Exercise-1

Marked questions are recommended for Revision.

PART - I : SUBJECTIVE QUESTIONS

Section (A) : Degree of unsaturation and catalytic hydrogenation

A-1. Calculate the DU of following compounds :
(i) C_6H_6ClBrO (ii) C_5H_9N

A-2. How many structural isomeric alkenes on hydrogenation give n-Pentane.

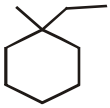
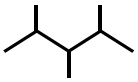
A-3. On catalytic hydrogenation how many isomeric alkene will give 2-Methyl butane.

A-4. How many isomeric alkyne on hydrogenation gives 3, 3-Dimethylhexane.

Section (B) : Monochloroination & ozonolysis reactions

B-1. A cycloalkane having molecular mass 84 and four secondary carbon atoms will form four monochloro structure isomers on chlorination. Identify the structure of cycloalkane.

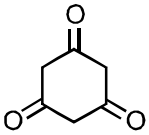
B-2. Number of monochloro structural isomers of :

(i)  $\xrightarrow{Cl_2/h\nu}$ (ii)  $\xrightarrow{Cl_2/h\nu}$

B-3. Write the product of following reactions :

(a) $CH_3-\overset{H_3C}{\overset{|}{C}}=\overset{CH_3}{\overset{|}{C}}-CH_3 \xrightarrow[Zn/H_2O]{O_3}$ (b) $CH_3–C\equiv C–CH_3 \xrightarrow[Zn/H_2O]{O_3}$

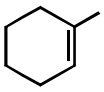
(c) $CH_3–C\equiv C–CH_3 \xrightarrow{O_3/H_2O_2}$ (d) $CH_3-\overset{CH_3}{\overset{|}{C}}=CH-CH_3 \xrightarrow{O_3/H_2O_2}$

B-4. (i) P(hydrocarbon) $\xrightarrow[H_2O]{O_3/Zn}$  + $CH_2=O$

(ii) Q (C_6H_{10}) $\xrightarrow[H_2O]{O_3/Zn}$ Hexane-1,6-dial

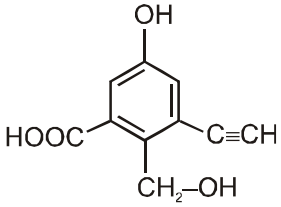
Write the structure of P and Q.

B-5. Write the product of following reactions :

(i) $CH_3–C\equiv C–CH=CH_2 \xrightarrow{O_3/H_2O_2}$ (ii)  $\xrightarrow{O_3/H_2O_2}$

Section (C) : Test for acidic hydrogen & unsaturation

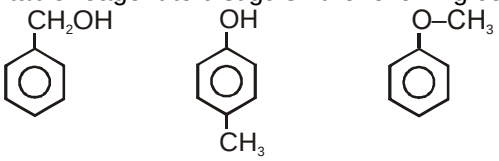
C-1. No. of moles of H_2 gas evolved when one mole of the following compound reacts with sodium.



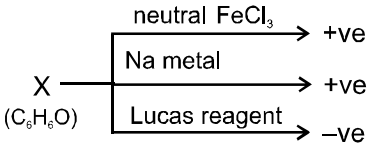
C-2. Molecular formula C_4H_6 have two position isomers A and B. Both A and B isomer decolourised the bromine water. B release H_2 gas with sodium metal but isomer A does not release H_2 gas. Write IUPAC name of A and B.

Section (D) : Test for functional groups

D-1. Write suitable reagent to distiguish the following compounds.



D-2.

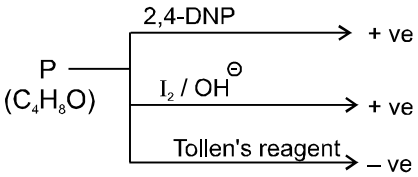


Identify the structure of X :

D-3. A compound X ($C_5H_{10}O$) reacts with 2,4-DNP but does not give silver mirror test and Iodoform reaction . The possible structure for X is :

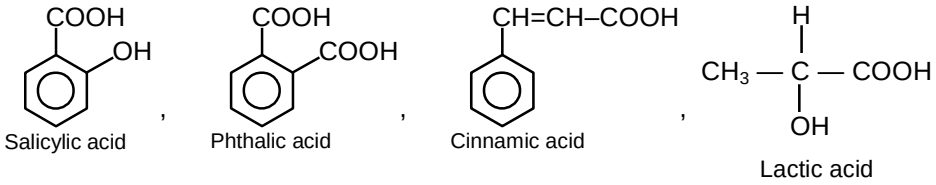
D-4. Which of the following compounds will not give positive iodoform test.
Acetophenone, Benzophenone, 2-Pentanone, 3-Pentanone, Acetaldehyde,
CH_3COCH_3, $(CH_3)_2CHOH$, $(CH_3CH_2)_2CH\text{-}OH$, CH_3COOH, CH_3CONH_2, CH_3COOCH_3, CH_3COCl

D-5.



Identify the structure of P :

D-6. Which of the following compound will gives positive test with $NaHCO_3$?

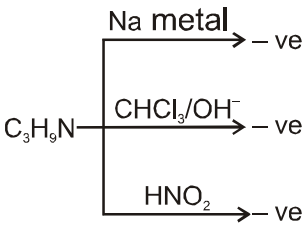


CH_3COOH, $PhSO_3H$, $PhOH$

D-7. Molecular formula $C_3H_6O_2$ have two structures A & B. Structure A releases CO_2 gas with $NaHCO_3$ but B does not. Compound B is fruity smelling liquid. Write the structures & IUPAC name of A and B.

D-8. A symmetrical organic compound of $C_4H_{11}N$ give yellow oily layer on treatment with HNO_2 then find the structure of the compound.

D-9.



Identify the structure of amine.

Section (E) : Elements detection

E-1. When Lassiange extract of Methylamine react with $FeSO_4$/dilute H_2SO_4 what happend ?

E-2. Explain the reason for the fusion of an organic compound with metallic sodium for testing nitrogen, sulphur and halogen.

E-3. What will happen during lassaigne's test for nitrogen if the compound also contians sulphur?

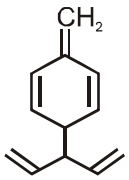
PART - II : ONLY ONE OPTION CORRECT TYPE

Section (A) : Degree of unsaturation and catalytic hydrogenation

A-1. The degree of unsaturation of following compound $C_8H_{12}O$, C_3H_5N, C_4H_8O are respectively :
(A) 4, 3, 2 (B) 3, 2, 1 (C) 2, 1, 3 (D) 2, 2, 3

A-2. Which of the following hydrocarbons give same product on hydrogenation.
(A) 2-Methyl hex-1-ene & 3-Methyl hex-3-ene
(B) 3-Ethyl hex-1-en-4-yne & 2-Methylhept-2-en-4-yne
(C) 3-Ethylcycloprop-1-ene & 1,2-Dimethylcycloprop-1-ene
(D) 2-Methylbut-2-ene & 3-Methylbut-1-ene

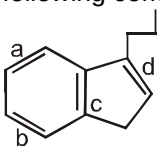
A-3. Number of moles of hydrogen will required for complete hydrogenation of one mole of following compound :



(A) 6 (B) 7 (C) 5 (D) 3

A-4. How many alkenes on catalytic hydrogenation give isopentane as a product (consider only structural isomers)?
(A) 2 (B) 3 (C) 4 (D) 5

A-5. If 1 mole H_2 is reacted with 1 mole of the following compound.



Which double bond will be hydrogenated ?
(A) c (B) b (C) a (D) d

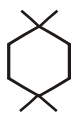
Section (B) : Monochloroination & ozonolysis reactions

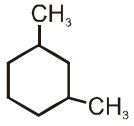
B-1. Only two isomeric monochloro derivatives are possible for :-
(A) n-Pentane (B) 2,4-Dimethyl pentane
(C) Toluene (D) 2,3-Dimethyl butane

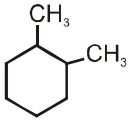
B-2. The number of possible monochloro derivatives of 2, 2, 3, 3-Tetramethylbutane is -
(A) 2 (B) 3 (C) 4 (D) 1

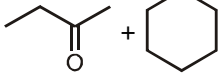
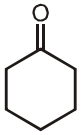
B-3. Which of the following alkene gives four monochloro (structural isomer) products after hydrogenation ?
(A) Pent-2-ene (B) 2-Methylbut-2-ene
(C) 3-Methylhex-2-ene (D) 2, 3-Dimethylbut-2-ene

B-4. Which of the following compound will give four monochloro (structural) product on monochlorination.

(A) 
(B) 

(C) 

(D) 

B-5. X $\xrightarrow{O_3 / Zn}$  + 

$\xrightarrow{H_2/Ni}$ Y.

The IUPAC name of compound Y is :
(A) 2-Cyclohexylbutane (B) 1-Methylpropylcyclohexane
(C) Butylcyclohexane (D) 1-Cyclohexylbutane

B-6. An alkene give two moles of HCHO, one mole of CO_2 and one mole of $CH_3-\underset{\underset{O}{\|}}{C}-CHO$ on ozonolysis. What is its structure?

(A) $CH_2=CH-\underset{\underset{CH_3}{|}}{CH}-CH=CH_2$ (B) $CH_2=C=CH-\underset{\underset{CH_2}{\|}}{C}-CH_3$

(C) $CH_3-\underset{\underset{CH_3}{|}}{C}=CH-CH=CH_2$ (D) $CH_2=C=CH-\underset{\underset{CH_3}{|}}{CH}-CH=CH_2$

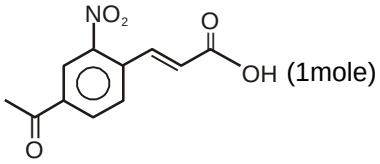
B-7. An unknown compound on ozonolysis to give acid $C_3H_6O_2$ and a ketone C_4H_8O. From this information, identifiy structure of unknown compound.

(A) $(CH_3)_2C=CHCH_2-CH_2CH_3$ (B) $CH_3CH_2-\underset{\underset{CH_3}{|}}{C}=CHCH_2CH_3$

(C) $(CH_3)_2CHCH=CHCH_2CH_3$ (D) $CH_3CH_2CH_2CH=CHCH_2CH_3$

Section (C) : Test for acidic hydrogen & unsaturation

C-1. When one mole of the given compound reacts with sodium metal then how many moles of H_2 gas will release?



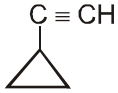
(1mole)

(A) 1 mole (B) 1.5 mole (C) 2 mole (D) 0.5 mole

C-2. C_4H_6 (X) → Br_2/H_2O → +ve test; Bayer's reagent → +ve test; Na metal → +ve test

Compound X is

(A) $H_3C-C\equiv C-CH_3$ (B) $CH_2=CH-CH=CH_2$

(C) $CH_3-CH_2-C\equiv CH$ (D) 

C-3. C_6H_{10} (X) → Br_2 / H_2O → + ve; O_3 / H_2O_2 → CH_3CH_2COOH

Identify X :

(A) $CH_3-CH_2-C\equiv C-CH_2-CH_3$ (B) $CH_3-C\equiv C-CH_2-CH_2-CH_3$

(C)  (D) 

C-4. Ammonical $AgNO_3$ gives white ppt after reaction with any compound then this reflects the presence of

(A) One –CHO group (B) One triple bond

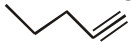
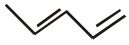
(C) A terminal alkyne (D) Compound is unsaturated

C-5. Which of the following compound gives red ppt with Cu_2Cl_2 / NH_4OH ?

(A) $CH_3-C\equiv C-CH_3$ (B) $CH_3-CH_2-C\equiv CH$

(C) $CH_3-CH_2-CH=CH_2$ (D) $CH_3-C\equiv C-CH=CH_2$

C-6. Identify the hydrocarbon having molecular formula C_5H_6 which gives white ppt with ammonical $AgNO_3$?

(A)  (B)  (C)  (D) 

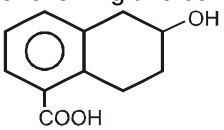
Section (D) : Test for functional groups

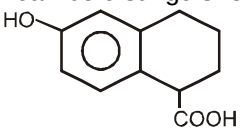
D-1. The group reagent for the test of alcohols is :

(A) Cerric ammonium nitrate (B) Schiff's reagent

(C) Molisch's reagent (D) Bromine water

D-2. The following two compounds I and II can be distinguished by using reagent

(I) 

(II) 

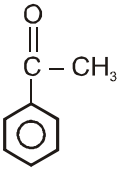
(a) aq. $NaHCO_3$ (b) Neutral $FeCl_3$

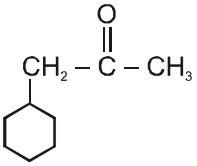
(c) Blue litmus solution (d) Na metal

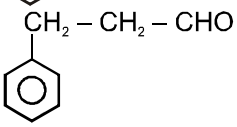
(e) $HCl/ZnCl_2$ anhydrous

(A) a or c (B) b or e (C) d or e (D) c or d

D-3. Which of the following compound will not react with I_2 /OH^-.

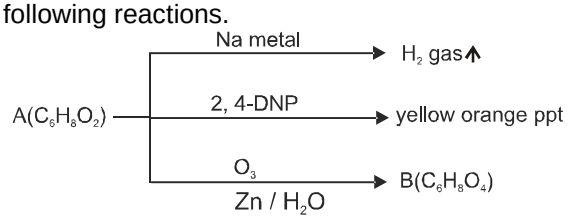
(A) 

(B) 

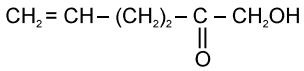
(C) 

(D) CH_3–CHO

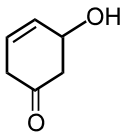
D-4. The compound A gives following reactions.

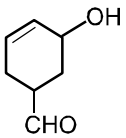


Its structure can be

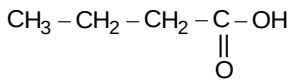
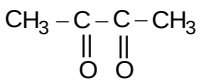
(A) 

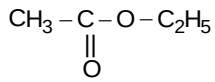
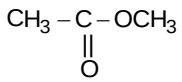
(B) OHC–$(CH_2)_2$–CH=CH–COOH

(C) 

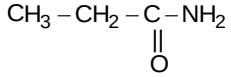
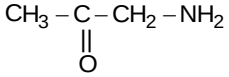
(D) 

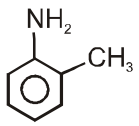
D-5. An oragnic compound X ($C_4H_8O_2$) gives positive test with NaOH and Phenopthalein. Structure of X will be :

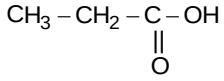
(A)  (B) 

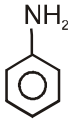
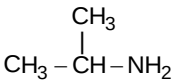
(C)  (D) 

D-6. Which of the following compound will give smell of NH_3 with conc. NaOH.

(A)  (B) 

(C) 

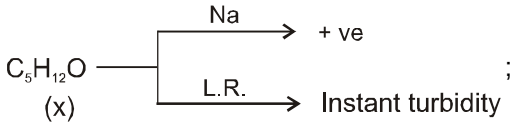
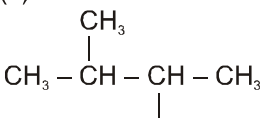
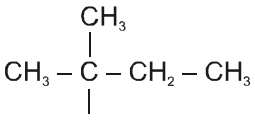
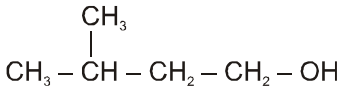
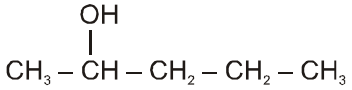
(D) 

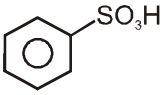
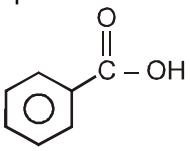
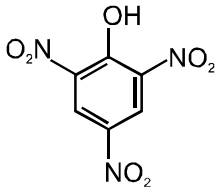
D-7. Which of the following will not give positive test with $CHCl_3$ / KOH.
(A) $CH_3–CH_2–NH–CH_3$ (B) $CH_3–CH_2–CH_2–NH_2$
(C)  (D) 

D-8. A positive carbylamine test is given by :
(A) N,N-dimethylaniline (B) 2, 4-dimethylaniline
(C) N-methyl-o-methylaniline (D) N-methylaniline

D-9. The Hinsberg's method is used for :
(A) preparation of primary amines (B) preparation of secondary amines
(C) preparation of tertiary amines (D) separation of amine mixtures

D-10. Molisch reagent is used to identify following compound ?
(A) Glucose (B) Raffinose (C) D-oxyribose (D) All of these

D-11.  ; Identify X :
(A)  (B) 
(C)  (D) 

D-12. Which of the following would produce effervescence with sodium bicarbonate?
(A)  (B)  (C)  (D) All of these

D-13. A compound is heated with zinc dust and ammonium chloride followed by addition of the Tollen's reagent. Formation of silver mirror indicates the presence of following group
(A) –CHO (B)  (C) $–NO_2$ (D) $–NH_2$

Section (E) : Elements detection

E-1. In the Lassaigne's test, one of the organic compounds gave red colour with $FeCl_3$. Compound can be :
(A) Na_2S (B) NH_2CSNH_2 (C) C_6H_5Cl (D) NaCN

E-2. Lassaigne's test is used in qualitative analysis to detect
(A) Nitrogen (B) Sulphur (C) Chlorine (D) All of these

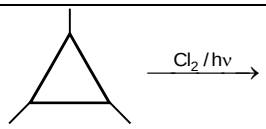
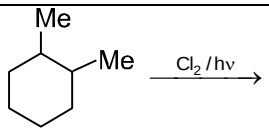
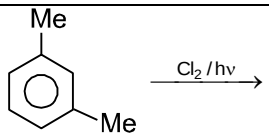
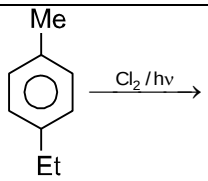
E-3. The compound that does not give a blue colour in Lassaigne's test is
(A) $C_6H_5–NH_2$ (B) CH_3CONH_2 (C) $NH_2–NH_2$ (D) $C_6H_5–NO_2$

E-4. Nitrogen containing organic compound when fused with sodium metal forms:
(A) $NaNO_2$ (B) NaCN (C) $NaNH_2$ (D) NaNC

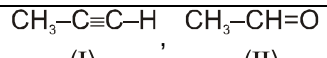
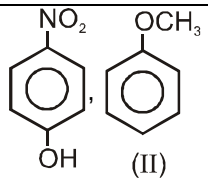
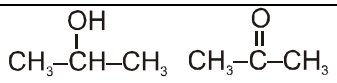
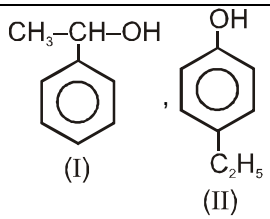
E-5. The sodium extract of an organic compound on acidification with acetic acid and addition of lead acetate solution gives a black precipitate. The organic compound contains
(A) Nitrogen (B) Halogen (C) Sulphur (D) Phosphorus

PART - III : MATCH THE COLUMN

1. Match the column :

	Column – I (Compound)		**Column - II (No. of monochloro structural product)**
(A)		(p)	= 1
(B)		(q)	= 2
(C)		(r)	= 3
(D)		(s)	= 4

2. Match the compounds of column-I with the reagent of column-II, which can distinguish between the compounds of column-I.

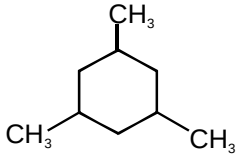
	Column-I		**Column-II**
(A)	 (I) , (II)	(p)	Tollen's reagent
(B)	 (I) (II)	(q)	I_2/NaOH
(C)	 (I) , (II)	(r)	Lucas reagent
(D)	 (I) (II)	(s)	Neutral $FeCl_3$
		(t)	2, 4-DNP

Exercise-2

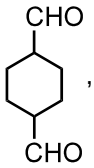
Marked questions are recommended for Revision.

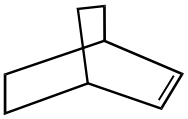
PART - I : ONLY ONE OPTION CORRECT TYPE

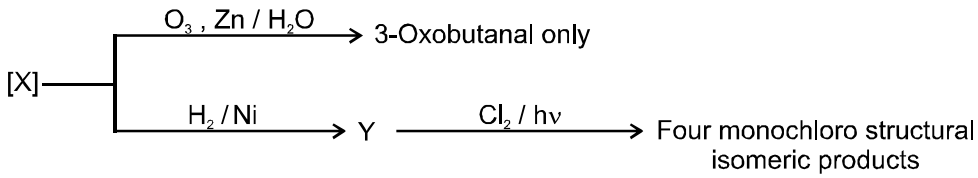
1. How many products (structural isomers only) are formed by monochlorination of given compound.



(A) 4 (B) 3 (C) 5 (D) 6

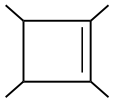
2. An alkene (A) $\xrightarrow{\text{Ozonolysis}}$  , A is :

(A)  (B)  (C)  (D) 

3. 

Compound 'X' is :
(A) 1-Methylcyclopropene (B) 1, 4-Dimethylcyclohexa-1,4-diene
(C) 1, 4-Dimethylcyclohexa-1,3-diene (D) 1, 2-Dimethylcyclohexa-1,4-diene

4. The chemical reactions of an unsaturated compound 'M' are given below. Determine the possible structural formula of 'M'

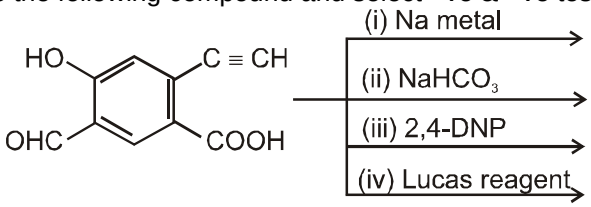
(A)  (B)  (C)  (D) 

5. Red precipitate $\xleftarrow[NH_4OH]{Cu_2Cl_2}$ P(C_5H_8) $\xrightarrow{\text{Ozonolysis}}$ 2-Methylpropanoic acid + compound (Q)

structure of P can be -
(A) $CH_3–CH_2–CH_2–C\equiv CH$ (B) $CH_3–\underset{\displaystyle CH_3}{\underset{|}{CH}}–C\equiv CH$
(C) $CH_3C\equiv C–CH_2–CH_3$ (D) $CH_3–\underset{\displaystyle CH_3}{\underset{|}{CH}}–CH=CH_2$

6. Compound A(C_3H_5N) gives precipitate with Tollen's reagent and H_2 gas is also evolved on addition of Li metal. Compound A can be :
(A) $CH_3–CH_2–C\equiv N$ (B) $H–C\equiv C–NH–CH_3$
(C) $CH_3–CH_2–N\overset{+}{\equiv}C$ (D) $CH_2=C=N–CH_3$

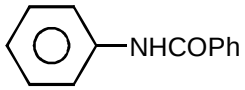
7. Observe the following compound and select +ve & –ve test respectively.

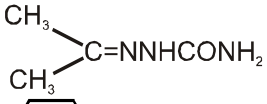


(A) + + + – (B) + + + + (C) + – + – (D) + – – +

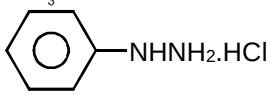
8. Which of the following amine does not react with Hinsberg's reagent ?
(A) $CH_3CH_2NH_2$ (B) $(CH_3CH_2)_2NH$ (C) $(CH_3CH_2)_3N$ (D) All of these

9. Lassaigne's test for the detection of nitrogen will fail in the case of

(A) 

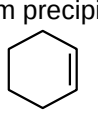
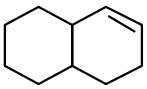
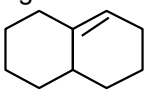
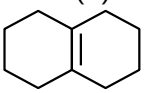
(B) 

(C) $NH_2–NH_2.HCl$

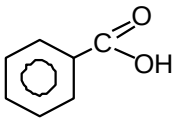
(D) 

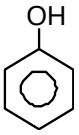
10. The sodium extract of an organic compound on treatment with $FeSO_4$ solution, $FeCl_3$ and HCl gives red solution. The Red colour of :
(A) $Fe(CN)_3$ (B) $K_4[Fe(CN)_6]_3$ (C) $Fe(CNS)_3$ (D) Fe_2S

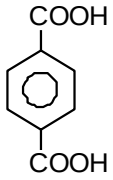
11. A unsaturated hydrocarbon (P) on reductive ozonolysis produces a dicarbonyl compound (Q). (Q) can form precipitate with 2, 4-DNP but no with Tollen's reagent. Identify the structure of (P).

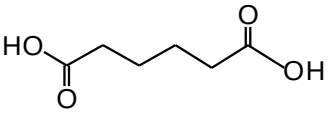
(A)  (B)  (C)  (D) 

12. An organic compound with 68.9% of C and 4.92% of H, is aromatic and gives CO_2 with $NaHCO_3$. The organic compound is :

(A) 

(B) 

(C) 

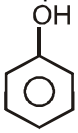
(D) 

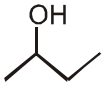
PART - II : SINGLE AND DOUBLE VALUE INTEGER TYPE

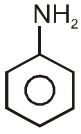
1. How many isomeric alkynes on catalytic hydrogenation gives 3-Ethyl-4-methylheptane ?

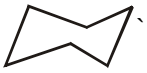
2. Find the number of structural isomers of fully saturated cycloalkane of molecular formulae C_6H_{12} which give three monochloro structural products.

3. How many of the following compounds decolorise Br_2 water solution ?

(I)  (II) 

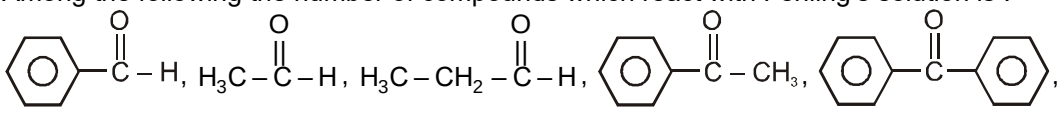
(III) Me–C≡C–Me (IV) 

(V) 

(VII)  (VIII) Me–CH=CH–Et (IX) 

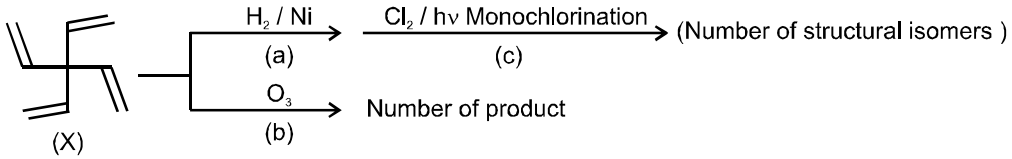
4. How many structures possible for a compound with the molecular formula $C_6H_{12}O$ which can give positive iodoform and 2,4-DNP test.

5. Among the following the number of compounds which react with Fehling's solution is :



HCHO, HCOOH, CH_3COCH_3.

6.



Calculate sum of number of products formed in the reaction a, b and c.

7. How many no. of active Hydrogen atoms are present in a compound (mol.mass 90) 0.45 g of which when treated with Na metal liberates 112 ml of the H_2 gas at STP.

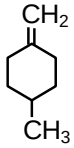
8. In the Lassaigne's test, one of the organic compound X gives blood red colour with $FeCl_3$. Compound X, when fused with sodium metal forms compound Y. Molecular mass of compound Y is

PART - III : ONE OR MORE THAN ONE OPTIONS CORRECT TYPE

1. Which of the following compound is/are react with Na metal & liberate hydrogen gas.

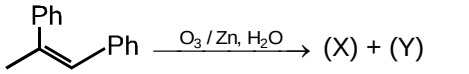
(A) CH_3–OH (B) CH_3–C≡CH (C) Ph–OH (D) 

2. Which of the following compound gives 1,4-Dimethyl cyclohexane when undergo catalytic hydrogenation.

(A)  (B)  (C)  (D) 

3. Which of the following will perform iodoform reaction with I_2/OH^- ?

(A) $CH_3COCH_2CH_3$ (B) CH_3CONH_2 (C) $C_6H_5COCH_3$ (D) CH_3CHO

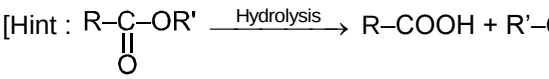
4. 

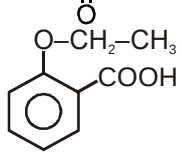
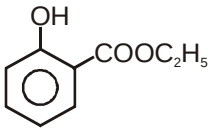
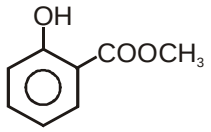
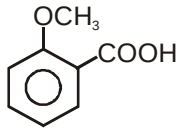
Compound (X) and (Y) can be distinguish by

(A) Tollen's reagent (B) Fehling solution

(C) Haloform test (D) 2, 4-DNP Test

5. A compound (X) gives fruity smell. [X] on hydrolysis gives an acid and alcohol. Acid give violet colour with neutral $FeCl_3$ while alcohol give yellow precipitate on boiling with I_2 and NaOH. **(X)** can be :

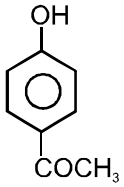
[Hint : ]

(A)  (B)  (C)  (D) 

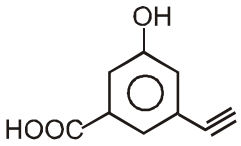
6. Formic acid and Acetaldehyde can be distinguish by

(A) I_2 + NaOH (B) Tollen's reagent

(C) Fehling solution (D) 2,4-DNP test

7. Correct statement(s) about  is/are

(A) It gives coloured solution with neutral $FeCl_3$ solution.
(B) It liberates H_2 gas with Na metal.
(C) It gives positive Iodoform test.
(D) It forms sweet smelling compound with alcohols.

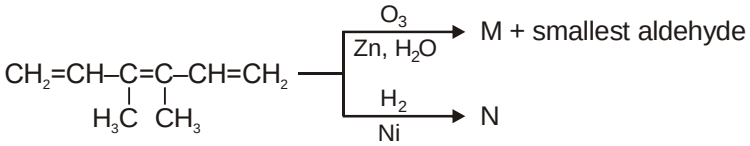
8. Correct statment(s) about  is /are :

(A) librate $\frac{3}{2}$ mole of H_2 on treatment with Na. (B) Positive test with $FeCl_3$

(C) Positive test with $NaHCO_3$ (D) Positive test with tollen's reagent

PART - IV : COMPREHENSION

Comprehension # 1



1. Product M cannot respond with :
(A) 2, 4-DNP (B) Ammonical silver nitrate
(C) Sodium hypoiodite (D) Sodium bicarbonate

2. Number of moles of ozone used for one mole of the given unsaturated hydrocarbon ?
(A) 1 (B) 2 (C) 3 (D) 4

3. How many total monochloro structural isomers obtained on chlorination of product **(N)**.
(A) 2 (B) 4 (C) 6 (D) 8

Comprehension # 2

Answer Q.4, Q.5 and Q.6 by appropriately matching the information given in the three columns of the following table.

Different reagents used for the identification of different functional groups. eg. (i) Tollens reagent used for the identification of –CHO. (ii) cerric ammonium nitrate (CAN) used for alcohol.		
Column-1	**Column-2**	**Column-3**
(I) Benzaldehyde	(i) I_2 + NaOH (aq.)	(P) Yellow crystals is formed
(II) Butan-1-ol	(ii) $AgNO_3$ (aq.) + NH_4OH	(Q) White ppt is formed
(III) Formic acid	(iii) anhy. $ZnCl_2$ + conc. HCl	(R) Silver mirror is formed
(IV) Acetophenone	(iv) $(NH_4)_2[Ce(NO_3)_6]$	(S) Wine red colouration

4. The only correct combination in which the reaction does not proceed through redox mechanism.
(A) (I), (ii), (R) (B) (IV), (i), (P) (C) (II), (iv), (S) (D) (III), (ii), (R)

5. For the formation of two different organic compounds the only correct combination is :
(A) (I), (ii), (R) (B) (IV), (i), (P) (C) (II), (iii), (Q) (D) (IV), (ii), (R)

6. For the formation of silver mirror the only correct combination is :
(A) (IV), (ii), (R) (B) (II), (ii), (R) (C) (III), (i), (R) (D) (I), (ii), (R)

Exercise-3

*** Marked Questions may have more than one correct option.**

PART - I : JEE (ADVANCED) / IIT-JEE PROBLEMS (PREVIOUS YEARS)

1. Identify a reagent from the following list which can easily distinguish between 1-butyne and 2-butyne.
(A) bromine, CCl_4 (B) H_2, Lindlar catalyst **[IIT-JEE-2002(S), 3/90]**
(C) dilute H_2SO_4, $HgSO_4$ (D) ammonical Cu_2Cl_2 solution

2. Four isomeric para-disubstituted aromatic compounds A to D with molecular formula $C_8H_8O_2$ were given for identification. Based on the following observations, give structures of the compounds. **[JEE 2002(M), 5/60]**
(i) Both A and B form a silver mirror with Tollen's reagent; also B gives a positive test with $FeCl_3$ solution.
(ii) C gives positive iodoform test.
(iii) D is readily extracted in aqueous $NaHCO_3$ solution.

3. In conversion of 2-butanone to propanoic acid which reagent is used. **[JEE 2005, 3/84]**
(A) NaOH, NaI / $H^{\oplus}$ (B) Fehling solution (C) NaOH, I_2 / $H^{\oplus}$ (D) Tollen's reagent

PART - II : JEE (MAIN) / AIEEE PROBLEMS (PREVIOUS YEARS)

JEE(MAIN) OFFLINE PROBLEMS

1. On mixing a certain alkane with chlorine and irradiating it with ultraviolet light, it forms only one monochloroalkane this alkane could be : **[AIEEE 2003, 3/225]**
(1) propane (2) pentane (3) isopentane (4) neopentane.

2. The prussian blue colour obtained during the test of nitrogen by Lassaigne's test is due to the formation of : **[AIEEE 2004, 3/225]**
(1) $Fe_4[Fe(CN)_6]_3$ (2) $Na_3[Fe(CN)_6]$ (3) $Fe(CN)_3$ (4) $Na_4(Fe(CN)_5NOS]$

3. Of the five isomeric hexanes, the isomer which can give two monochlorinated compounds is ? **[AIEEE 2005, 3/225]**
(1) n-Hexane (2) 2,3-Dimethylbutane
(3) 2,2-Dimethylbutane (4) 2-Methylpentane

4. Among the following the one that gives positive iodoform test upon reaction with I_2 and NaOH is ? **[AIEEE 2006, 3/165]**
(1) $CH_3CH_2CH(OH)CH_2CH_3$ (2) $C_6H_5CH_2CH_2OH$
(3) $CH_3-CH(CH_2-OH)-CH_3$ (4) $PhCHOHCH_3$

5. In the following sequence of reactions, the alkene affords the compound 'B'
$CH_3CH=CHCH_3 \xrightarrow{O_3} A \xrightarrow[Zn]{H_2O} B$, compound B is **[AIEEE 2008, 3/105]**
(1) CH_3CH_3CHO (2) CH_3COCH_3 (3) $CH_3CH_2COCH_3$ (4) CH_3CHO

6. Which of the following reagents may be used to distinguish between phenol and benzoic acid ? **[AIEEE 2011, 4/120]**
(1) Aqueous NaOH (2) Tollen's reagent (3) Molisch reagent (4) Neutral $FeCl_3$

7.* Silver Mirror test is given by which one of the following compounds? **[AIEEE 2011, 4/120]**
(1) Acetaldehyde (2) Acetone (3) Formaldehyde (4) Benzophenone

8. Ozonolysis of an organic compound 'A' produces acetone and propionaldehyde in equimolar mixture. Identify 'A' from the following compounds : **[AIEEE 2011, 4/120]**
(1) 1-Pentene (2) 2-Pentene
(3) 2-Methyl-2-pentene (4) 2-Methyl-1-pentene

9. Which of the following compounds can be detected by Molisch's test : **[AIEEE 2012, 4/120]**
(1) Nitro compounds (2) Sugars (3) Amines (4) Primary alcohols

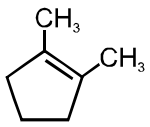
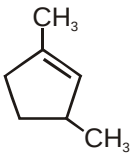
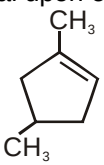
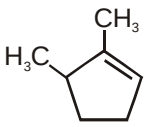
10. Which branched chain isomer of the hydrocarbon with molecular mass 72u gives only one isomer of mono substituted alkyl halide ? **[AIEEE 2012, 4/120]**
(1) Tertiary butyl chloride (2) Neopentane
(3) Isohexane (4) Neohexane

11. Iodoform can be prepared from all except : **[AIEEE 2012, 4/120]**
(1) Ethyl methyl ketone (2) Isopropyl alcohol
(3) 3-Methyl-2-butanone (4) Isobutyl alcohol

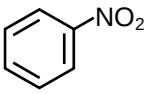
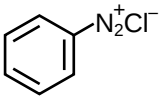
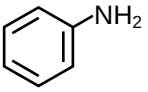
12. On heating an aliphatic primary amine with chloroform and ethanolic potassium hydroxide, the organic compound formed is : **[JEE(Main)-2014, 4/120]**
(1) an alkanol (2) an alkanediol (3) an alkyl cyanide (4) an alkyl isocyanide

13. For the estimation of nitrogen, 1.4 g of an organic compound was digested by Kjeldahl method and the evolved ammonia was absorbed in 60 mL of $\frac{M}{10}$ sulphuric acid. The unreacted acid required 20 mL of $\frac{M}{10}$ sodium hydroxide for complete neutralization. The percentage of nitrogen in the compound is :
[JEE(Main)-2014, 4/120]
(1) 6% (2) 10% (3) 3% (4) 5%

14. In Carius method of estimation of halogens, 250 mg of an organic compound gave 141 mg of AgBr. The percentage of bromine in the compound is : (at. mass Ag = 108 ; Br = 80) **[JEE(Main)-2015, 4/120]**
(1) 24 (2) 36 (3) 48 (4) 60

15. Which compound would give 5-keto-2-methyl hexanal upon ozonolysis ? **[JEE(Main)-2015, 4/120]**
(1) 
(2) 
(3) 
(4) 

16. The distillation technique most suited for separating glycerol from spent-lye in the soap industry is :
[JEE(Main)-2016, 4/120]
(1) Fractional distillation (2) Steam distillation
(3) Distillation under reduced pressure (4) Simple distillation

17. Which of the following compounds will be suitable for Kjeldahl's method for nitrogen estimation ?
[JEE(Main)-2018, 4/120]
(1) 
(2) 
(3) 
(4) 

JEE(MAIN) ONLINE PROBLEMS

1. In the Victor-Meyer's test, the colour given by 1º, 2º and 3º alcohols are respectively:
[JEE(Main) 2014 Online (20-04-14), 4/120]
(1) Red, colourless, blue (2) Red, blue, colourless
(3) Colourless, red, blue, (4) Red, blue, violet

2. Match the organic compounds in column-I with the Lassaigne's test results in column-II appropriately :
[JEE(Main) 2015 Online (11-04-15), 4/120]

	Column-I		**Column-II**
(A)	Aniline	(i)	Red colour with $FeCl_3$
(B)	Benzene sulfonic acid	(ii)	Violet colour with sodium nitroprusside
(C)	Thiourea	(iii)	Blue colour with hot and acidic solution of $FeSO_4$

(1) A - (ii); (B) - (iii) ; (C) - (i) (2) A - (iii); (B) - (i) ; (C) - (ii)
(3) A - (iii); (B) - (ii) ; (C) - (i) (4) A - (ii); (B) - (i) ; (C) - (iii)

3. The test to distinguish primary, secondary and tertiary amine is:

[JEE(Main) 2016 Online (09-04-16), 4/120]

(1) Mustard oil test
(2) $C_6H_5SO_2Cl$
(3) Sandmeyer's reaction
(4) Carbylamine reaction

4. Observation of "Rhumann's purple" is a confirmatory test for the presence of :

[JEE(Main) 2016 Online (10-04-16), 4/120]

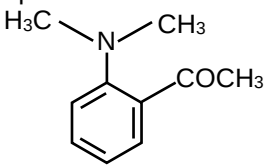
(1) Reducing sugar (2) Starch (3) Protein (4) Cupric ion

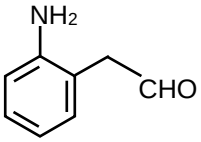
5. The tests performed on compound X and their inferences are :

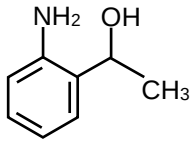
	Test	Inference
(a)	2, 4-DNP test	Coloured
(b)	Iodoform test	yellow precipitate
(c)	Azo-dry test	No dry formation

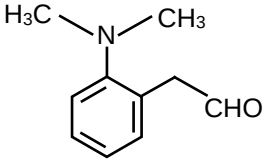
Compound 'X' is :

[JEE(Main) 2019 Online (09-01-19), 4/120]

(1) 

(2) 

(3) 

(4) 

6. Which of the following tests cannot be used for identifying amino acids?

[JEE(Main) 2019 Online (10-01-19), 4/120]

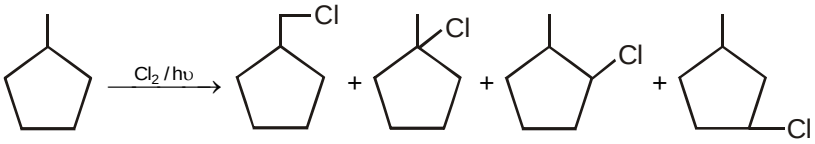
(1) Biuret test (2) Barfoed test (3) Ninhydrin test (4) Xanthoproteic test

Answers

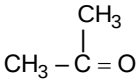
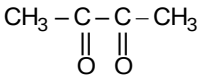
EXERCISE - 1

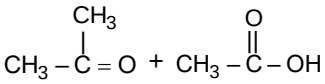
PART - I

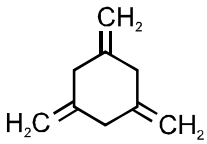
A-1. (i) 3 ; (ii) 2 **A-2.** 2 **A-3.** 3 **A-4.** 3

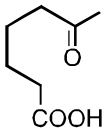
B-1. 

B-2. (i) 6 ; (ii) 4

B-3. (a)  (b) 

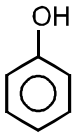
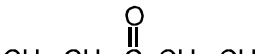
(c) $CH_3–COOH$ (d) 

B-4. P =  ; Q = 

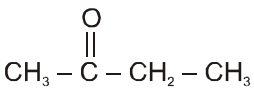
B-5. (i) $CH_3–COOH + HOOC–COOH + CO_2$; (ii) 

C-1. 2 **C-2.** A = $CH_3–C\equiv C–CH_3$ (But-2-yne) ; B = $CH_3–CH_2–C\equiv CH$ (Bytyne)

D-1. Lucas reagent (HCl/ $ZnCl_2$) or Neutral $FeCl_3$

D-2.  **D-3.** 

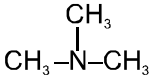
D-4. Benzophenone, 3-Pentanone, $(CH_3CH_2)_2C–OH$, CH_3COOH, CH_3CONH_2, $CH_3–COOCH_3$, $CH_3–COCl$

D-5. 

D-6. Salicylic acid, Phthalic acid, Cinnamic acid, Lactic acid, acetic acid and benzene sulphonic acid.

D-7. CH_3CH_2COOH (Propanoic acid) $\rightarrow$ (A) ; CH_3COOCH_3 (Methyl acetate) $\rightarrow$ (B) or $HCOOC_2H_5$

D-8. $CH_3CH_2\ NHCH_2CH_3$ (2º amine)

D-9.  (3º Amine)

E-1. Prussian blue colour will appear.

E-2. As the elements present in the organic compounds are in their covalent form, these are fused with sodium metal to convert them into ionic form (like NaCN, Na_2S, NaX).

E-3. Appearance of blood-red coloration indicates the presense of both sulphur and nitrogen.

PART - II

A-1.	(B)	**A-2.**	(D)	**A-3.**	(C)	**A-4.**	(B)	**A-5.**	(D)
B-1.	(D)	**B-2.**	(D)	**B-3.**	(B)	**B-4.**	(D)	**B-5.**	(B)
B-6.	(B)	**B-7.**	(B)	**C-1.**	(D)	**C-2.**	(C)	**C-3.**	(A)
C-4.	(C)	**C-5.**	(B)	**C-6.**	(A)	**D-1.**	(A)	**D-2.**	(B)
D-3.	(C)	**D-4.**	(C)	**D-5.**	(C)	**D-6.**	(A)	**D-7.**	(A)
D-8.	(B)	**D-9.**	(D)	**D-10.**	(D)	**D-11.**	(B)	**D-12.**	(D)
D-13.	(C)	**E-1.**	(B)	**E-2.**	(D)	**E-3.**	(C)	**E-4.**	(B)
E-5.	(C)								

PART - III

1. (A – q) ; (B – s) ; (C – p) ; (D – r) **2.** (A – p,q,t) ; (B – s) ; (C – r,t) ; (D – q,r,s)

EXERCISE - 2

PART - I

1.	(B)	**2.**	(C)	**3.**	(D)	**4.**	(C)	**5.**	(B)
6.	(B)	**7.**	(A)	**8.**	(C)	**9.**	(C)	**10.**	(C)
11.	(D)	**12.**	(A)						

PART - II

1.	3	**2.**	3	**3.**	5	**4.**	4	**5.**	4
6.	5	**7.**	No. of active H = 2			**8.**	81		

PART - III

1.	(ABC)	**2.**	(ABC)	**3.**	(ACD)	**4.**	(AC)	**5.**	(B)
6.	(AD)	**7.**	(ABC)	**8.**	(ABCD)				

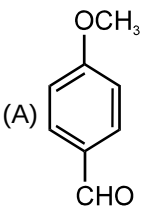
PART - IV

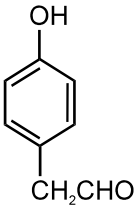
1.	(D)	**2.**	(C)	**3.**	(B)	**4.**	(C)	**5.**	(B)
6.	(D)								

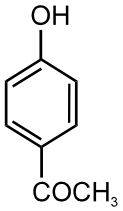
EXERCISE - 3

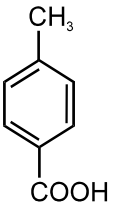
PART - I

1. (D)

2. (A) 

(B) 

(C) 

(D) 

3. (C)

PART - II

JEE(MAIN) OFFLINE PROBLEMS

1.	(4)	**2.**	(1)	**3.**	(2)	**4.**	(4)	**5.**	(4)
6.	(4)	**7.***	(1,3)	**8.**	(3)	**9.**	(2)	**10.**	(2)
11.	(4)	**12.**	(4)	**13.**	(2)	**14.**	(1)	**15.**	(2)
16.	(3)	**17.**	(4)						

JEE(MAIN) ONLINE PROBLEMS

1.	(2)	**2.**	(3)	**3.**	(2)	**4.**	(3)	**5.**	(1)
6.	(2)								