**A**                     Reg. No. :

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**Question Paper Code: 53323**

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B.E. / B.Tech. DEGREE EXAMINATION, DEC 2021

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

<center>PART – B (5 x 2= 10 Marks)</center>

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

<center>PART – C (5 x 16= 80 Marks)</center>

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

<center>Or</center>

    (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

<center>Or</center>

    (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.

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

                              Or

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

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

                              Or

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

20. (a) Analyze briefly about any two types of single phase induction   CO5- U   (16)
       motor.
                              Or
    (b) (i) Recognize the principle of operation of a universal motor with   CO5- U   (8)
       a neat sketch.

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

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