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Question Paper Code: 53323

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2024

Third Semester

Mechanical Engineering

15UEE323 - ELECTRICAL MACHINES

(Regulation 2015)

Duration: Three hours　　　　　　　　　　　　　　　　Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. D.C. motors are widely used in　　　　　　　　　　　　　　　　　　　CO1- R

   (a) Pumping sets　　(b) Air compressors　　(c) Electric traction　　(d) Machine shops

2. Working Principle of Motor_____　　　　　　　　　　　　　　　　CO1- R

   (a) Fleming Right Hand Rule　　　　　　　(b) Ohms Law

   (c) Fleming Left Hand Rule　　　　　　　　(d) None of the Above

3. A transformer core is laminated to reduce　　　　　　　　　　　　　　CO2- R

   (a) Hysteresis loss　　(b) Copper loss　　(c) Eddy current loss　　(d) All the above losses

4. An ideal transformer has _____.　　　　　　　　　　　　　　　CO2- R

   (a) Core loss　　　　　　　　　　　　　　(b) Magnetic leakage

   (c) No winding resistance　　　　　　　　(d) None of the above

5. Star-delta starting of motors is not possible in case of　　　　　　　　CO3- R

   (a) Single phase motors　　　　　　　　　(b) Variable speed motors

   (c) Low horse power motors　　　　　　　(d) High speed motors

6. A 50 Hz, three phase supply is given to a four pole induction motor.　　CO3- R
   The synchronous speed of the machine is_____

   (a) 3000 rpm　　　　(b) 1500 rpm　　　　(c) 1000 rpm　　　　(d) 750 rpm

7. Synchronous condensers are used to   CO4- R

    (a) Improve starting torque   (b) Improve the power factor

    (c) Reduce hunting   (d) All of the above

8. In a synchronous motor, damper windings are provided on   CO4- R

    (a) Rotor shaft   (b) Stator frame   (c) Pole faces   (d) None of the above

9. An universal motor is also called as _____   CO5- R

    (a) Induction motor   (b) Synchronous motor   (c) AC series motor   (d) Stepper motor

10. The electric motor used in portable drill is   CO5- R

    (a) Capacitor run motor   (b) Universal motor

    (c) Hysteresis motor   (d) Repulsion motor

PART – B (5 x 2= 10 Marks)

11. Define back emf and give its expression.   CO1 R

12. Classify different types of transformers.   CO2 R

13. Write the torque equation of three phase induction motor.   CO3 R

14. Define Hunting   CO4 R

15. List the applications of BLDC motor.   CO5 R

PART – C (5 x 16= 80 Marks)

16. (a) Sketch the construction of DC Motor and explain about various   CO1- U   (16)
         parts associated with it.

                                    Or

    (b) (i) Plot and explain various characteristics of DC Motor   CO1- U   (8)
         (ii) Develop the torque equation of a DC Motor   CO1- U   (8)

17. (a) Sketch the single phase transformer and explain about its   CO2- U   (16)
         construction and working principle

                                    Or

    (b) (i) Derive the expression for EMF equation of a Transformer.   CO2- U   (8)

         (ii) Obtain the equivalent circuit by using the open circuit test and   CO2- U   (8)
         short circuit test on transformer.

2

53323

18. (a) Explain the construction and working principle of three phase induction motor. CO3-U (16)

Or

(b) Discuss briefly about types of starting methods of three phase induction motor. CO3-U (16)

19. (a) Recognize the principle of operation of a synchronous motor with a neat sketch. Also demonstrate how it can be self started. CO4- U (16)

Or

(b) Explain the starting method and Torque equation of synchronous motor. CO4- U (16)

20. (a) Analyze briefly about any two types of single phase induction motor. CO5- U (16)

Or

(b) (i) Recognize the principle of operation of a universal motor with a neat sketch. CO5- U (8)

(ii) Generalize with construction and circuit diagrams, the operation of a hysteresis motor. (8)

3

53323

53323