A **Reg. No. :** | | | | | | | | | | |

Question Paper Code: 53323

B.E. / B.Tech. DEGREE EXAMINATION, MAY 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)

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. The synchronous speed of the machine is_____ CO3- R

   (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)