JHARKHAND Rai University
RANCHI

**End Semester/Reappear (Semester II) Examination May 2025**

**Programme: B. Pharm**
**Course: Pharmaceutical Organic chemistry I** **Full Marks: 75**
**Course Code: BP202T** **Time: 3 Hrs.**
**Enrolment no. _____**

| Q.No. | Questions | CO | Bloom Taxonomy Category | Marks |
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| | **Section I** | | | |
| 1 | **Objective Type Questions** | | | |
| | i. Which of the following halogenations of alkanes is the most reactive?<br>a. Fluorination b. Chlorination c. Bromination d. Iodination<br>ii. Which reaction is used to cleave a double bond completely and form carbonyl compounds?<br>a. Diels-Alder reaction b. Halogenation c. Ozonolysis d. Hydroboration<br>iii. What is the correct order of reactivity of alkyl halides in SN1 reactions?<br>a. Methyl > Primary > Secondary > Tertiary b. Tertiary > Secondary > Primary > Methyl<br>c. Primary > Tertiary > Secondary > Methyl d. Secondary > Tertiary > Primary > Methyl<br>iv. Which compound is commonly used as a dry-cleaning solvent?<br>a. Dichloromethane b. Trichloroethylene c. Ethyl chloride d. Methyl alcohol<br>v. Which alcohol is a component of antifreeze and is toxic when ingested?<br>a. Glycerol b. Propylene glycol c. Ethyl alcohol d. Methyl alcohol | CO1 | Remember | **1 x 20 = 20** |
| | vi. Which alcohol is commonly used in cosmetics as an emulsifying agent?<br>a. Cetosteryl alcohol b. Chlorobutanol c. Benzyl alcohol d. Propylene glycol<br>vii. Which one of the following is the correct IUPAC name for the compound: $CH_3–CH=CH–CH_3$?<br>a. 1-butene b. 2-butene c. But-2-ene d. B and C both<br>viii. Which compound gives a positive iodoform test?<br>a. Formaldehyde b. Acetone c. Benzaldehyde d. Paraldehyde<br>ix. Which compound is known to have sleep-inducing and sedative properties?<br>a. Benzoin b. Chloral hydrate c. Cinnamaldehyde d. Hexamine<br>x. The compound Hexamine is used as:<br>a. Antiseptic b. Disinfectant c. Fuel in solid fuel tablets d. All of the above | | | |
| | xi. Which of the following is formed in the Perkin condensation?<br>a. β-hydroxy ketone b. α,β-unsaturated acid c. Primary alcohol d. α-hydroxy acid<br>xii. Which carbonyl compound is used as a preservative and disinfectant?<br>a. Paraldehyde b. Formaldehyde c. Chloral hydrate d. Benzaldehyde<br>xiii. Which of the following reactions involves the formation of β-hydroxy aldehyde or ketone?<br>a. Cannizzaro reaction b. Aldol condensation c. Benzoin condensation d. Perkin condensation<br>xiv.Which of the following is a carbocyclic compound?<br>a. Cyclopentane b. Hexane c. Benzene d. Both A and<br>xv. Which of the following is a functional group isomer of ethanol?<br>a. Propanol b. Dimethyl ether c. Acetone d. Methanol | | | |
| | xvi.Which of the following compounds is classified as a saturated acyclic hydrocarbon?<br>a. $C_2H_2$ b. $C_4H_{10}$ c. $C_6H_6$ d. $C_2H_4$<br>xvii. What happens to the configuration of the product in an SN2 reaction?<br>a. Retention of configuration b. Racemization c. Inversion of configuration d. No change in configuration<br>xviii. Markownikoff's rule is applicable in:<br>a. Free radical addition to alkenes b. Electrophilic addition to alkenes<br>c. Nucleophilic substitution reactions d. E2 elimination<br>xix. Which compound is a positional isomer of but-1-ene?<br>a. But-2-ene b. Butyne c. Cyclobutane d. Butanol<br>xx.Which of the following does not undergo the Cannizzaro reaction?<br>a. Formaldehyde b. Benzaldehyde c. Acetone d. Trimethylacetaldehyde | | | |
| | **Section II** | | | |
| **2. Short Answer type questions.** | | | | |
| a | Explain how position isomerism differs from functional group isomerism with two examples each. | CO1 | Understand | |

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| b | Why are conjugated dienes more stable than normal dienes? Give one example. | CO2 | Understand | |
| c | Give the chemical tests used to identify alcohols. Mention the observations and which types of alcohols respond | CO3 | Remember | |
| d | Describe the mechanism of aldol condensation using acetaldehyde. Why is this reaction limited to aldehydes/ketones with α-hydrogen? | CO4 | Understand | |
| e | What is the effect of substituents on the basicity of aliphatic amines? How does an alkyl group compare to a phenyl group in terms of basicity in amines? | CO5 | Remember | |
| f | Describe the effect of the inductive effect on the acidity of carboxylic acids. How does the presence of an electronegative substituent like chlorine affect the acidity? | CO5 | Understand | **7 x 5 = 35** |
| | or | | | |
| | Describe the structure and uses of acetic acid. What are its major applications in industry and in daily life? | CO5 | Understand | |
| g | What is ozonolysis? Write a simple reaction of alkene with ozone. | CO2 | Remember | |
| | or | | | |
| | Explain $sp^2$ hybridization in alkenes with the help of ethene structure. How does this hybridization influence the geometry of the molecule? | CO2 | Understand | |
| **Section III** | | | | |
| **Long Answer Type questions** | | | | |
| 3 | Analyze the difference in reactivity between aldehydes and ketones in aldol condensation reactions. How do the electronic and steric effects of aldehydes and ketones affect the mechanism, and why do aldehydes generally undergo aldol condensation more readily than ketones? | CO4 | Analyze | **2 x 10 = 20** |
| | or | | | |
| | Design an experiment to distinguish between a ketone and an aldehyde. Create a flowchart that includes the reagents, observations, and expected outcomes for each test. | CO4 | Create | |
| 4 | Construct a reaction chart that compares and contrasts the outcomes of E1 and E2 elimination reactions using three different alkyl halides (primary, secondary, tertiary). Indicate the major products formed in each case, and apply Saytzeff's rule to predict product distribution | CO2 | Create | |
| | or | | | |
| | Create five different alkenes (with molecular formula $C_5H_{10}$) and write their IUPAC names. For each alkene, predict the major product when it undergoes addition of HBr. Indicate which product follows Markovnikov's rule. | CO2 | Create | |

**Course Outcomes (CO)**:

CO 1: Write down the structure, name and the type of isomerism of the organic compound.

CO 2: Write the reaction, name the reaction and orientation of reactions.

CO 3: Account for reactivity/ stability of compounds.

CO 4: Identify/ confirm the identification of organic compounds.

CO 5: Knowledge about structure & IUPAC name.