

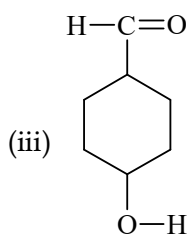
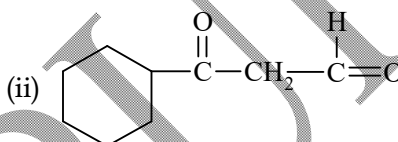
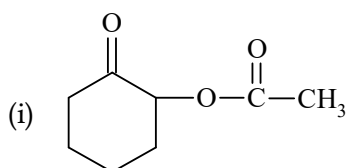
## CHEMISTRY-2

## Basic concepts of Organic Chemistry

## [Set-2]

## SECTION-A

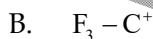
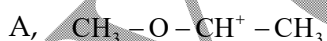
- Which of the following contains only sp carbon atoms?  
(i) Propyne (ii) But-2-yne (iii) 1,2-Dicyanoethyne (iv) All of these
- Which of the following is a metamer of ethoxy ethane?  
(i) Methoxy propane (ii) 2-Methoxy propane (iii) both (i) and (ii) (iv) None of these
- Which of the following contains maximum number of functional groups?



(iv) All contain equal number of functional groups

- The incorrectly written name is  
(i) 2-Hydroxy butan-3-amine (ii) 3-Amino butan-2-ol  
(iii) Butan-2-one (iv) 5-oxopentanoic acid
- Match the following:**

## Column-I



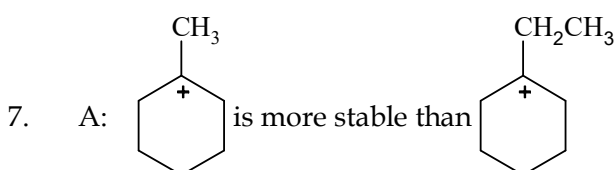
## Column-II

- Stable due to resonance
- Destable due to inductive effect
- Stable due to the hyperconjugation
- Secondary carbocation

	A	B	C	D
(i)	(1,2)	3	2	(3,4)
(ii)	1	2	2	(3,4)
(iii)	(1,2)	4	(2,3)	3
(iv)	(1,2)	2	3	(3,4)

**Assertion-Reason type Questions:**

- (a) Both A and R are true and R is the correct explanation of A  
 (b) Both A and R are true and R is not the correct explanation of A  
 (c) A is true but R is false  
 (d) A is false but R is true
6. A: Isobutane and n-butane have the same number of primary hydrogens  
 R: Isobutane and n-butane are isomers



R: Both are tertiary carbocations

**Passage based questions:**

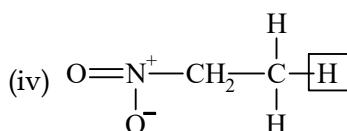
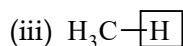
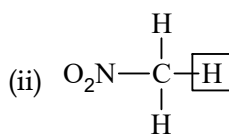
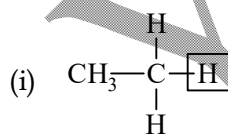
Organic reactions mainly proceeds via three reaction intermediates, carbocation, carbanions and free radicals. The stability of these intermediates can be explained with the help of inductive effect, hyperconjugation and resonance. In genera, the stability of carbocation/carbanion depends on the dispersal of charge. More the dispersal of charge, more the stability of carbocation/carbanion. Also, the carbocations are stabilized by electron denoting groups whereas electron withdrawing groups stabilized the carbanion.

8. The correct order of increasing stability of the following is

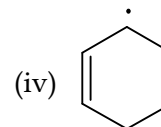
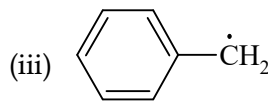
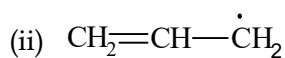
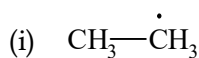


- (i)  $\text{I} < \text{II} < \text{III}$       (ii)  $\text{III} < \text{I} = \text{II}$       (iii)  $\text{III} < \text{II} < \text{I}$       (iv)  $\text{III} < \text{I} < \text{II}$

9. The most acidic hydrogen is



10. The least stable free radical is



SECTION-B

11. Account for the following

(i)  $\text{CH}_3-\overset{+}{\text{C}}\text{H}-\text{CH}_2\text{CH}_2\text{CH}_3$  is more stable carbocation than  $\text{CH}_3\text{CH}_2\overset{+}{\text{C}}\text{H}-\text{CH}_2\text{CH}_3$  although both are secondary carbocation

(ii)  $\overset{\oplus}{\text{C}}\text{H}_2-\text{CH}=\text{CH}-\overset{\ominus}{\text{O}}:$  is more stable than  $\overset{\ominus}{\text{C}}\text{H}_2-\text{CH}=\overset{\oplus}{\text{C}}\text{H}-\overset{\oplus}{\text{O}}:$

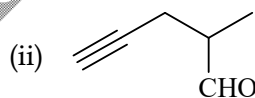
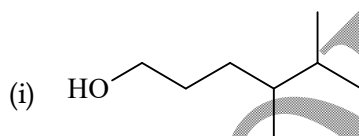
12. Give the structural formula of the following compounds

(i) 3-oxopent-4-enoic acid

(ii) 3,4-dinitro benzene carbaldehyde

OR

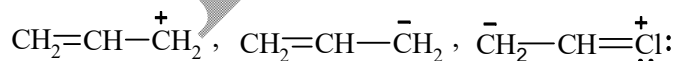
Write IUPAC names of the following compounds:



13. Draw the structure of 2,2,4-Trimethyl pentane, label each carbon atom as 1°, 2°, 3° and 4° carbon. Also, write a bond-line structure of this compound.

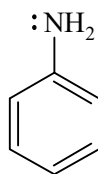
14. (i) Which of the two:  $\text{O}_2\text{N}-\text{CH}_2-\text{CH}_2-\text{O}^\cdot$  or  $\text{CH}_3-\text{CH}_2-\text{O}^\cdot$  is expected to be more stable and why?

(ii) Arrange the following in order of increasing stability:



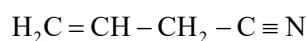
(iii) Why is phenol a stronger acid than water?

OR



- (i) Draw the resonance structures of aniline using curved arrow notation showing the correct position of the positive and negative charges.

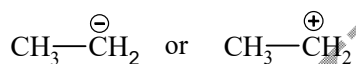
- (iii) Label each carbon as  $sp$ ,  $sp^2$  and  $sp^3$



15. (i) What are reaction intermediates? How are these intermediates formed?  
 (ii) Define hyperconjugation  
 (iii) Draw all possible alcohols with molecular formula  $\text{C}_4\text{H}_{10}\text{O}$ .

OR

- (i) What do you understand by homolytic and heterolytic cleavage of a bond?  
 (ii) Which one is more stable and why?



- (iii) Draw all possible aldehydes and ketones with molecular formula  $\text{C}_4\text{H}_8\text{O}$ . Also write their IUPAC names.