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Reg.No :

Name :

MAHATMA GANDHI UNIVERSITY, KOTTAYAM
MGU-UGP (HONOURS) REGULAR EXAMINATION MARCH 2025
SECOND SEMESTER

Discipline Specific Core Course (DSC) - MG2DSCCHE100 -
FUNDAMENTALS OF CHEMISTRY - II

(2024 ADMISSION ONWARDS)

Duration: 1.5 Hours

Maximum Marks: 50

Remember(K), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C), Skill(S), Interest(I)
and Appreciation(Ap)

Students should attempt at least one question from each course outcome to enhance their overall outcome attainability.

Part A

Multiple choice questions

Answer all questions

Each question carries **1** marks

1. Which of the following is often used as an indicator in a redox titration involving potassium permanganate (KMnO_4)? [K] / [CO1]
a). Methyl orange b). Starch
c). Phenolphthalein d). No indicator is needed
2. What is usually the final product of E1 and E2 reactions? [U] / [CO2]
a). Alkane b). Alkene c). Free radical d). Polymer
3. The pressure exerted by a gas on the walls of its container is due to. [U] / [CO3, CO4]
a). The gravitational force
b). The cohesive forces between the molecules
c). The collision of gas molecules with the walls
d). The density of the gas molecules

4. What is the primary objective of a titrimetric analysis? [U] / [CO1]
- a). To measure the pH of a solution
 - b). To analyze the color of a solution
 - c). To determine the concentration of an unknown substance
 - d). To separate components of a mixture
5. What is the first step in the peroxide effect mechanism? [U] / [CO2]
- a). Formation of a carbocation
 - b). Formation of free radicals
 - c). Nucleophilic attack
 - d). Electrophilic attack
6. The presence of which element can form hydrogen bonds? [An] / [CO3, CO4]
- a). Nitrogen
 - b). Oxygen
 - c). Fluorine
 - d). All of the other answers
7. 20 g of NaOH is dissolved in 1 L of distilled water. What is the molarity of the solution? [A] / [CO1]
- a). 0.5 M
 - b). 1.0 M
 - c). 2.0 M
 - d). 0.1 M
8. Which of the following statements is true regarding the S_N2 mechanism? [U] / [CO2]
- a). The reaction occurs in two steps
 - b). The rate depends only on the alkyl halide concentration
 - c). The nucleophile attacks the electrophilic carbon from the front side
 - d). The reaction rate depends on both the nucleophile and alkyl halide concentration
9. Diamond crystallizes in which crystal system? [A] / [CO3, CO4]
- a). Cubic
 - b). Tetragonal
 - c). Orthorhombic
 - d). Monoclinic
10. What is the major product when HCl is added to propene? [U] / [CO2]
- a). 1-chloropropane
 - b). 2-chloropropane
 - c). propane
 - d). 1,2,3-trichloropropane

[1x10 = 10]

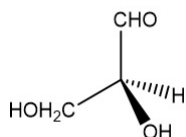
Part B

Short Answer Questions

Answer any 4 questions

Each question carries 3 marks

11. Explain the ionization process of acids and bases with relevant examples. [U] / [CO1]
12. Give an account of electrophiles. [U] / [CO2]
13. What is meant by the term 'matter'? [K] / [CO3, CO4]
14. How does acid-base titration work? Provide an example to illustrate the process. [U] / [CO1]
15. Identify the following projection formula. Convert it into Fischer projection. [U] / [CO2]



16. What is compressibility factor (Z), and what does it indicate? [U] / [CO3, CO4]
- [3x4 = 12]**

Part C

Short Essay Questions

Answer any 4 questions

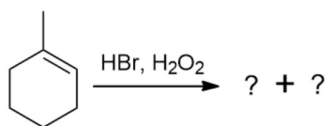
Each question carries 7 marks

17. Explain the mole concept and Avogadro's number. How is the number of moles calculated from mass and volume? Give an example. [U] / [CO1]
18. Define and explain the following terms with relevant examples (a) Polymer (b) Monomer (c) Polymerisation. [U] / [CO2]
19. Explain the general properties of liquids and how they differ from solids and gases. [U] / [CO3, CO4]
20. Classify the substances as acids or bases according to Arrhenius, Bronsted-Lowry, and Lewis definitions, and explain why. (a) Ammonia (NH₃) reacts with water (H₂O) to form ammonium ion (NH₄⁺) and hydroxide ion (OH⁻). (b) Sulfuric acid (H₂SO₄) dissociates in water to produce H⁺ and HSO₄⁻ ions. (c) Boron trifluoride (BF₃) reacts with ammonia (NH₃) to form an adduct. [A] / [CO1]
21. For each of the following reactions: [U] / [CO2]

i) Identify the major and minor products . ii) Explain your reasoning for the major/minor product formation. iii) Provide reaction mechanisms.



b)



22. Differentiate between crystalline and amorphous solids.

[A] / [CO3, CO4]

[7x4 = 28]