

A

Reg. No. :

--	--	--	--	--	--	--	--	--	--

Question Paper Code: 53323

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2022

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)

- D.C. motors are widely used in CO1- R
(a) Pumping sets (b) Air compressors (c) Electric traction (d) Machine shops
- Working Principle of Motor _____ CO1- R
(a) Fleming Right Hand Rule (b) Ohms Law
(c) Fleming Left Hand Rule (d) None of the Above
- A transformer core is laminated to reduce CO2- R
(a) Hysteresis loss (b) Copper loss (c) Eddy current loss (d) All the above losses
- An ideal transformer has _____. CO2- R
(a) Core loss (b) Magnetic leakage
(c) No winding resistance (d) None of the above
- 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
- 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 parts associated with it. CO1- U (16)
- 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 construction and working principle CO2- U (16)
- 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 short circuit test on transformer. CO2- U (8)

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)

