HYDROCARBONS

1. SUB TOPIC NAME: ALKANES

1. **Isopropyl bromide on wurtz reaction gives**
   1) Hexane 2) Propane 3) 2, 3-dimethyl butane 4) Neohexane
2. **Heating a mixture of sodium benzoate and sodalime gives**
   1) Benzene 2) Methane 3) Sodium benzoate 4) Calcium benzoate
3. **n-Octane when heated to 773k under a pressure of 10-20 atm and in presence of a mixture of Cr_2O_3, V_2O_5 and Mo_2O_3 supported over Al_2O_3 as catalyst gives**
   1) o – Xylene 2) m – Xylene 3) p – Xylene 4) All the three
4. **The dihedral angle between two C-H bonds in the staggered conformation of ethane is**
   1) 180° 2) 0° 3) 120° 4) 60°
5. **Which of the following has least hindered rotation about Carbon – Carbon bond ?**
   1) Ethane 2) Ethylene 3) Acetylene 4) Hexachloroethane
6. **Which of the following alkane has lowest boiling point and highest melting point ?**
   1) n – Pentane 2) Isopentane 3) Neopentane 4) n – Hexane
7. $CH_3CH_3 + HNO_3 \xrightarrow{675K}$
   1) $CH_3CH_2NO_2$ 2) $CH_3CH_2NO_2 + CH_3NO_2$ 3) $2CH_3NO_2$ 4) $CH_2 = CH_2$
8. **Consider the following reaction,**

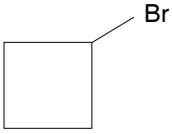
   $$H_3C-\underset{D}{\underset{|}{CH}}-\underset{CH_3}{\underset{|}{CH}}-CH_3 + \dot{B}r \rightarrow 'X' + HBr$$

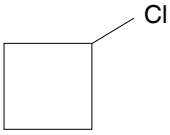
   Identify the structure of the major product 'X'

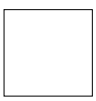
   1) $CH_3-\underset{D}{\underset{|}{CH}}-\underset{CH_3}{\underset{|}{CH}}-\dot{C}H_2$ 2) $CH_3-\underset{D}{\underset{|}{CH}}-\underset{CH_3}{\underset{|}{\dot{C}}}-CH_3$

   3) $CH_3-\underset{D}{\underset{|}{\dot{C}}}-\underset{CH_3}{\underset{|}{CH}}-CH_3$ 4) $CH_3-\dot{C}H-\underset{CH_3}{\underset{|}{CH}}-CH_3$
9. **On mixing certain alkane with chlorine and irradiating it with ultraviolet light, one forms only one mono chloroalkane. The alkane could be**
   1) Neopentane 2) Propane 3) Pentane 4) Isopentane
10. **Which of the following has the minimum boiling point ?**
    1) n-Butane 2) 1-Butyne 3) 1-Butene 4) 1-Isobutene
11. **Of the five isomeric hexanes, the isomer which can give two monochlorinated compounds is**
    1) n-hexane 2) 2, 3-dimethylbutane
    3) 2, 2-dimethylbutane 4) 2-methyl pentane

\12. **What will be the product formed when 1-bromo-3-chlorocyclo butane reacts with two equivalents of metallic sodium in ether?**

1) 

2) 

3) 
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13. **Enthalpy of hydrogenation of cyclohexene is -119.5 kJ mol^{-1}, its enthalpy of hydrogenation would be**
1) -358.5 kJ mol^{-1} 2) -508.9 kJ mol^{-1} 3) -208.1 kJ mol^{-1} 4) -269.9 kJ mol^{-1}

14. **Phenylmagnesium bromide reacts with methanol to give**
1) a mixture of anisole and Mg(OH)Br 2) a mixture of benzene and Mg(OMe)Br
3) a mixture of toulene and Mg(OH)Br 4) a mixture of Phenol and Mg(OMe)Br

15. **Increasing order of stability among the three main conformations (i.e., eclipse, anti, gauche) of 2-flouroethanal is**
1) eclipse, anti, gauche 2) anti, gauche, eclipse
3) eclipse, gauche, anti 4) gauche, eclipse, anti

16. **An alkyl halide by formation of its Grignard reagent and heating with water gives propane. What is the original alkyl halide?**
1) methyl iodide 2) ethyl iodide 3) ethyl bromide 4) propyl bromide

17. **The number of structural isomers for C_6H_{14} is**
1) 3 2) 4 3) 5 4) 6

18. $CH_3CH_2CH_2CH_3 \xrightarrow{catalyst} CH_3-\underset{\underset{CH_3}{|}}{CH}-CH_3$

The catalyst used in the above conversion is
1) $ZnCl_2 / HCl$ 2) $AlCl_3 / HCl$ 3) $PdCl_2 / HCl$ 4) $CuCl / HCl$

19. **Of the isomeric hexanes, the isomers that give the minimum and maximum number of mono chloro derivatives are respectively**
1) 3-methyl pentane and 2, 3-dimethyl butane
2) 2, 3-dimethyl butane and n-hexane
3) 2, 2- dimethyl butane and 2-methyl pentane
4) 2, 3- dimethylbutane and 2-methylpentane

20. **Isomers which can be interconverted through rotation around a single bond are :**
1) Conformers 2) Diastereomers
3) Enantiomers 4) Positional isomers

21. **Main constituent of LPG is**
1) Methane 2) Isobutane, Propane 3) H_2, CH_4, Isobutane 4) None of these

22. **The reaction conditions leading to best yields of C_2H_5Cl are**
1) $C_6H_6(excess)+Cl_2 \xrightarrow{UV\ light}$ 2) $C_6H_6+Cl_2 \xrightarrow[room\ temp]{Dark}$
3) $C_6H_6+Cl_2(excess) \xrightarrow{UV\ light}$ 4) $C_6H_6+Cl_2 \xrightarrow{UV\ light}$

23. **2.84 g of methyl iodide was completely converted into methyl magnesium iodide and the product was decomposed by excess of ethanol. The volume of the gaseous hydrocarbon produced at NTP will be :**
1) 22.4 litre 2) 22400 mL 3) 0.448 litre 4) 0.224 litre

24. **The IUPAC name of neo-pentane is**
1) 2-methyl butane 2) 2, 2-dimethyl butane
3) 2-methyl propane 4) 2, 2-dimethyl propane

25. **Which of the following is the correct sequence of steps in the halogenation of an alkane ?**
1) Propogation, initiation, termination
2) Initiation, termination, propagation
3) Initiation, Propagation, termination
4) Propagation, termination, initiation

26. **Which of the following alkanes can be synthesized in good yield by the wurtz reaction ?**
1) $(CH_3)_2CH-CH_2-CH(CH_3)_2$ 2) $(CH_3)_2CH-CH_2CH_2-CH(CH_3)_2$
3) $CH_3CH_2-C(CH_3)_2-CH_2CH_3$ 4) $(CH_3)_3C-CH_2-CH_2-CH_3$

27. **An alkane with a molecular formula C_6H_{14} reacts with chlorine in the presence of light and heat to give two constitutionally isomeric monochlorides of monochlorides of molecular formula, $C_6H_{13}Cl$. What is the most reasonable starting alkane?**
1) n-Hexane 2) 2, 2-dimethyl butane
3) 2, 3-dimethyl butane 4) 3-methyl pentane

28. $(CH_3)_3C-MgCl$ **on reaction with D_2O produces:**
1) $(CH_3)_3CD$ 2) $(CH_3)_3OD$ 3) $(CD_3)_3CD$ 4) $(CD_3)_3OD$

29. **Which one of the following is reduced with zonc and hydrochloride acid to give the corresponding hydrocarbon?**
1) Ethyl acetate 2) Acetic acid 3) Acetamide 4) Butan-2-one

30. **2-Methyl butane on reacting with bromine in the presence of sunlight gives mainly,**
1) 1-bromo-2-methylbutane 2) 2-bromo-2-methylbutane
3) 2-bromo-3-methylbutane 4) 1-bromo-3-methylbutane

31. **The treatment of CH_3MgX with $CH_3-C\equiv C-H$ produces:**
1) CH_4 2) $CH_3HC = CH_2$ 3) $CH_3-C\equiv C-CH_3$ 4) $CH_3HC = CHCH_3$

KEY

1) 3 2) 1 3) 4 4) 4 5) 1 6) 3 7) 2 8) 2 9) 1 10) 1

11) 2 12) 4 13) 3 14) 2 15) 1 16) 4 17) 3 18) 2 19) 4 20) 1

2. SUB TOPIC NAME: ALKENES

1. **Among the alkenes, which one produces tertiary butyl alcohol on acid hydration?**
1) $CH_3CH_2CH = CH_2$ 2) $CH_3CH = CHCH_3$
3) $(CH_3)_2C=CH_2$ 4) $CH_3CH = CH_2$

2. **Ozonolysis of an organic compound gives formaldehyde as one of the products. This confirms the presence of**
1) a vinyl group 2) two ethylenic double bonds
3) an isopropyl group 4) an acetylenic triple bond

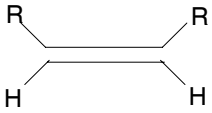
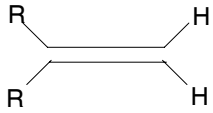
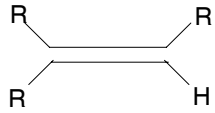
3. **Which of the following reactions will yield 2, 2-dibromo propane?**
1) $H_2C = CHBr + HBr$ 2) $CH_3C\equiv CCH_3+2HBr$
3) $CH_3C\equiv CH+2HBr$ 4) $CH_3CH=CHBr+2HBr$

4. **Which of the following reagents will you choose for the given reaction ?**

$$H_2C = CH_2 + H_2O + O \rightarrow H_2\underset{OH}{\underset{|}{C}} - \underset{OH}{\underset{|}{C}}H_2$$

1) Dil.$KMnO_4$, 273 k
2) Alkaline $KMnO_4$, high temperature
3) Acid and $K_2Cr_2O_7$ at room temperature
4) Acid and $KMnO_4$ at room temperature

5. **Which one of the following alkenes will react faster with H_2 under catalytic hydrogenation condition ?**

1) 
2) 
3) 
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6. **The reaction of propene with HOCl proceeds via the addition of :**

1) H^+ in the first step
2) Cl^+ in the first step
3) OH^- in the first step
4) Cl^+ and ^-OH in the single step

7. **Identify the set of reagents / reaction conditions 'X' and 'Y' in the following set of transformations:**

$$CH_3CH_2CH_2Br \xrightarrow{'X'} \text{Product} \xrightarrow{'Y'} CH_3 - \underset{Br}{\underset{|}{C}}H - CH_3$$

1) X = dilute aqueous NaOH, 20°C, Y = HBr/acetic acid, 20°C
2) X = Conc.alcoholic NaOH, 80°C, Y = HBr/acetic acid, 20°C
3) X = dilute aqueous NaOH, 20°C, Y = Br_2/CCl_3, 0°C
4) X = Conc.alcoholic NaOH, 80°C, Y = $Br_2/CHCl_3$, 0°C

8. **In the presence of peroxide, hydrogen chloride and hydrogen iodide do not give anti–Markounikoff's addition to alkenes because :**

1) both are highly ionic
2) One is oxidizing and other is reducing
3) One of the steps is endothermic in both the cases
4) All the steps are exothermic in both the cases

9. **Which of the following used for the conversion of 2-hexyne into trans-2-hexene?**

1) H_2/Pd / $BaSO_4$
2) H_2, PtO_2
3) $NaBH_4$
4) Li-NH_3 / C_2H_5OH

10. **When 2-butyne is treated with P-$BaSO_4$; the product formed will be :**

1) cis-2-butene
2) trans-2-butene
3) 1-butene
4) 2-hydroxy butane

11. **Reaction of one mole of HBr with one molecule of 1, 3-butadiene at 40°C gives predominantly :**

1) 3-boromo butane under kinetically controlled conditions
2) 1-bromo-2-butene under thermodynamically controlled conditions
3) 3-bromobutene under thermodynamically controlled conditions
4) 1-bromo-2-butene under kinetically controlled conditions

12. **Acid catalyzed hydration of alkenes except ethane leads to the formation of:**

1) Primary alcohol
2) secondary or tertiary alcohol
3) Mixture of primary and secondary alcohols
4) Mixture of secondary and tertiary alcohols

13. **Elimination of bromine from 2-bromo butane results in the formation of:**

1) equimolar mixture of 1 and 2-butene
2) Predominantly-2-butene
3) Predominantly-1-butene
4) Predominantly-2-butyne

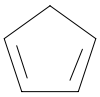
14. **Addition of Br_2 to Z-but-2-ene gives:**
1) (R, R) – 2, 3-di bromobutane only
2) (S, S) – 2, 3-dibromobutane only
3) (R, S) – 2, 3-di bromobutane only
4) a mixture of (R, R) and (S, S)-2, 3-dibromo butanes (50% : 50%)

15. **The Markounikoff's rule is best applicable to the reaction between:**
1) $C_2H_4 + HCl$ 2) $C_3H_6 + Br_2$
3) $C_3H_6 + HBr$ 4) $C_3H_8 + Cl_2$ 5) $C_2H_4 + I_2$

16. **An alkene on reductive ozonolysis gives two molecules of $CH_2(CHO)_2$. The alkene is**
1) 2, 4-hexadiene 2) 1, 3-cyclo hexadiene
3) 1, 4-cyclo hexadiene 4) 1-methyl-1, 3-cyclopentadiene

17. **HBr reacts with $H_2C = CH – OCH_3$ under anhydrous conditions at room temperature to give:**
1) CH_3CHO and CH_3Br 2) $BrCH_2CHO$ and CH_3OH
3) $BrCH_2 – CH_2 – OCH_3$ 4) $H_3C – CHBr – OCH_3$

18. **Reaction of trans-2-phenyl-1-bromo cyclopentane on reaction with alcoholic KOH produces**
1) 4-phenyl cyclopentene 2) 2- phenyl cyclopentene
3) 1- phenyl cyclopentene 4) 3- phenyl cyclopentene

19. **Ozonolysis products of an olefin are OHC – CHO and OHC – CH_2 – CH_2 – CHO, the defin is :**
1)  2)  3)  4) 

20. **A molecule (X) has (i) four sigma bonds formed by the overlap of sp^2 and s orbitals ; (ii) one sigma bond formed by sp^2 and sp^2 orbitals and (iii) one π-bond formed by P_Z and P_Z orbitals which of the following is X ?**
1) C_2H_6 2) C_2H_3Cl 3) $C_2H_2Cl_2$ 4) C_2H_4

21. **Identify 'B' in the following reaction:**
$$H_2C = CH_2 + HCl \xrightarrow{Anhyd.AlCl_3} (A) + 2H \xrightarrow[C_2H_5OH]{Zn-Cu} (B) + HCl$$
1) CH_4 2) C_2H_6 3) C_2H_5Cl 4) C_2H_5OH

22. **Which of the following is the most stable alkene?**
1) $R_2C = CR_2$ 2) RCH = CHR 3) $RCH = CH_2$ 4) $H_2C = CH_2$

23. **Oxidation of 1-butene with hot $KMnO_4$ solution produces:**
1) $CH_3CH_2COOH + HCOOH$ 2) $CH_3CH_2COOH + CO_2$
3) $CH_3COOH + CO_2$ 4) $(CH_3)_2 C = O + CO_2$

24. **One molecule of alkene 'X' on ozonolysis gave one mole of acetone. The IUPAC name of 'X' is**
1) 2-methyl-1-butene 2) 2-methyl-2-butene 3) 2-butene 4) 1-butene

25. **The order of reactivity of the alkenes,**
$(CH_3)_2 C = CH_2$, $CH_3CH = CH_2$, $H_2C = CH_2$
I II III
When subjected to acid catalyzed hydration is
1) I > II > III 2) I > III > II 3) III > II > I 4) II > I > III

26. **Which of the following has lowest boiling point**
1) $CH_3CH_2CH = CH\ CH_3$ 2) $CH_3CH_2CH_2CH_2CH_3$
3) $H_2C = CH - CH_2\ CH - CH_2$ 4) $CH_3 - \underset{\underset{CH_3}{|}}{C} = \underset{\underset{CH_3}{|}}{C} - CH_3$

27. **One mole of a symmetrical alkene on ozonolysis gives two moles of an aldehyde having a molecular mass of 44u. The alkene is**

1) ethane 2) propene 3) 1-butene 4) 2-butene

28. **But-1-ene may be converted to butane by a reaction with**

1) Zn-HCl 2) Sn – HCl 3) Zn – Hg 4) Pd / H_2

29. **The most stable alkene is**

1) $R_2C = CR_2$ 2) RCH = CHR 3) $H_2C = CH_2$ 4) $RCH = CR_2$

30. **An alkene on vigorous oxidation with $KMnO_4$ gives only acetic acid. The alkene is**

1) $CH_3\ CH_2\ CH = CH_2$ 2) $CH_3\ CH = CH\ CH_3$

3) $(CH_3)_2\ C = CH_2$ 4) $CH_3\ CH = CH_2$

31. **In the following sequence of reactions, the alkene affords the compound 'B'**

$CH_3CH = CHCH_3 \xrightarrow{O_3} A \xrightarrow[Zn]{H_2O} B$. The compound 'B' is

1) CH_3CH_2CHO 2) CH_3COCH_3 3) $CH_3CH_2COCH_3$ 4) CH_3CHO

32. **Which one of the following gives, on ozonolysis, both aldehydes and ketones ?**

1) $Me_2C = CHMe$ 2) $Me_2C = CMe_2$

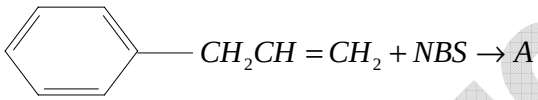
3) $MeCH_2$-C(Me) = CMe_2 4) MeCH(Me) – CH = CH Me

33. 

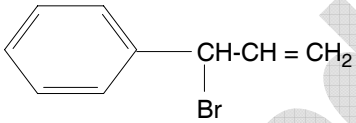
'A' is

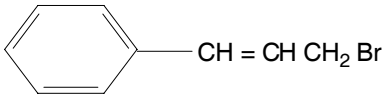
1) mesodiol 2) racemic diol 3) both (a) and (b) 4) ketodiol

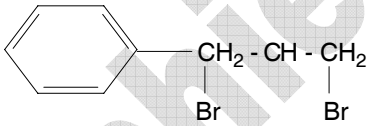
34. **Following compound is treated with NBS**

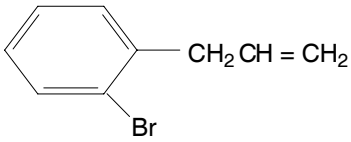


, compound formed 'A' is

1) 

2) 

3) 

4) 

35. **Order of reactivity of C_2H_6, C_2H_4 and C_2H_2 is**

1) $C_2H_6 > C_2H_4 > C_2H_2$ 2) $C_2H_2 > C_2H_6 > C_2H_4$

3) $C_2H_4 > C_2H_2 > C_2H_6$ 4) All are equally reactive

KEY

1) 3	2) 1	3) 3	4) 1	5) 1	6) 2	7) 2	8) 3	9) 4	10) 1
11) 2	12) 2	13) 2	14) 4	15) 3	16) 3	17) 4	18) 4	19) 3	20) 4
21) 2	22) 1	23) 2	24) 2	25) 3	26) 4	27) 4	28) 4	29) 1	30) 2
31) 4	32) 1	33) 1	34) 2	35) 3					

3. SUB TOPIC NAME: ALKYNES

1. **Which compound does not give precipitate with ammonical silver nitrate solution ?**

   1) $C_2H_5-C\equiv CH$ 2) $CH_3-C\equiv C-CH_3$

   3) $CH_3-C\equiv \overset{CH_3}{\overset{|}{C}}\ H-C\equiv CH$ 4) $Ph-CH_2-C\equiv CH$

2. **The treatment of CH_3MgX with $CH_3C\equiv CH$ produces**

   1) $CH_3-CH=CH_2$ 2) $CH_3C\equiv CCH_3$ 3) $CH_3-\overset{H}{\overset{|}{C}}=\overset{H}{\overset{|}{C}}-CH_3$ 4) CH_4

3. **What are X and Y respectively in the following reaction ?**

   Z-product $\xleftarrow{Y}$ 2-butyne $\xrightarrow{X}$ E-product

   1) Na/NH_3 (liq) and $Pd/BaSO_4 + H_2$ 2) Ni / 140°C and $Pd/BaSO_4 + H_2$

   3)Ni / 140°C and Na/NH_3 (liq) 4) Pd / $BaSO_4 + H_2$ and Na/NH_3 (liq)

4. **In the following reaction,** $C_2H_2 \xrightarrow[HgSO_4/H_2SO_4]{H_2O} X$ CH_3CHO**, what is 'X' ?**

   1) CH_3CH_2OH 2) CH_3-O-CH_3 3) CH_3CH_2CHO 4) $CH_2=CHOH$

5. **What is the product formed when acetylene reacts with hypochlorous acid ?**

   1) CH_3COCl 2) $ClCH_2CHO$ 3) Cl_2CHCHO 4) $ClCH_2COOH$

6. $CH_3-CH_2-C\equiv CH \xrightarrow[H_2SO_4]{HgSO_4} A$ **the compound 'A' is**

   1) $CH_3-CH_2-\overset{O}{\overset{\|}{C}}-CH_3$ 2) $CH_3-CH_2-CH_2-CHO$

   3) $CH_3-CH_2-CH_2-COOH$ 4) $CH_3-\overset{O}{\overset{\|}{C}}-CH_3$

7. **Which of the following organic compounds exhibit acidic character?**

   1) $H_3C-C\equiv CH$ 2) $H_3C-C\equiv C-CH_3$ 3) $H_2C=CH_2$ 4) H_3C-CH_3

8. **Identify the alkyne in the following sequence of reactions**

   Alkyne $\xrightarrow[Lindlar's\ catalyst]{H_2}(A)\xrightarrow{Ozonolysis}(B)_{only}\xleftarrow{\text{Wacker Process}} H_2C=CH_2$

   1) $H_3C-C\equiv C-CH_3$ 2) $H_3C-CH_2-C\equiv CH$

   3) $H_2C=CH-C\equiv CH$ 4) $HC\equiv C-CH_2-C\equiv CH$

9. **The reagent (s) for the following conversion**

   Is / are

   1) Alcoholic KOH 2) alcoholic KOH followed by $NaNH_2$

   3) aqueous KOH followed by $NaNH_2$ 4) Zn / CH_3OH

10. **In the reactions (B)** $\xleftarrow[H_2]{Lindlars\ catalyst} R-C\equiv C-R \xrightarrow{Na/NH_3}(A)$

    (A) and (B) are geometrical isomers. Then

    1) 'A' is cis and 'B' is trans 2) 'A'n is trans and 'B' is cis

    3) 'A' and 'B' is cis 4) 'A' and 'B' are trans

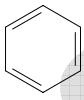
11. $CaC_2 + H_2O \rightarrow (X) \xrightarrow{O_3/H_2O} HCOOH$ **, (X) is**

    1) C_2H_2 2) C_2H_4 3) C_2H_6 4) Ca $(OH)_2$

12. **The number of possible alkynes with molecular formula C_5H_8 is**
1) 6 2) 5 3) 4 4) 3

13. **The decreasing order of acidic character among ethene (I), ethane (II), ethyne (III) and propyne (IV) is**
1) I > II > III > IV 2) II > III > I > IV 3) III > IV > II > I 4) IV > III > II > I

14. **A hydrocarbon of molecular formula, C_6H_{10} reacts with sodamide and the same on ozonolysis followed by hydrogen peroxide oxidation gives two molecules of carboxylic acids, one being optically active. Then the hydrocarbon may be**
1) 1-hexyne 2) 2- hexyne 3) 3- hexyne 4) 3-methyl-1-pentyne

15. **Acetylene contains same degrees of unsaturation as**
1)  2)  3)  4) 

16. **Propyne and propene can be distinguished by**
1) Conc. H_2SO_4 2) Br_2 in CCl_4 3) $AgNO_3$ in ammonia 4) dil.$KMnO_4$

17. **Two organic compounds X and Y on analysis give the same percentage composition, namely C = $\left(\frac{12}{13}\right)\times 100\%$ and H = $\left(\frac{1}{3}\right)\times 100\%$. However, compound 'X' decolourises bromine water while compound 'X' does not. Two compounds 'X' and 'Y' may be respectively**
1) ethylene and benzene 2) acetylene and benzene
3) toluene and benzene 4) benzene and styrene

18. **Addition of HOCl to ethyne gives**
1) ethyl chloride 2) vinyl chloride
3) dichloro acetaldehyde 4) ethylidene chloride

19. **The end product of the following sequence of operation is**
$$CaC_2 \xrightarrow{H_2O} A \xrightarrow[HgSO_4]{H_2SO_4} B \xrightarrow[LiAlH_4]{H} C$$
1) Methyl alcohol 2) ethyl alcohol 3) acetaldehyde 4) ethylene

20. **The name of the poisonous gas formed by the interaction of acetylene and arsenictrichloride is**
1) Lewisite 2) Phosgene 3) Westron 4) Mustard gas

21. **A metallic carbide on treatment with water gives a colourless gas which burns readily in air and gives a precipitate with ammonical silver nitrate solution. The gas evolved is**
1) CH_4 2) C_2H_6 3) C_2H_4 4) C_2H_2

KEY

1) 2 2) 4 3) 1 4) 4 5) 3 6) 1 7) 1 8) 1 9) 2 10) 2

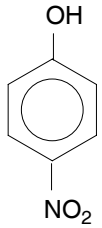
11) 1 12) 4 13) 3 14) 4 15) 2 16) 3 17) 2 18) 2 19) 2 20) 1

21) 4

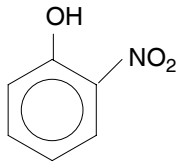
4. SUB TOPIC NAME: BENZENE

1. **Which one of the following statements is wrong?**
   1) Aromatic compounds are richer in carbon content
   2) Aromatic compounds burn with smoky flame
   3) Aromatic compounds are generally unstable
   4) Aromatic compounds show substitution reactions
2. **The C-C-C bond angle in benzene is**
   1) 90° 2) 60° 3) 109° 4) 120°
3. **The decreasing order of reactivity towards electrophilic substitution reaction of the following compounds benzene, chlorobenzene, nitrobenzene, toluene is**
   1 2 3 4
   1) 1 > 3 > 4 > 2 2) 4 > 1 > 3 > 2 3) 4 > 1 > 2 > 3 4) 4 > 2 > 1 > 3
4. **The nitro group in nitrobenzene is**
   1) Ortho – directing 2) meta – directing
   3) para- directing 4) Ortho – and para – directing
5. **The function of anhydrous aluminium chloride in the Friedal – Crafts reaction is**
   1) To absorb water 2) to absorb hydrochloric acid
   3) To produce an electrophile 4) to produce nucleophile
6. **Chlorination of benzene in the presence of halogen carrier is an example of:**
   1) Aromatic nucleophilic substitution 2) aromatic electrophilic substitution
   3) Aromatic nucleophilic addition 4) aromatic electrophilic addition
7. **In the nitration of benzene with a mixture of conc.HNO_3 and conc.H_2SO_4, the active species involved in**
   1) NO_3^- 2) NO_2 3) NO_2^- 4) NO_2^+
8. **In the sulphonation of benzene, the electrophile involved is:**
   1) HSO_4^- 2) SO_3 3) SO_2 4) SO_4^{2-}
9. **The reaction of chlorine with toluene in presence of ferric chloride gives predominantly**
   1) Benzoyl chloride 2) m-chlorotoluene
   3) Benzyl chloride 4) o-and p-chlorotoluene
10. **Given are cyclohexanol (I), acetic acid (II), 2, 4, 6-trinitrophenol (III) and phenol (IV). In these the order of decreasing acidic character will be**
    1) III > II > IV > I 2) II > III > I > IV 3) II > III > IV > I 4) III > IV > II > I
11. **Which of the following acids is strongest?**
    1) $C_6H_5SO_3H$ 2) CH_3COOH 3) C_6H_5COOH 4) $(COOH)_2$
12. **The substitutent which is predominantly ortho-para directing but deactivating in aromatic electrophilic substitution:**
    1) $–NO_2$ 2) –OH 3) $–OCH_3$ 4) – Cl

13. **Out of the given two compounds, the vapour pressure of (B) at a particular temperature is**



(A)



(B)

1) Same as that (A)
2) 2) Lower than that of (A)
3) Higher than that of (A)
4) Higher or lower than (A) depending on the size of the vessel

14. **Chlorination of toluene in presence of light and heat followed by treatment with aqueous NaOH gives**

1) O-cresol 2) p-cresol 3) 2: 4 dihydroxy toluene 4) benzoic acid

15. **Which of the following is most reactive towards electrophilic substitution reaction?**

1) Aniline 2) Nitrobenzene 3) Benzoic acid 4) Acetanilide

16. **Which of the following statements are correct with respect to the effect of trifluoromethyl group (-CF_3) on an electrophilic aromatic substitution?**

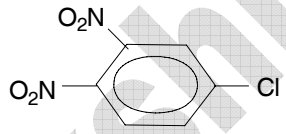
a) The CF_3 group will deactivate the ring
b) The CF_3 group will activate the ring
c) The CF_3 group will be an O- and P-director
d) The CF_3 group will be a meta-director

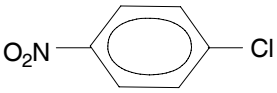
1) a and b 2) a and d 3) a and c 4) b and c

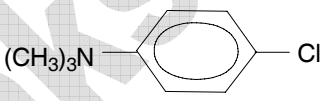
17. **According to Huckel rules an aromatic compound must process:**

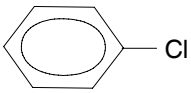
1) $(4n+1)\pi$ Electrons 2) $(4n+2)\pi$ electrons
3) $(2n+2)\pi$ Electrons 4) (2) and (3)

18. **Which chloroderivative of benzene among the following would undergo hydrolysis most readily with aqueous NaOH to furnish the corresponding hydroxy compound ?**

1) 

2) 

3) 

4) 

19. **According to Huckel rule, the number of Pi electrons in naphthalene is**

1) 6 2) 10 3) 14 4) 16

20. **Most stable carbocation ion is**

1) p – NO_2 – C_6H_4 – $\overset{+}{C}H_2$ 2) $C_6H_5\overset{+}{C}H_2$
3) p – Cl – C_6H_4 – $\overset{+}{C}H_2$ 4) p – CH_3O – C_6H_4 – $\overset{+}{C}H_2$

21. **The most suitable method of separation of a equal (1: 1) mixture of o- and p – nitro phenols is**

1) Sublimation 2) Crystallisation 3) Chromatography 4) Distillation

22. **The reagent (s) which can be used to distinguish acetophenone from benzophenone is (are) :**

1) 2, 4 – dinitrophenyl hydrazine 2) Bendicts reagent

3) I_2 and Na_2CO_3 4) Aqueous solution of $NaHSO_3$

23. **Among the following four compounds**

I) Phenol II) Methyl phenol III) m-Nitrophenol IV) p-Nitrophenol

The acidity order is

1) IV > III > I > II 2) III > IV > I > II 3) I > IV > III > II 4) II > II > III > IV

24. **When nitrobenzene is treated with Br_2 in presence of $FeBr_3$, the major product formed is m-bromo-nitrobenzene, statement which is related to obtain the m-isomer is**

1) The electron density on meta carbon is more than that of ortho and para positions

2) Loss of aromaticity when Brt attacks at the Ortho and Para positions and not at meta positions.

3) Easier loss of H^+ to region aromaticity from the meta position than from ortho and para positions.

4) None of the above

25. **In the following groups**

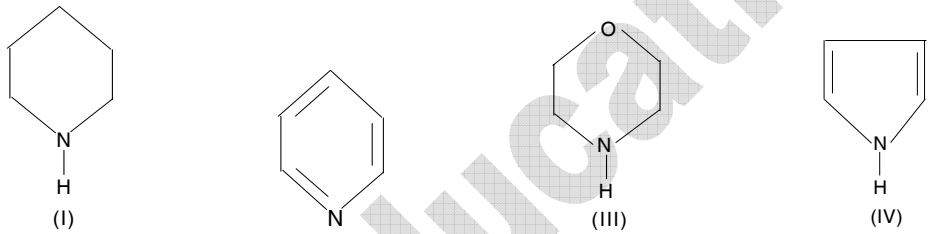
-OAc, -OMe, $-OSO_2Me$, $-SO_2CF_3$

(I) (II) (III) (IV)

The order of leaving group ability is

1) I > II > III > IV 2) IV > III > I > II 3) III > II > I > IV 4) II > III > IV > I

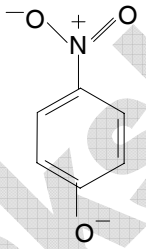
26. **In the following compounds**

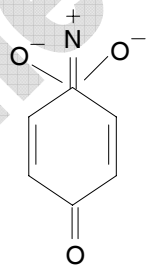


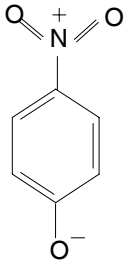
The order of basicity is :

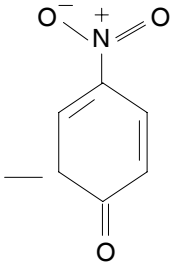
1) IV > I > III > II 2) III > I > IV > II 3) II > I > III > IV 4) I > III > II > IV

27. **The most unlikely representation of resonance structures of p-nitrophenoxide ion is**

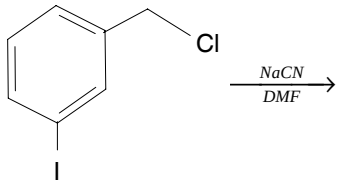
1) 

2) 

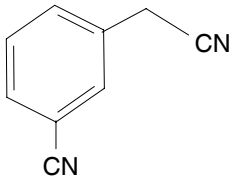
3) 

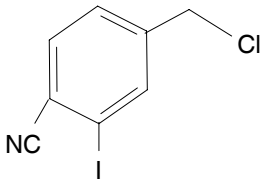
4) 

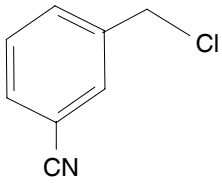
28. **The structure of the major product formed in the following reaction**

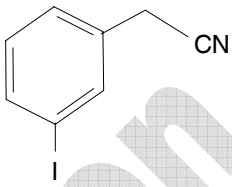


is :

1) 

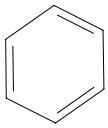
2) 

3) 

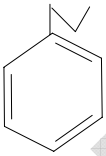
4) 

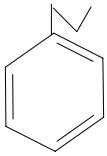
29. **The strongest ortho-para and strongest meta-directing groups respectively are :**

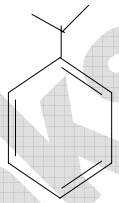
1) $-NO_2$ and $-NH_2$
2) $-NH_2$ and $-CoNH_2$
3) $-CoNH_2$ and $-NH_2$
4) $-NH_2$ and $-NO_2$

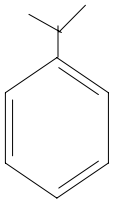
30. 

The major products P and Q are

1)  and $CH_3\ CH_2\ CHO$

2)  and $CH_3\ CH_2\ CHO$

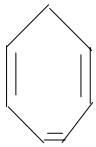
3)  and $CH_3\ CH_2\ CHO$

4)  and $CH_3\ Co\ CH_3$

31. **Presence of a nitro group in a benzene ring**

1) Deactivates the ring towards electrophilic substitution
2) Activates the ring towards electrophilic substitution
3) Renders the ring basic
4) Deactivates the ring towards nucleophilic substitution

32. **Pickout the wrong statement**

1) Toluene shows resonance 2)  is non-aromatic

3) The hybrid state of carbon in carbonyl group is sp^2

4) Dipole moment of vinyl chloride is less than that of methyl chloride.

33. **Toluene is nitrated and the resulting product is reduced with tin and hydrochloric acid. The product so obtained is diazotized and then heated with cuprous bromide. The reaction mixture so formed contains a :**

1) Mixture of o-and m-bromo toluenes 2) mixture of o-and p-bromo toluenes

3) Mixture of o-and p-dibromo benzenes 4) mixture of o-and p-bromo anilines

34. **Fluoro bezene (C_6H_5F) can be synthesized in the laboratory:**

1) by heating phenol with HF and KF

2) from aniline by diazotization followed by heating the diazonium salt with HBF_4

3) by direct fluorination of benzene with F_2 gas

4) by reacting bromobenzene with NaF solution

35. **Phenyl magnesium bromide reacts with methanol to give:**

1) a mixture of anisole and Mg(OH)Br 2) a mixture of benzene and Mg(OMe)Br

3) a mixture of toulene and Mg(OH)Br 4) a mixture of phenol and Mg(Me)Br

KEY

1) 3	2) 4	3) 3	4) 2	5) 3	6) 2	7) 4	8) 2	9) 4	10) 1
11) 1	12) 4	13) 3	14) 4	15) 1	16) 2	17) 2	18) 1	19) 2	20) 2
21) 4	22) 3	23) 1	24) 1	25) 2	26) 4	27) 3	28) 4	29) 4	30) 4