

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- SEMESTER-III (NEW) EXAMINATION – WINTER 2024****Subject Code: 2131005****Date:06-12-2024****Subject Name: Electrical Machines****Time: 10:30 AM TO 01:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

		MARKS
Q.1	(a) How do you reduce leakage flux in a transformer?	03
	(b) List the advantages and applications of auto - transformer.	04
	(c) Write down the EMF equation of a transformer relative to the secondary winding. What happen to a transformer when a DC supply is applied?	07
Q.2	(a) Does transformer draw any current when secondary is open? Why?	03
	(b) Explain voltage buildup in D.C machine	04
	(c) Explain the different types of 3 phase transformer connections.	07
	OR	
	(c) Explain the armature reaction in a DC generator on no load and on load conditions. Also explain the methods to overcome the adverse effects of the armature reaction	07
Q.3	(a) Compare field and armature control methods in DC motor.	03
	(b) Compare the following transformers (i) Core type transformer (ii) Shell type.	04
	(c) Define the term voltage regulation of a transformer and derive the expression for voltage regulation	07
	OR	
Q.3	(a) The starting torque of a dc series motor more than that of a dc shunt motor of same power rating. Justify	03
	(b) State and explain condition at which starting torque developed in a 3 phase induction motor is maximum	04
	(c) Discuss 'V' and inverted 'V' curve of a synchronous motor.	07
Q.4	(a) What is synchronous condenser? Explain.	03
	(b) Why i) An induction motor will never run at its synchronous speed. ii) A single-phase induction motor is not self-starting.	04
	(c) Explain the star-delta method of starting of 3 ϕ induction motor.	07
	OR	
Q.4	(a) What are the principal advantages of rotating field type construction in Alternators?	03
	(b) What is hunting in a synchronous machine? Also write the purpose of damper winding.	04
	(c) Draw and explain the construction and principle of operation of three-phase slip ring induction motor. How is the construction different in squirrel cage induction motor?	07
Q.5	(a) Define load factor, diversity factor & plant utilization factor.	03
	(b) Why Ferranti effect occurs in a transmission line? Explain briefly.	04
	(c) Explain how you obtain, A, B, C, D parameters of a model of a long transmission line in the laboratory.	07
	OR	
Q.5	(a) How the transmission lines are categorized as three types?	03
	(b) List the advantages of nuclear power plants over conventional thermal power plants	04
	(c) Explain in details the different load power factor improvement techniques.	07
