Enrolment No/Seat No.: _____

R.N.G.PATEL INSTITUTE OF TECHNOLOGY-RNGPIT

(An Autonomous College U/s UGC Act 1956)

B.Tech SEMESTER-II, SEMESTER END EXAMINATION –SUMMER 2025

Subject Code: 1CH202 **Date: 26-05-2025**

Subject Name: ENGINEERING CHEMISTRY

Time: 11:00 AM to 01:30 PM **Total Marks: 70**

Instructions

1. It is **compulsory** for students to write **Enrolment No. /Seat No.** on the question paper.
2. Write answers of **Section A** and **Section B** in **separate answer books**.
3. Attempt all questions from both **Section A** and **Section B**.
4. Each section carries **35 marks**, with a total of **70 marks** for the examination.
5. The figures to the right of each question indicate full marks, make suitable assumptions with justification.
6. BL - Bloom's Taxonomy Levels (R-Remember, U-Understanding, A –Application, N –Analyze, E – Evaluate, C -Create), CO - Course Outcomes.

SECTION A

		Marks	BL	CO
Q.1	**Multiple-Choice Questions**	**[05]**		
(a)	The main purpose of making alloys is to	**1**	**R**	**1**
	(i) Increase the cost of the metal **(ii)** Improve the properties of the metal **(iii)** Make the metal heavier **(iv)** Reduce the conductivity of metals			
(b)	Permanent hardness in water is due to	**1**	**R**	**2**
	(i) Bicarbonates of calcium and magnesium **(ii)** Carbonates of sodium and potassium **(iii)**Chlorides and sulfates of calcium and magnesium **(iv)** Oxygen and nitrogen			
(c)	The process of heating rubber with sulfur to improve its properties is called:	**1**	**R**	**3**
	(i) Polymerization **(ii)** Vulcanization **(iii)** Condensation **(iv)** Addition reaction			
(d)	Metals are generally good conductors of	**1**	**R**	**1**
	(i) Electricity only **(ii)** Heat only **(iii)** Both heat and electricity **(iv)** Neither heat nor electricity			

(e)	Polyvinyl Chloride (PVC) is a type of	**1**	**R**	**3**

(i) Natural fiber **(ii)** Thermoplastic polymer

(iii) Thermosetting polymer **(iv)** Metal alloy

Q.2	**Attempt Any Two**	**[10]**		
(a)	Discuss the physical properties of metal.	**5**	**U**	**1**
(b)	Explain the factors influencing the rate of corrosion.	**5**	**U**	**1**
(c)	Give the list of corrosion prevention method and discuss the cathodic protection method.	**5**	**U**	**1**
Q.3	**Attempt Any Two**	**[10]**		
(a)	List out factors influencing hardness of water and discuss the types of hardness & its unit.	**5**	**U**	**2**
(b)	Differentiate between scale and sludge. How does the formation of sludge and scales affect boiler performance? Give a method of prevention of scales.	**5**	**U**	**2**
(c)	Explain the Bomb calorimeter apparatus with diagram.	**5**	**U**	**2**
Q.4	**Attempt Any Two**	**[10]**		
(a)	Explain the classification of Polymer.	**5**	**U**	**3**
(b)	Explain the preparation, properties and use of Polyvinylchloride.	**5**	**U**	**3**
(c)	Write a note on Biodegradable polymers.	**5**	**U**	**3**

SECTION B

		Marks	BL	CO
Q.5	**Multiple-Choice Questions**	**[05]**		
(a)	The glass electrode used in pH measurement works based on:	**1**	**R**	**5**
	(i) Electrolysis **(ii)** Redox reaction			
	(iii) Ion exchange **(iv)** Conductivity			
(b)	Beer-Lambert's Law states that absorbance is:	**1**	**R**	**5**
	(i) Inversely proportional to path length **(ii)** Directly proportional to concentration and path length			
	(iii) Independent of concentration **(iv)** Directly proportional to wavelength			
(c)	Which of the following measures pH most accurately?	**1**	**R**	**5**
	(i) Litmus paper **(ii)**) pH paper			
	(iii) Universal indicator **(iv)** Glass electrode			
(d)	Which of the following causes deviation from Beer's Law?	**1**	**R**	**5**
	(i) Low concentration of analyte **(ii)** Monochromatic light			
	(iii) Stray light interference **(iv)** Short path length			
(e)	Fluorescence spectroscopy is widely used in medicine for:	**1**	**R**	**5**
	(i) Measuring pressure **(ii)** Diagnosing infections			
	(iii) Identifying isotopes **(iv)** Blood glucose estimation			
Q.6	**Attempt Any Two**	**[10]**		
(a)	Describe the causes and types of deviation from Beer's Law.	**5**	**U**	**5**
(b)	Describe the principle and working of UV-visible spectrophotometry.	**5**	**U**	**5**
(c)	Explain the differences between vibrational and rotational spectroscopy	**5**	**U**	**5**
Q.7	**Attempt Any Two**	**[10]**		
(a)	Define and illustrate the concept of structural isomers and stereoisomers.	**5**	**U**	**4**
(b)	What is chirality? How do enantiomers and diastereomers differ?	**5**	**U**	**4**
(c)	Discuss the E, Z isomerism with examples.	**5**	**U**	**4**

Q.8	**Attempt Any Two**	**[10]**		
	(a) Explain the concept of green chemistry.	**5**	**U**	**4**
	(b) Enlist the twelve principles of green chemistry.	**5**	**R**	**4**
	(c) Explain the laboratory synthesis of Aspirin or Paracetamol.	**5**	**A**	**4**

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