

Enrollment No./Seat No.:

GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering - SEMESTER - 1/2 EXAMINATION - WINTER 2025

Subject Code: BE01000031/BE01R00031

Date: 20-12-2025

Subject Name: Chemistry

Time: 02:30 PM TO 05:00 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) Write short notes on hybridization.	03
(b) Write properties and applications of alloys.	04
(c) What is hard water? How it is affecting industries? Write the remediation for the same.	07
Q.2 (a) Write difference between: Scale & Sludge & Priming & Foaming	03
(b) Give details of Schrodinger's wave equation.	04
(c) How badly a metal can be affected by oxidation via moist air? Give definition types and two methods of prevention of corrosion.	07
OR	
(c) How will you solve the problem associated with efficiency of fuel? Explain your answer with respect to altering important properties of fuels.	07
Q.3 (a) Write notes on Heisenberg's uncertainty principle.	03
(b) How acidity and basicity is defined/varies in Hard and soft acid base concept.	04
(c) Write detailed notes on classification of alloys and heat treatment of steel.	07
OR	
(a) What is caustic emrittlement? Write chemistry behind it and remediation.	03
(b) Give two examples of each sp^3 and sp^3d type of hybridization.	04
(c) Describe energy storage devices with lithium batteries construction and working	07
Q.4 (a) What are Eco friendly materials? How they provide sustainable solution to pollution, give answer in context to bio based materials.	03
(b) Write short notes on: Red Shift, Retention factor, Hook's law, Shielding	04
(c) Write short notes on: Bio fuel, Bio diesel, Bio briquettes, photolysis of water, Knocking, octane number, calorific value	07

OR

- (a) Write applications of chemistry in our daily life, covering the topics associated with this course. **03**
- (b) "Structural elucidation is incomplete without spectroscopic techniques", defend the statement with facts and figure. **04**
- (c) What is Fermentation? Write its applications in synthesis of one very important chemical used in chemical industry (with detailed process, diagram and reaction). **07**
- Q.5** (a) Breaking form top to bottom or making from bottom to top? Write on approaches used to make nano particles. **03**
- (b) Write detailed note on GC. **04**
- (c) Write the principle behind UV spectroscopy, draw its instrumentation diagram and elaborate application. **07**

OR

- (a) Write a note on: metal nano particles, fullerenes, carbon nano tubes **03**
- (b) What is chromatography? Why it is important to do TLC in basic synthesis in chemistry laboratory? **04**
- (c) Nikita synthesized o-nitro phenol in chemistry laboratory. Help her analyzing the same with the help of UV, IR, NMR spectroscopy with tentative peak assignments and evaluation of the structure. **07**
