B.E. DEGREE EXAMINATIONS: NOV/DEC 2010

Second Semester

U07EE203: BASIC ELECTRICAL ENGINEERING

(Common to Aeronautical Engineering & Mechanical Engineering)

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

Answer ALL Questions:-

PART A (10 x 1 = 10 Marks)

1. Kirchoff's current law is applicable to only
   (A) Junction in a network   (B) Closed loops in a network
   (C) Electric circuits   (D) Electronic circuits

2. The voltage of domestic supply is 220V. This value represents
   (A) Mean value   (B) r.m.s. value   (C) Peak value   (D) Averge value

3. The field coils of DC generator are usually made of
   (A) Mica   (B) Copper   (C) Cast iron   (D) Carbon

4. Which type of DC motor is generally preferred for cranes and hoists?
   (A) Cumulatively compound motor   (B) Shunt motor
   (C) Series motor   (D) Differentially compound motor

5. Which of the following does not change in a transformer?
   (A) Current   (B) Induced emf   (C) Voltage   (D) Frequency

6. A transformer core is laminated to reduce
   (A) Hysterisis loss   (B) Copper losss   (C) Eddy current losss   (D) Windage loss

7. The starting toque of a squirrel cage induction motor is
   (A) Low   (B) Zero   (C) Same as full load torque   (D)Slightly more than full load torque

8. The centrifugal switch is used to disconnect starting winding when motor has
   (A) run for about 1 minute   (B) picked up about 10 to 25% of Rated speed
   (C) run for about 5 minutes   (D) picked up about 50 to 70% of Rated speed

9. The torque which is used to bring back the moving system is
   (A) Inertia Torque   (B) Control Torque   (C) Deflecting torque   (D) Damping torque.

10. The error due to human mistakes in reading instruments is called
    (A) Gross Errors   (B) Systematic Errors   (C) Random errors   (D) Environmental errors

PART B (10 x 2=20 Marks)

11. Define RMS Value.

12. What is the line and phase value relationship of three phase star connected cicuit?

13. What is back emf?

14. What are the two types of rotor construction of synchronous generator?

15. What is a transformer?

16. List the various types of three phase transformer connecctions.

17. A three phase, 4 pole, 50 Hz induction motor runs at 1460 rpm. Determine its percentage slip.

18. Why single phase induction motor is not self starting?

19. What are the ways of producing damping torque in measuring instruments?

20. Distinguish between moving coils instruments and moving iron instruments.

PART C (5 x 14= 70 Marks)

21. a) (i) A battery of emf 40V and internal resistance 2Ω is connected in parallel with a second battery of 44V and internal resistance 4Ω. A load resistance of 6Ω is connected across the ends of the parallel circuits, Draw the circuit and find the current in each battery using Kirchoff's Voltage law. (7)

    (ii) Derive the rms and average value for the sinusoidal alternating quantity. (7)

(OR)

  b) A choke coil having resistance of 10Ω and an inductance of 0.05H is connected in series with a condenser of 100μF. The whole circuit has been connected to 200V, 50Hz supply. Calculate (i) impedance (ii) Current (iii) Power factor (iv) Power input (v) Apparent power and (vi) reactive power.

22. a) (i) Draw the OCC of DC shunt generators and bring out the condition for voltage build-up in a DC shunt generator. (7)

    (ii) Draw and explain the speed-torque characterisitcs of dc shunt and series motor with relevant expression. (7)

(OR)

  b) (i) Derive the emf equation of synchronous generator. (7)

    (ii) Expalin the various starting methods of synchronous motor. (7)

23. a) (i) What are the types of transformer? Also give a brief description about their construction. (7)

(ii) Explain the operation of a single phase transformer under no load condition with relevant vector diagram. (7)

(OR)

b) (i) From the first principles, obtain the equivalent circuit of a transformer. (7)

(ii) A 40 KVA transformer has a core loss of 400W and full load copper loss of 800W. If the power factor of the load is 0.9 lag, calculate (1) The full load efficiency (2) Percentage of full load at which maximum efficiency occurs. (7)

24. a) (i)Draw and explain the slip-torque characteristics for various values of rotor resistance of three phase inductrion motor. (7)

(ii) Expalin the operation of star-delta starter with relevant diagram and expression. (7)

(OR)

b) List the various starting methods of single phase induction motor. Explain any two types of starting methods with relevant diagrams and applications.

25. a) Describe the construction and working principle of PMMC instruments. Also list their advantages and disadvantages.

(OR)

b) Explain the construction and working principle of induction type energy meter. Also discuss its advantages and disadvantage along with its application.

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