a current of 61 A at 100 rpm. If the current taken remains unaltered find the resistance to be included in series with the armature circuit to reduce the speed to 750 rpm.

(OR)

b) Explain the operation of step up and step down chopper and methods of controlling it with a neat diagram.

25. a) Explain the slip power recovery scheme.

(OR)

b) With neat diagrams, explain the speed control three phase induction motor using Voltage Source Inverter.

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