DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Supplementary Winter Examination – 2023

Course: B. Tech. **Semester : VI**

Branch: Electrical Engineering / Electrical Engineering (Electronics and Power)/ Electrical & Electronics Engg. / Electrical & Power Engineering.

Subject Code & Name: BTEEC602_Y22 Electrical Machine Design

Max Marks: 60 **Date: 18/01/2024** **Duration: 3 Hr.**

Instructions to the Students:

1. *All the questions are compulsory.*
2. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Solve Any Two of the following.**		**12**
A)	Provide a brief explanation of the study of magnetic, electric, and dielectric materials	**CO1**	**6**
B)	Explain the key principles of design. How do these principles impact user experience and overall success of a design?	**CO3**	**6**
C)	State the limitations in the design of Electrical Machines? Explain in brief.	**CO4**	**6**
Q.2	**Solve Any Two of the following.**		**12**
A)	Explain the fundamental differences in the design principles for AC and DC machines. How do these differences impact factors like magnetic circuit, windings, and commutation?	**CO2**	**6**
B)	What are the primary differences between AC and DC windings in terms of design considerations and their applications in electrical apparatus?	**CO2**	**6**
C)	Describe the impact of core materials on the design and performance of AC and DC windings in simple electrical apparatus.	**CO3**	**6**
Q. 3	**Solve Any Two of the following.**		**12**
A)	What are the primary design considerations for the stator in an induction motor, and how do they impact motor performance?	**CO1**	**6**
B)	How does the choice of stator core material influence the efficiency and magnetic performance of an induction motor?	**CO4**	**6**
C)	Write expression for Calculation of Ampere-Turns for flux distribution in rotating machines.	**CO4**	**6**
Q.4	**Solve Any Two of the following.**		**12**
A)	Explain Selection of length of air gap and explain factors affection on factors affecting length of air gap, design of rotor.	**CO2**	**6**

B)	Explain with neat diagram harmonic field effect on the performance of 3-phase induction motor	**CO3**	**6**
C)	Discuss the impact of skewed rotor slots on the operation and performance of squirrel cage rotors in induction motors.	**CO1**	**6**

Q. 5 Solve Any Two of the following. **12**

A)	Discuss the significance of temperature rise limits in electrical machines and their impact on machine performance and longevity.	**CO2**	**6**
B)	Explain how the cooling time constant is calculated and its importance in predicting the rate of temperature decrease in an electrical machine.	**CO4**	**6**
C)	Discuss the factors that influence the heating time constant and its relevance in different types of electrical machines.	**CO3**	**6**

***** End *****