DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE
Regular and Supplementary Summer 2024

Course: B. Tech. **Semester : IV**

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

Subject Name & Code: BTEEC403 Electrical Machine- II

Max Marks: 60 **Date:18/06/2024** **Duration: 3 Hrs.**

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)	Explain construction and principle of operation of synchronous generator and motor	Remember	**6**
B)	What is RMF? Find the Direction of RMF by using phasor method.	Understand	**6**
C)	Enlist the causes of harmonics and explain How do you reduce the harmonics in EMF generated in alternator?	Understand	**6**
Q.2	**Solve Any Two of the following.**		**12**
A)	Define the following terms with diagram and Formulas [2M each] 1. Coil Span Factor 2. Distribution Factor 3. Winding factor	Remember	**6**
B)	What is Armature Reaction in Synchronous Machine? explain Armature Reaction at different power factors with Phasor Diagram	Remember	**6**
C)	A 3-phase, 16-pole synchronous generator has a resultant air gap flux of 0.06 Wb per pole. The flux is distributed sinusoidal over the pole. The stator has 2 slots per pole per phase and 4 conductors per slot are accommodated in two layers. The coil span is 150^0 electrical. Calculate the phase and line induced voltages when the machine runs at 375 r.p.m	Evaluate	**6**
Q. 3	**Solve Any Two of the following.**		**12**
A)	Draw the equivalent circuit diagram of synchronous machine and explain each parameter used in circuit.	Understand	**6**
B)	Briefly discuss on synchronous condenser.	Understand	**6**
C)	A 1500kVA, star connected, 2300V, 3-phase, salient-pole synchronous generator has reactance $X_d = 1.95\ ohm$ and $X_q = 1.4\ ohm$ per phase. All losses may be neglected. Find the excitation voltage for operation at rated kVA and power factor of 0.85 lagging	Evaluate	**6**

Q.4	**Solve Any Two of the following.**		**12**
A)	Compare squirrel cage and slipring Induction motor	Remember	**6**
B)	Derive the generalized torque equation of three phase induction motor and Obtain the condition for maximum torque under running condition	Create	**6**
C)	If a 3 phase 440V, 50Hz Induction motor is having 4 poles and operated at no load condition. Determine the rotor frequency of the motor.	Evaluate	**6**
Q. 5	**Solve Any Two of the following.**		**12**
A)	Explain the construction and working principle of single phase Induction Motor	Understand	**6**
B)	Explain the double revolving field theory	Understand	**6**
C)	Briefly discuss on permanent magnet ac motors.	Remember	**6**

***** End *****