

SRIGAYATRI EDUCATIONAL INSTITUTIONS

INDIA

ALKENES (UT-05 QB)

1. When subjected to acid catalyzed hydration, the order of reactivity of the alkenes;

$(\text{CH}_3)_2\text{C}=\text{CH}_2$ (I), $\text{CH}_3\text{CH}=\text{CH}_2$ (II) and $\text{CH}_2=\text{CH}_2$ (III) is

- a) I>II>III b) III>II>I c) II>I>II d) I>III>II

2. When one mole of an alkene on ozonolysis produces 2 moles of propanone, the alkene is

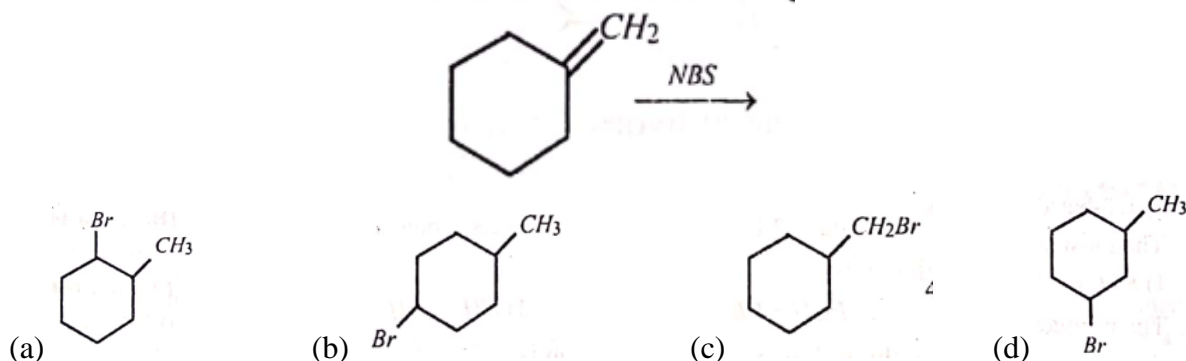
- a) isobutene b) 2, 3-dimethyl-2-pentene c) 2,3 -dimethyl-1-butene
d) 3 -methyl-1-butene e) 2,3 -dimethyl- 2 -butene

3. In the following sequence of reactions, the alkene gives the compound B

$\text{CH}_3-\text{CH}=\text{CH}-\text{CH}_3 \xrightarrow{\text{O}_3} \text{A} \xrightarrow{\text{H}_2\text{O}/\text{Zn}} \text{B}$. B is

- (a) $\text{CH}_3\text{CH}_2\text{CHO}$ (b) CH_3CH_3 (c) $\text{CH}_3\text{CH}_2\text{COCH}_3$ (d) CH_3CHO

4. What will be the product in the following reaction?



5.

$\text{H}_3\text{C}-\underset{\text{CH}_3}{\text{CH}}-\text{CH}=\text{CH}_2 + \text{HBr} \rightarrow \text{A}$. A (Predominately) is

- (a) $\text{CH}_3-\underset{\text{CH}_3}{\text{CH}}-\text{CH}_2-\text{CH}_2\text{Br}$ (b) $\text{CH}_3-\overset{\text{Br}}{\underset{\text{CH}_3}{\text{C}}}-\text{CH}_2\text{CH}_3$ (c) $\text{CH}_3-\underset{\text{Br}}{\text{CH}}-\underset{\text{Br}}{\text{CH}}-\text{CH}_3$ (d) $\text{CH}_3-\underset{\text{CH}_3}{\text{CH}}-\underset{\text{Br}}{\text{CH}}-\text{CH}_3$

6. In the following reaction, A and B respectively are $\text{A} \xrightarrow{\text{HBr}} \text{C}_2\text{H}_5\text{Br} \xrightarrow{\text{B}} \text{A}$

- a) $\text{C}_2\text{H}_2, \text{PBr}_3$ b) $\text{C}_2\text{H}_5\text{Cl}, \text{aq.KOH} / \Delta$
c) $\text{CH}_3\text{OH}, \text{aq.KOH} / \Delta$ d) $\text{C}_2\text{H}_4, \text{alc.KOH} / \Delta$

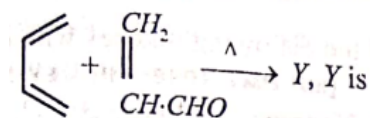
7. $\text{R}-\text{CH}=\text{CH}_2 \xrightarrow[\text{Na.NH}_3(\text{l})]{\text{C}_2\text{H}_5\text{OH}} \text{RCH}_2\text{CH}_3$ This reaction is called

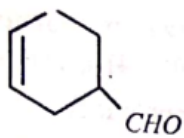
- a) Fisher-Spier reaction b) Clemmensen reduction
c) Birch reduction d) Arndt-Eistert reaction

8. The compound $\text{CH}_3-\overset{\text{CH}_3}{\text{C}}=\text{CH}-\text{CH}_3$ on reaction with NaIO_4 in the presence of KMnO_4 gives

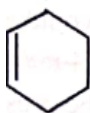
- a) $\text{CH}_3\text{COCH}_3 + \text{CH}_3\text{COOH}$ b) CH_3COCH_3 c) $\text{CH}_3\text{CHO} + \text{CO}_2$ d) $\text{CH}_3\text{COCH}_3 + \text{CH}_3\text{CHO}$

9.

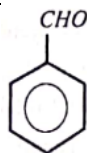




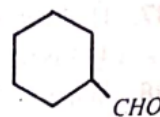
a)



b)



c)



d)

10. Ethylene is converted to X on passing through a mixture of an acidified aqueous solution of palladium chloride and cupric chloride. Which of the following reagents readily take part in addition reaction with X ?

a) HCN

b) HBr

c) HCl

d) Br₂

11. Which of the compounds with molecular formula C₅H₁₀ yields acetone on ozonolysis?

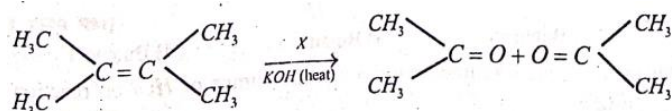
(a) 2-Methyl-2-butene

b) 3-Methyl-1-butene

c) Cyclopentane

d) Methyl-1-butene

12.



X in the above reaction is

a) KMnO₄b) O₃c) HNO₃d) O₂

13. In which of the following, addition of HBr does not take place against Markownikoff's rule or Anti-Markownikoff addition of HBr is not observed for?

a) But-2-ene

b) Propene

c) Pent-2-ene

d) But-1-ene

14. The intermediate during the addition of HCl to propene in the presence of peroxide is

a) $\text{CH}_3\overset{+}{\text{C}}\text{HCH}_3$ b) $\text{CH}_3\text{CH}_2\overset{+}{\text{C}}\text{H}_2$ c) $\text{CH}_3\text{CH}_2\dot{\text{C}}\text{H}_2$ d) $\text{CH}_3\dot{\text{C}}\text{HCH}_2\text{Cl}$

15. Addition of HCl does not obey anti-Markownikov's rule because

a) Its bond energy is high

b) It is a strong acid

c) It is a gas

d) Its bond energy is less

16. Which of the following reactions will yield 2,2-dibromopropane?

(a) $\text{CH}_3 - \text{CH} = \text{CH}_2 + \text{HBr} \rightarrow$ (b) $\text{CH}_3 - \text{C} \equiv \text{CH} + 2\text{HBr} \rightarrow$ (c) $\text{CH}_3\text{CH} = \text{CHBr} + \text{HBr} \rightarrow$ (d) $\text{CH} \equiv \text{CH} + 2\text{HBr} \rightarrow$

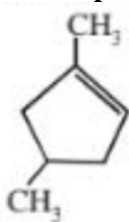
17. The hydrocarbon which can react with sodium in liquid ammonia is

(a) $\text{CH}_3\text{CH}_2\text{CH}_2\text{C} = \text{CCH}_2\text{CH}_2\text{CH}_3$ (b) $\text{CH}_3\text{CH}_2\text{C} \equiv \text{CH}$ (c) $\text{CH}_3\text{CH} = \text{CHCH}_3$ (d) $\text{CH}_3\text{CH}_2\text{C} \equiv \text{CCH}_2\text{CH}_3$

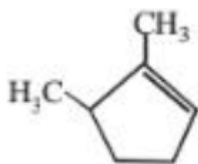
18. The treatment of CH_3MgX with $\text{CH}_3\text{C} = \text{C} - \text{H}$ produces

(a) $\text{CH}_3 - \text{CH} = \text{CH}_2$ (b) $\text{CH}_3\text{C} = \text{C} - \text{CH}_3$ (c) $\begin{array}{c} \text{H} \quad \text{H} \\ | \quad | \\ \text{CH}_3 - \text{C} = \text{C} - \text{CH}_3 \end{array}$ (d) CH_4

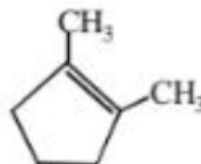
19. Which compound would give 5-keto-2-methylhexanal upon ozonolysis?



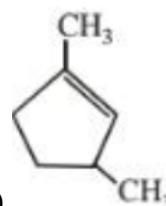
(a)



(b)



(c)

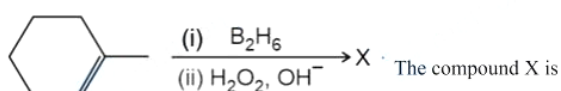


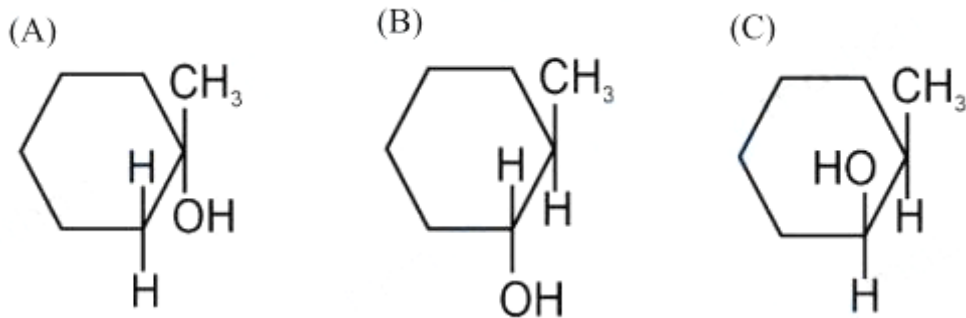
(d)

20. The reaction of propene with HOCl (Cl₂ + H₂O) proceeds through the intermediate:

a) $\text{CH}_3 - \text{CH}(\text{OH}) - \overset{+}{\text{C}}\text{H}_2$ b) $\text{CH}_3 - \text{CHCl} - \overset{+}{\text{C}}\text{H}_2$ c) $\text{CH}_3 - \overset{+}{\text{C}}\text{H} - \text{CH}_2 - \text{OH}$ d) $\text{CH}_3 - \overset{+}{\text{C}}\text{H} - \text{CH}_2 - \text{Cl}$

21.



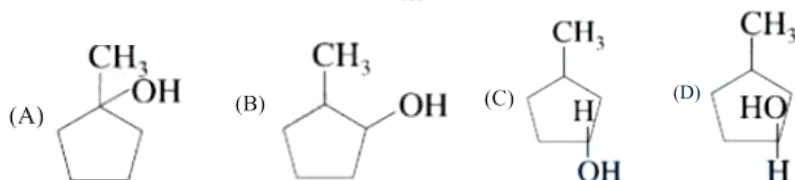
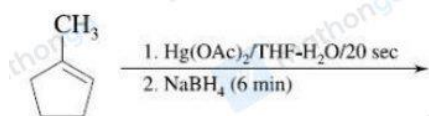


(d) All of these

22. Ethylene dibromide on heating with metallic sodium in ether yields

- (A) ethene (B) ethyne (C) 2-butene (D) 1-butene

23. The final product obtained in the reaction



24. The correct stability order of following species is:



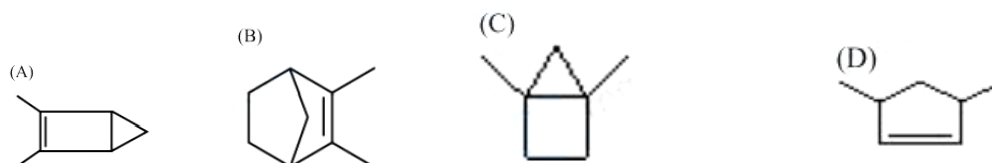
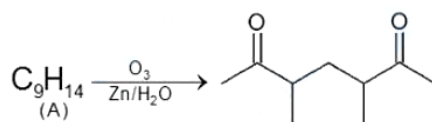
(A) $x > y > w > z$

(C) $x > w > z > y$

(B) $y > x > w > z$

(D) $z > x > y > w$

25. The reactant A is

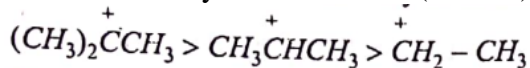


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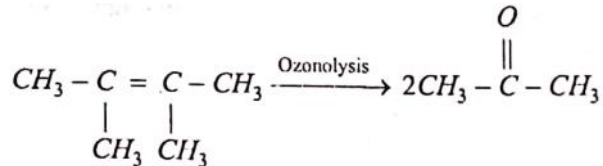
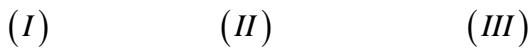
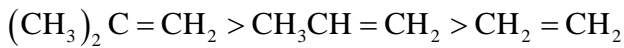
1) a	2) e	3) d	4) a	5) b	6) d	7) c	8) a	9) a	10) a
11) a	12) a	13) a	14) a	15) a					
16) b	17) b	18) d	19) d	20) d					
21) b	22) b	23) d	24) d	25) d					

SOLUTIONS

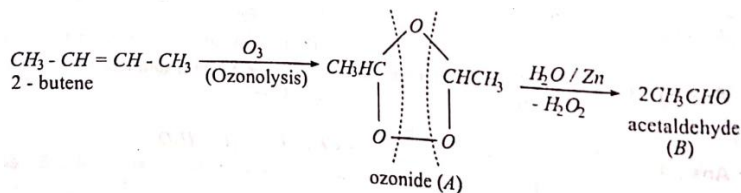
1. Acid catalysed hydration of alkenes involves formation of carbo cation intermediate. Higher the stability of carbocation intermediate, more is the reactivity towards acid catalysed hydration. The order of stability of carbocation (formed) is



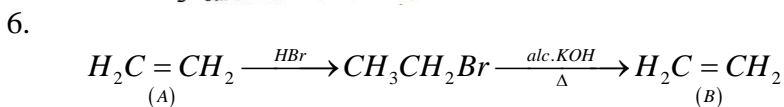
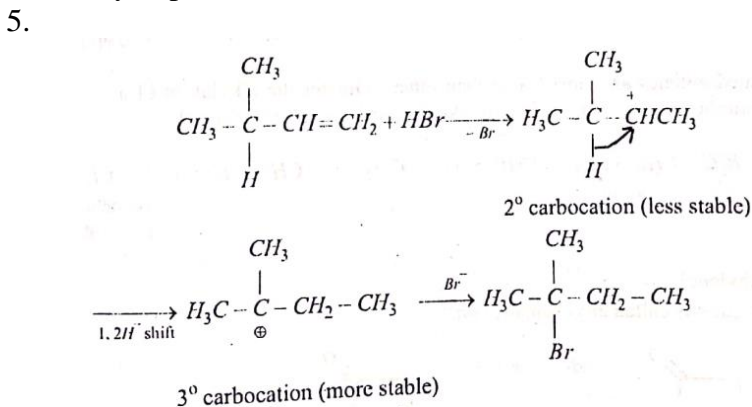
Thus, the order of reactivity towards acid catalysed hydration is



2. 2, 3-dimethylbut-2-ene



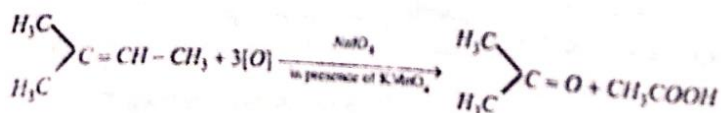
- 3.
4. NBS is a selective brominating reagent since it normally brominates the ethylenic compounds in the allylic position.



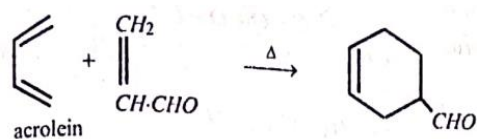
Hence, A = C₂H₄
 B = alc.KOH / Δ

7. Reduction by sodium in liquid ammonia is called Birch reduction

8.

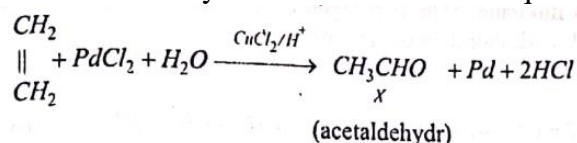


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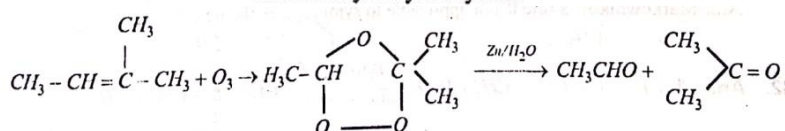
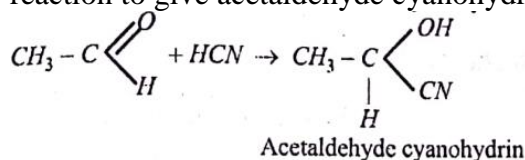


This reaction is an example of Diel's - Alder reaction

10. Wacker process is used in the preparation of acetaldehyde from ethylene. This process involves the treatment of ethylene with an acidified aqueous solution of palladium chloride and cupric chloride.

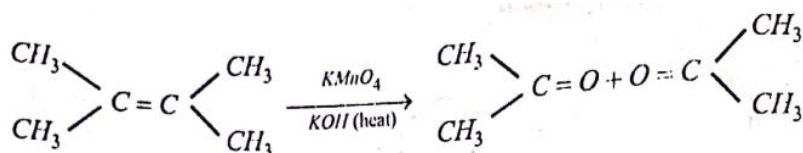


So, the compound X is acetaldehyde. The compound X reacts with HCN and undergoes addition reaction to give acetaldehyde cyanohydrin.

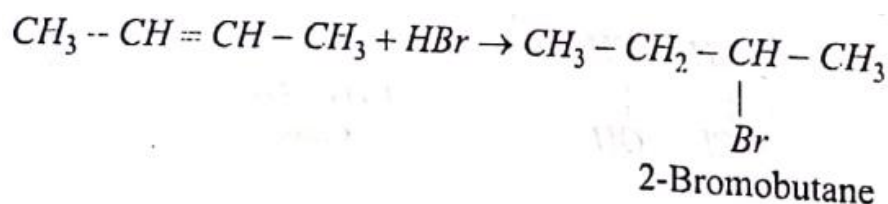


11.

12.

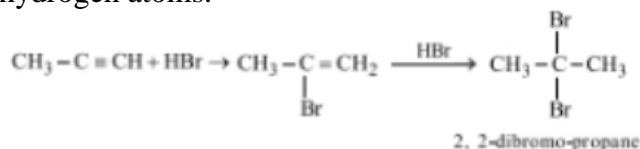


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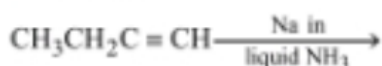


Anti-Markownikoff's rule is not applicable to symmetrical alkenes

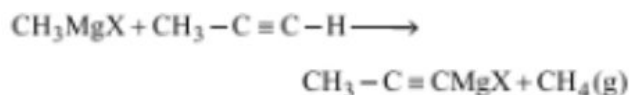
16. The reaction follows Markownikoff rule which states that when unsymmetrical reagent adds across unsymmetrical double or triple bond the negative part adds to carbon atom having lesser number of hydrogen atoms.



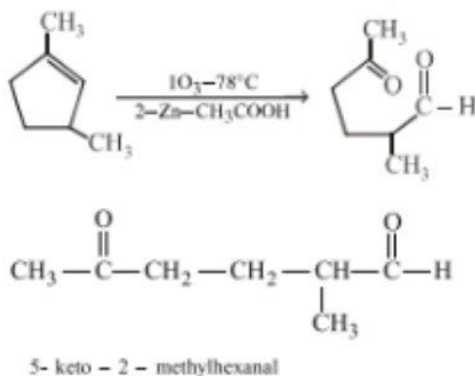
17. Alkynes having terminal $-\text{C}\equiv\text{H}$ react with Na in liquid ammonia to yield H_2 gas of the given compounds $\text{CH}_3\text{CH}_2\text{C}\equiv\text{CH}$ can react with Na in liquid NH_3 so the correct answer is (b).



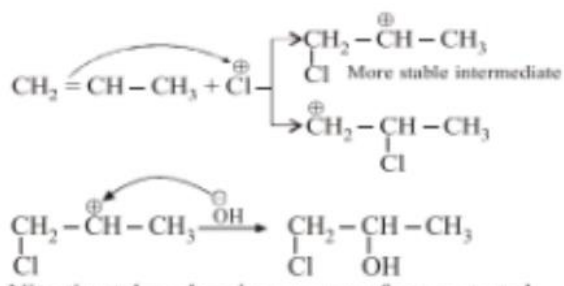
18. Writing the reaction we get



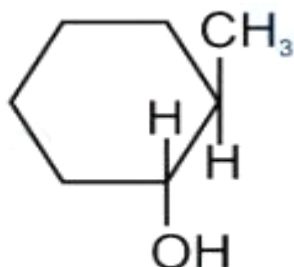
19. When 1,3-dimethylcyclopentene is heated with ozone and then with zinc and acetic acid, oxidative cleavage leads to keto-aldehyde.



20.

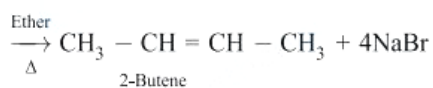
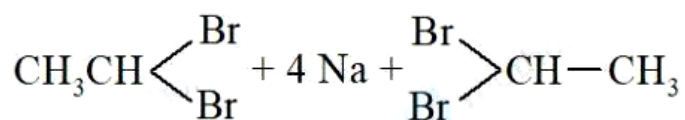


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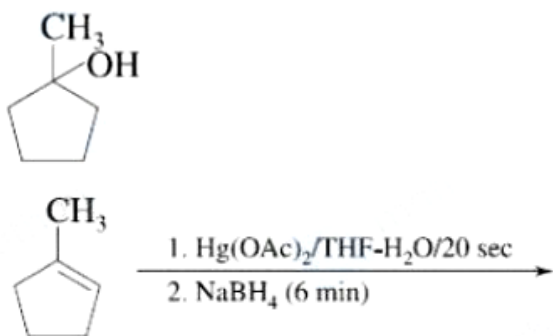


Hydroboration - oxidation reaction of alkenes leads to anti-Markovnikov's hydration. Further addition of water adds in syn-manner, i.e., H and OH are added to the same face of the double bond leading to formation of trans-product. In short, hydroboration-oxidation of alkenes is region selective as well as stereo selective.

22.



23.



As Hydration (addition of H^+ / OH) takes place according to Markownikoff rule.

24. X is a conjugated diene system.
W is an isolated diene system
Z is a cumulated diene system
Y is antiaromatic system
Hence stability order is $\text{X} > \text{W} > \text{Z} > \text{Y}$

25.

