Additional Problems for Self Practice (APSP)

✍ **Marked questions are recommended for Revision.**

This Section is not meant for classroom discussion. It is being given to promote self-study and self testing amongst the Resonance students.

PART - I : PRACTICE TEST-1 (IIT-JEE (MAIN Pattern))

Max. Marks: 100 **Max. Time : 1 Hour**

Important Instructions:

A. General :

1. The test paper is of **1** hour duration.
2. The Test Paper consists of **25** questions and each questions carries **4** Marks. Test Paper consists of **Two** Sections.

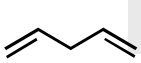
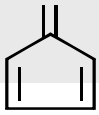
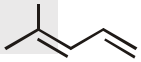
B. Test Paper Format and its Marking Scheme:

1. Section-1 contains **20** multiple choice questions. Each question has four choices (1), (2), (3) and (4) out of which **ONE** is correct. For each question in Section-1, you will be awarded 4 marks if you give the corresponding to the correct answer and zero mark if no given answers. In all other cases, minus one **(–1)** mark will be awarded.
2. Section-2 contains **5** questions. The answer to each of the question is a **Numerical Value**. For each question in Section-2, you will be awarded 4 marks if you give the corresponding to the correct answer and zero mark if no given answers. No negative marks will be answered for incorrect answer in this section. In this section answer to each question is **NUMERICAL VALUE** with two digit integer and decimal upto two digit. If the numerical value has more than two decimal places **truncate/round-off** the value to **TWO** decimal placed.

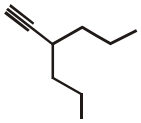
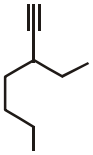
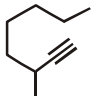
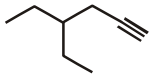
SECTION-1

This section contains **20** multiple choice questions. Each questions has four choices (1), (2), (3) and (4) out of which Only **ONE** option is correct.

1. ✍ Which of the following compound on reductive ozonolysis does not give glyoxal as one of the product?

(1)  (2)  (3)  (4) 

2. Which alkyne will give 3-Ethyl heptane on catalytic hydrogenation?

(1)  (2)  (3)  (4) 

3. An organic compound does not react appreciably with Lucas reagent but give white precipitate with Tollen's reagent. Which is the possible structure of compound ?

(1) $CH_3–\underset{\displaystyle OH}{\underset{|}{CH}}–C\equiv CH$ (2) $CH_3–C\equiv C–CH_2–CH_2–OH$

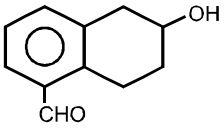
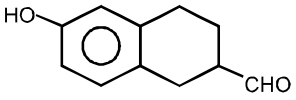
(3) $HC\equiv C–CH_2–CH_2–OH$ (4) $CH_2=C=CH–CH_2–OH$

4. Which of the following compounds will give a positive iodoform test ?

(1) Methanol (2) 2,2-Dimethylpropanol

(3) Ethanol (4) Methanal

5. The following two compounds I and II can be distinguished by using reagent?

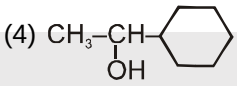
(I)  (II) 

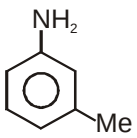
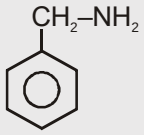
(a) aq. $NaHCO_3$ (b) Neutral $FeCl_3$ (c) Fehling solution (d) Na metal

(1) a or c (2) b or c (3) c or d (4) b or d

6. Which of the following compound cannot give Iodoform when react with IO^-(hypoiodite)?

(1) $CH_3-\overset{\overset{O}{\|}}{C}-OH$ (2) $Ph-\overset{\overset{O}{\|}}{C}-CH_3$

(3)  (4) 

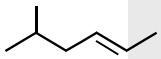
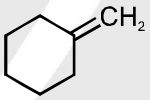
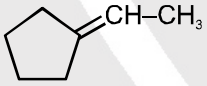
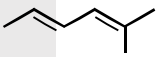
7.  and  can be distinguish by

(1) $CHCl_3$ + KOH (2) $NaNO_2$ + HCl followed by β-Napthol

(3) CS_2 + $HgCl_2$ (4) Na Metal

8. (x) $C_7H_{12} \xrightarrow[Me_2S]{O_3}$ P + Q

Compound P responds to Tollen's test and iodoform test but Q does not respond with both the reagents. Structure of compound (x) is :

(1)  (2)  (3)  (4) 

9. A research scholar get a mixture of three product during an experiment with ammonia. In product I only one H of ammonia is replaced by ethyl group and in II two H atoms of ammonia are replaced by ethyl groups and in III all the H-atoms are replaced by ethyl groups. Which test he should use to distinguish or separate the products :

(1) Carbyl amine test (2) Iodoform test

(3) Fehling solution test (4) Hinsberg test

10. Which is incorrect match with respect to the reagent used for lab test ?

(1) Carbohydrates $\rightarrow$ α-Naphthol (Molish reagent)

(2) Nitro ethane $\rightarrow$ Zn, NH_4Cl and $AgNO_3$ (Mulliken Barker test)

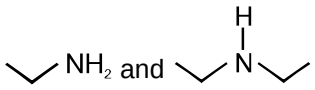
(3) Phenol $\rightarrow$ Anhydrous $ZnCl_2$ + Conc. HCl (Lucas Reagent)

(4) Benzoic acid $\rightarrow$ $NaHCO_3$

11. On oxidative ozonolysis of 3-Methylhex-3-ene, two products A & B are formed. A gives CO_2 gas with sodium bicarbonate, but B can not. The structures of A & B are respectively :

(1) $CH_3-CH_2-\overset{\overset{O}{\|}}{C}-CH_3$ & CH_3-CH_2-COOH (2) CH_3-CH_2-COOH & $CH_3-CH_2-CH=O$

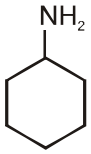
(3) CH_3-CH_2-COOH & $CH_3-CH_2-\overset{\overset{O}{\|}}{C}-CH_3$ (4) $CH_3-CH_2-CH_2-COOH$ & $CH_3-\overset{\overset{O}{\|}}{C}-CH_3$

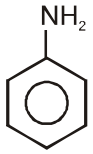
12.  and can be differentiated by :

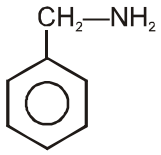
(1) Carbylamine reaction (2) Iodoform test

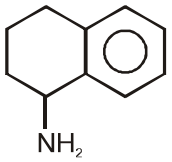
(3) Cold $KMnO_4$ (4) Br_2–H_2O

13. Which of the following compound gives azo dye test ?

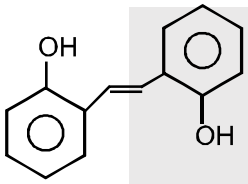
(1) 

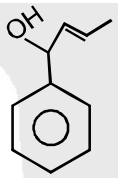
(2) 

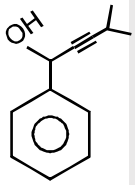
(3) 

(4) 

14. A compound (P), obtained as an ozonolysis product of (Q) gives brisk effervescence with Na, violet coloration with neutral $FeCl_3$ and silver mirror with Tollen's reagent. (Q) may be:

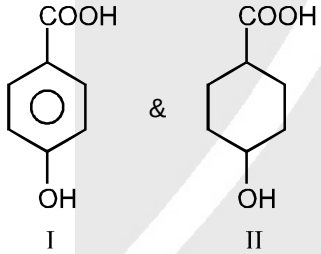
(1) 

(2) 

(3) 

(4) All of these

15. Which of the following reagent can distinguish the given compound I & II ?



I II

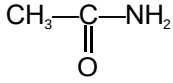
(1) Na metal (2) $NaHCO_3$ (3) Lucas Reagent (4) 2, 4-D.N.P

16. A compound (P) on reaction with "Q" in basic medium (KOH) gives a bad smelling compound (CH_3CH_2NC). Compound Q can be prepare by reaction of acetone with calciumhypochlorite ($Ca(OCl)_2$]. P and Q can:

(1) CH_3–CH_2–NH_2 & $CHCl_3$ (2) CH_3–CH_2–NO_2 & CH_3Cl

(3) CH_3–CH_2–NH–CH_3 & $COCl_2$ (4) $(CH_3–CH_2)_3N$ & Cl_2

17. Which of the following can gives Hinsberg test :

(1) CH_3–CH_2–OH (2) CH_3–CH_2–NO_2 (3) CH_3–CH_2–NH_2 (4) 

18. Acetaldehyde and Propyne can be distinguish by :

(i) Tollen's reagent (ii) I_2/NaOH (iii) Lucas reagent (iv) neutral $FeCl_3$

(1) (i) , (ii) & (iii) (2) (ii) & (iii) (3) (i) & (ii) (4) (iii) & (iv)

19. Two elements X (atomic weight = 75) and Y (atomic weight = 16) combine to give a compound having 75.8% X. The formula of the compound is :
(1) XY (2) X_2Y (3) X_2Y_2 (4) X_2Y_3

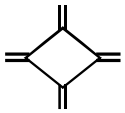
20. In the carius method, halogens present in organic compounds are estimated in the form of-
(1) barium halide (2) silver halide (3) hydrogen halide (4) gaseous halogen

SECTION-2

This section contains **5** questions. Each question, when worked out will result in **Numerical Value**.

21. How many isomeric structural alkene on catalytic hydrogenation gives 3-Methyl hexane?

22. How many structural isomeric ketones having molecular formula ($C_5H_{10}O$) give iodoform test ?

23.  $\xrightarrow{H_2/Ni}$ P $\xrightarrow{Cl_2/h\nu}$ Q (Total number of monochloro structural products).

24. How many hydrocarbons having molecular mass 68 can give white precipitate with Tollen's reagent

25. During estimation of nitrogen present in an organic compound by Kjeldahl's method, the ammonia evolved from 0.5 g of the compound in Kjeldahl's estimation of nitrogen, neutralized 10 mL of 1 M H_2SO_4. What is the percentage of nitrogen in the compound.

Practice Test-1 (IIT-JEE (Main Pattern))

OBJECTIVE RESPONSE SHEET (ORS)

Que.	1	2	3	4	5	6	7	8	9	10
Ans.										
Que.	11	12	13	14	15	16	17	18	19	20
Ans.										
Que.	21	22	23	24	25					
Ans.										

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

1. The compound formed in the positive test for nitrogen with the Lassaigne solution of an organic compound is - **[AIEEE 2004, 3/225]**
(1) $Fe_4[Fe(CN)_6]_3$ (2) $Na_3[Fe(CN)_6$ (3) $Fe(CN)_3$ (4) $Na_4[Fe(CN)_5NOS]$

2. Out 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

3. 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 $FeCl_3$

4. 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

5. 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

6. 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

7. 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

8. 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 :

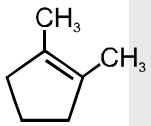
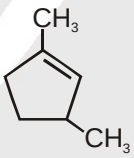
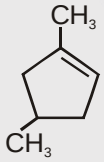
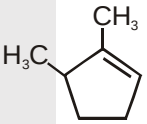
[JEE(Main)-2014, 4/120]

(1) 6% (2) 10% (3) 3% (4) 5%

9. 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]**

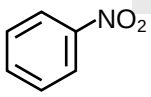
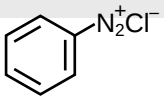
(1) 24 (2) 36 (3) 48 (4) 60

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

(1) 
(2) 
(3) 
(4) 

11. Which of the following compounds will be suitable for Kjeldahl's method for nitrogen estimation ?

[JEE(Main)-2018, 4/120]

(1) 
(2) 
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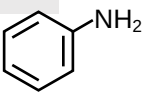
(4) 

PART - III : NATIONAL STANDARD EXAMINATION IN CHEMISTRY (NSEC) STAGE-I

1. What simple laboratory test could be performed to distinguish between 1-pentyne and 2-pentyne ? **[NSEC-2000]**

(A) the addition of Ag^+ in ammonia (B) the addition of H_2SO_4 in Hg^{+2}
(C) the addition of Br_2 in CCl_4 (D) the addition of H_2 on a Pt catalyst.

2. Which of the following produces four monochloro derivatives on free radical chlorination? **[NSEC-2000]**

(A) 2, 2-dimethylbutane (B) Pentane
(C) 2, 2-dimethylpropane (D) 2-methylbutane

3. Which of the following tests could be performed to distinguish between 1-butyne and 2-butyne ? **[NSEC-2001]**

(A) Ag^+ / NH_3 (B) Br_2 / CCl_4 (C) H_2 / Pt (D) Hg^{+2} / H_2SO_4

4. Which of the following compounds will give a positive iodoform test ? **[NSEC-2001]**

(A) methanol (B) 2,3-dimethyl ethanol

(C) α-haloethanol (D) methanal

5. Lucas reagent is : **[NSEC-2001]**

(A) anhydrous $CaCl_2$ and conc. HCl (B) anhydrous $ZnCl_2$ and conc. HCl

(C) anhydrous $AlCl_3$ and conc. HCl (D) anhydrous $PdCl_2$ and conc. HCl

6. The percentage composition of the elements of C_8H_9ON is : **[NSEC-2002]**

(A) 8 : 9 : 1 : 1 (B) 71.1 : 6.7 : 11.8 : 10.4

(C) 12 : 1 : 16 : 14 (D) none of these

7. The percentage of nitrogen in a compound is determined by **[NSEC-2006]**

(A) Nessler`s method

(B) Kjeldahl`s method

(C) Carius method

(D) taking the difference between total percentage and the sum of percentages of all other elements present.

8. The percentage of oxygen in a compound is determined by : **[NSEC-2007]**

(A) Dumas method

(B) Kjeldahl's method

(C) Carius method

(D) subtraction the sum of percentages of all other elements present from 100.

9. In the Dumas method for the estimation of nitrogen, 0.0237 grams of an organic compound gave 2.21 mL of nitrogen at 754.32 mm of Hg pressure at 18°C. (Aqueous tension at 18°C is 15.4 mm of Hg.) Therefore the percentage of nitrogen in the compound is : **[NSEC-2008]**

(A) 20.67% (B) 10.6% (C) 11.2% (D) 13.9%

10. The reagent which will be suitable to distinguish 1-methoxy-3-methyl-2-butene from isomeric 4-methyl-3-pentene-1-ol is : **[NSEC-2009]**

(A) bromine in chloroform. (B) alkaline potassium permanganate.

(C) ammoniacal silver nitrate. (D) sodium metal suspended in hexane.

11. Tollen's reagent is **[NSEC-2012]**

(A) Cu_2O (B) $[Cu(OH)_4]^{2-}$ (C) Ag_2O (D) $[Ag(NH_3)^2]^+$

12. The blood red color obtained in the detection of nitrogen and sulphur together in an organic compound in Lassaigne's test is due to **[NSEC-2013]**

(A) $[Fe(CNS)]^+$ (B) $[Fe(CNS)_2]^+$ (C) $[Fe(CNS)_3]^-$ (D) $[Fe(CNS)_2]^{2+}$

13. Fehling solution is **[NSEC-2013]**

(A) $AgNO_3$ solution + NaOH solution + NH_4OH

(B) Alkaline solution of Cupric ion complexed with citrate ion

(C) Copper sulphate + sodium potassium tartarate + NaOH

(D) Copper sulphate solution

14. Match the compounds given in list I with their characteristic reactions in list II **[NSEC-2016]**

List-I (Compound)		List-II (Reaction)	
1	Tert-butyl amine	a	Liberation of ammonia on heating with aq.NaOH
2	2-methyl-2-pentanol	b	Effervescence with $NaHCO_3$
3	2,4,6-trinitrophenol	c	Foul smell with chloroform in alkaline condition
4	Cyclohexane carboxamide	d	Formation of an water insoluble compound on treatment with conc. HCl and $ZnCl_2$

(A) 1-a, 2-c, 3-d, 4-b (B) 1-c, 2-d, 3-b, 4-a (C) 1-a, 2-b, 3-c, 4-d (D) 1-d, 2-a, 3-b, 4-c

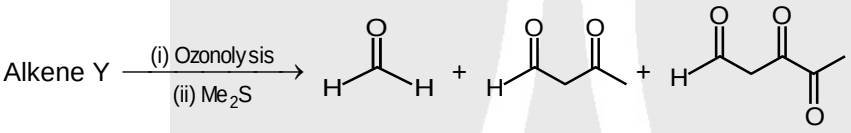
15. Number of products formed (ignoring stereoisomerism) in the monochlorination of ethylcyclohexane is **[NSEC-2019]**

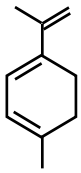
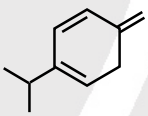
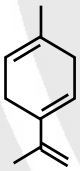
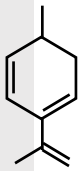
(A) 6 (B) 8 (C) 5 (D) 4

16. Atropine ($C_{17}H_{23}O_3N$) is a naturally occurring compound used to treat certain types of poisoning. The degree of unsaturation in atropine is **[NSEC-2019]**

(A) 7 (B) 6 (C) 5 (D) 4

17. The alkene 'Y' in the following reaction is **[NSEC-2019]**



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

PART - IV : PRACTICE TEST-2 (IIT-JEE (ADVANCED Pattern))

Max. Time : 1 Hr. **Max. Marks : 78**

Important Instructions

A. General :

1. The test is of 1 hour duration.
2. The Test Booklet consists of 26 questions. The maximum marks are 78.

B. Question Paper Format

3. Each part consists of five sections.
4. Section-1 contains 6 multiple choice questions. Each question has four choices (A), (B), (C) and (D) out of which ONE is correct.
5. Section-2 contains 5 multiple choice questions. Each question has four choices (A), (B), (C) and (D) out of which ONE OR MORE THAN ONE are correct.
6. Section-3 contains 8 questions. The answer to each of the questions is a numerical value, ranging from 0 to 9 (both inclusive).
7. Section-4 contains 2 paragraphs each describing theory, experiment and data etc. 3 & 2 questions relate to paragraph. Each question pertaining to a partcular passage should have only one correct answer among the four given choices (A), (B), (C) and (D).
8. Section 5 contains 2 multiple choice questions. Question has two lists (list-1 : P, Q, R and S; List-2 : 1, 2, 3 and 4). The options for the correct match are provided as (A), (B), (C) and (D) out of which ONLY ONE is correct.

C. Marking Scheme :

9. For each question in Section 1, 4 and 5 you will be awarded 3 marks if you darken the bubble corresponding to the correct answer and zero mark if no bubble is darkened. In all other cases, minus one (–1) mark will be awarded.
10. For each question in Section 2, you will be awarded 3 marks. If you darken all the bubble(s) corresponding to the correct answer(s) and zero mark. If no bubbles are darkened. No negative marks will be answered for incorrect answer in this section.
11. For each question in Section 3, you will be awarded 3 marks if you darken only the bubble corresponding to the correct answer and zero mark if no bubble is darkened. No negative marks will be awarded for incorrect answer in this section.

SECTION-1 : (Only One option correct Type)

This section contains 6 multiple choice questions. Each questions has four choices (A), (B), (C) and (D) out of which Only ONE option is correct.

1. An organic compound "A" of molecular weight 120, gives Tollen's reagent test and 2,4-DNP test but no Iodoform with $I_2/OH^{\ominus}$. The compound "A" may be :

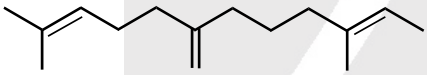
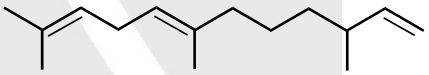
(A) Benzoic acid (B) Phenyl methyl ketone

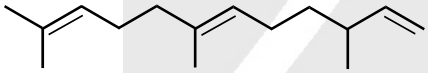
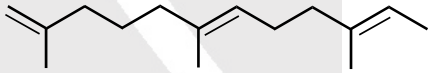
(C) 2-phenyl ethanal (D) 1-phenyl ethane

2. A hydrocarbon on oxidative ozonolysis produces Oxalic acid and Butanedioic acid. Its structure is

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

3. Farnesene is a compound found in the waxy coating of apples. On hydrogenation it gives 2,6, 10-Trimethyl dodecane. On ozonolysis it gives one mole acetone, one mole of formaldehyde, one mole of 2-Methylpentanedial and one mole of 4-Oxopentanal. The structure proposed for Farnesene may be

(A)  (B) 

(C)  (D) 

4. 'X' compound (C_4H_8O) decolorises bromine water & gives instant turbidity with Lucas reagent. When 'X' react with I_2 & NaOH it give yellow ppt Identify 'X'.

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

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

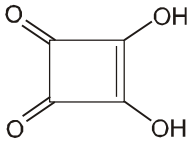
5. Compounds I and II can be distinguished by using reagent.

(I) 4–Hydroxy–4–methylpent–2–enoic acid

(II) 5–Hydroxypent–2–ynoic acid

(A) $NaHCO_3$ (B) Br_2 / H_2O

(C) $HCl / ZnCl_2$ (anhydrous) (D) Cu_2Cl_2 / NH_4OH

6. Which of the following test will not be given by  (Squaric acid)

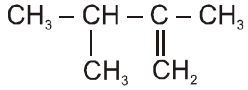
(A) Br_2 water test (B) 2, 4-DNP test (C) Neutral $FeCl_3$ (D) Tollen's test

Section-2 : (One or More than one options correct Type)

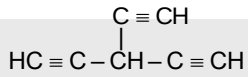
This section contains 5 multiple choice questions. Each questions has four choices (A), (B), (C) and (D) out of which ONE or MORE THAN ONE are correct.

7. Which of the following compounds after complete hydrogenation will form three monochloro structural isomeric products ?

(A) 

(B) 

(C) 

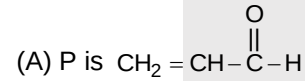
(D) 

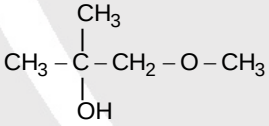
8. A organic compound having molecular formula C_3H_4, react with sodium metal to give a colourless and odourless gas. Select the correct statements about organic compound.

(A) It gives Bromine water test (B) It reacts with Bayer's reagent

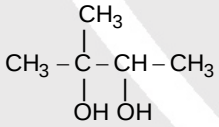
(C) It reacts with Tollen's reagent (D) It reacts with Ammonical cuprous chloride.

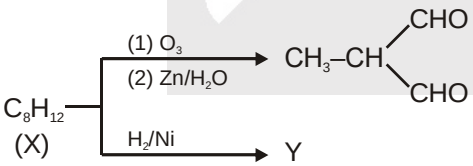
9. Compound P Liberates H_2 gas with Na metal. P gives white precipitate with tollen's reagent, there is no response towards Lucas reagent and compound Q gives instant turbidity with anhydrous $ZnCl_2$ / HCl, and with sodium metal 1 mole of compound Q liberates 11.2 litre H_2 gas at STP. Find the structural formula of compound P and Q.

(A) P is 

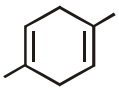
(B) Q is 

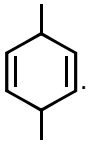
(C) P is $CH_3–O–C\equiv C–H$

(D) Q is 

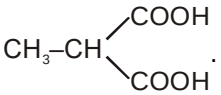
10. 

True statements is/are

(A) Structure of X is  .

(B) Structure of X is  .

(C) Y on monochlorination produce 3 monochloro structural products.

(D) Oxidative ozonolysis product of X is  .

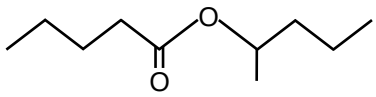
11. An unknown compound P (having fruity smell with molecular weight 172) is subjected to hydrolysed, products (Q) & (R) are formed having same number of carbon atoms in their parent chain.
Reactions are –

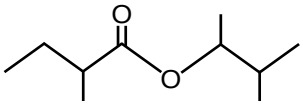
$[P] \xrightarrow{H_3O^{\oplus}} Q + R$

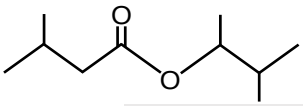
$[Q] \xrightarrow{NaHCO_3\ aq.} S + CO_2 \uparrow$

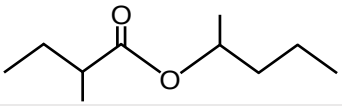
$[R] \xrightarrow{I_2 + NaOH} T + CHI_3(\text{yellow ppt.})$

Predict possible structures of P, on the basis of above observations ?

(A) 

(B) 

(C) 

(D) 

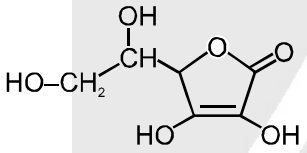
Section-3 : (Single/ Double Integer Value Correct Type.)

This section contains 8 questions. Each question, when worked out will result in numerical values from 0 to 9 (both inclusive)

12. How many alkenes, alkynes and alkadienes can be hydrogenated to form Isopentane (Including all structural isomers)

13. How many acyclic structural isomeric carbonyl compound having molecular formula $C_6H_{12}O$ can gives haloform test?

14. Structure of Ascorbic acid is represented as follows.

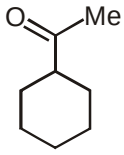


(Ascorbic acid)

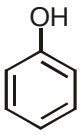
How many of the following reagents can give positive test with ascorbic acid?

$Cu_2Cl_2 + NH_4OH$	2,4-DNP	Na Metal	$HCl + ZnCl_2$	$FeCl_3$
(I)	(II)	(III)	(IV)	(V)
NaOH + Phenopthalein	dil.$KMnO_4$	Br_2/H_2O	$AgNO_3 + NH_4OH$	I_2 + NaOH
(VI)	(VII)	(VIII)	(XI)	(X)

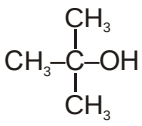
15. Observe the the following compounds.



(I)



(II)



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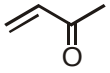
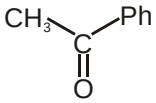
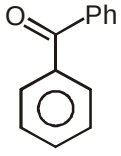


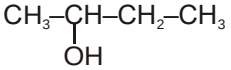
(IV)



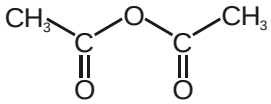
(V)



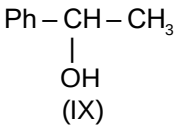
(VI)



(VII)



(VIII)



(IX)

Number of compound which can gives positive Haloform test = (x)
Number of compound which can gives positive Lucas reagent test = (y)
Report your answer (x + y)

16. 'n' Number of alkenes yield 2,2,3,4,4-pentamethyl-pentane on catalytic hydrogenation and 'm' number of monochloro structural isomers are possible for this compound.
Report your answer as (n + m).

17. Calculate total number of organic compounds with molecular formula $C_6H_{12}O_2$ which gives CO_2 gas with aqueous $NaHCO_3$ solution ?

18. How many oxygen atoms are present in 1 molecule of ammonium phosphomolybdate ?

19. How many organic compounds on treatment with $(CH_3COO)_2Pb$ give black precipitate in the Lassaigne test for element detection ?

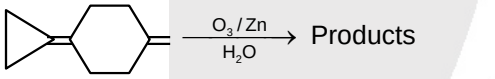
Cysteine	Methionine	Diethylthioether	Alanine
Glycine	Glucose	Salicylic acid	Ethylmercaptan

SECTION-4 : Comprehension Type (Only One options correct)

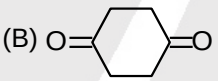
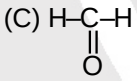
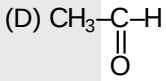
This section contains 2 paragraphs, each describing theory, experiments, data etc. Each 3 & 2 questions has only one correct answer among the four given options (A), (B), (C) and (D)

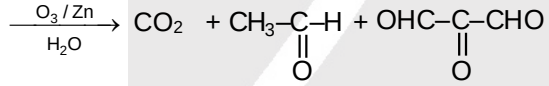
Comprehension # 1

Aldehyde and ketones may be prepared by reductive cleavage of carbon-carbon double bonds. A particularly useful reagent for this purpose is ozone under reductive conditions results in the formation of carbonyl compounds.

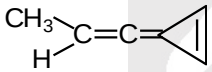
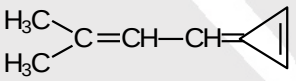
20.  Products

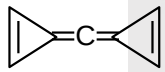
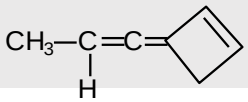
Which of the following product is not formed in above reaction -

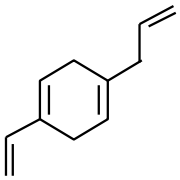
(A)  (B)  (C)  (D) 

21. (X) 

(X) is -

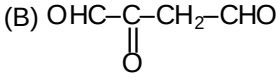
(A)  (B) 

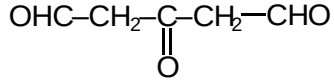
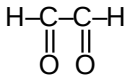
(C)  (D) 

22.  Products

Which of the following product is not formed in above reaction -

Products are -

(A)  (B) 

(C)  (D) 

Comprehension # 2

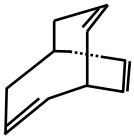
An organic compound (P) with formula $C_{10}H_{12}$ undergoes catalytic hydrogenation to yield $C_{10}H_{18}$(Q). Compound (Q) gives three different monochlorination structures. Reductive ozonolysis of (P) gives a single compound (R), $C_5H_6O_3$.

23. Which of the following is true ?

(A) (P) can decolorize bromine water

(B) (Q) contains a benzene ring

(C) (R) gives Tollen's reagent test.

(D) (P) may be 

24. Identify the correct statement(s) :

(A) (P) can answer Tollen's reagent test.

(B) (Q) is a bicyclic compound

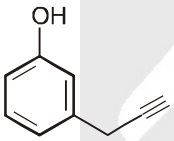
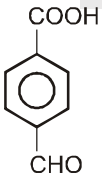
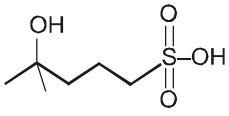
(C) (R) can give $NaHCO_3$ test

(D) (P) contains a benzene ring

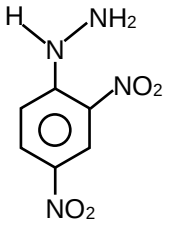
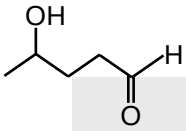
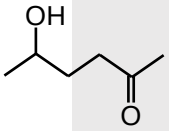
SECTION-5 : Matching List Type (Only One options correct)

This section contains 2 questions, each having two matching lists. Choices for the correct combination of elements from List-I and List-II are given as options (A), (B), (C) and (D) out of which one is correct.

25. Match the column :

	Column-I		**Column-II**
(A)	$CH_3–CH=CH–CH_2–\overset{\overset{O}{\|\|}}{C}–CH_3$	(P)	Bromine water solution decolourised
(B)		(Q)	precipitate obtained with $AgNO_3 + NH_4OH$
(C)		(R)	CO_2 gas liberated by $NaHCO_3$
(D)		(S)	Yellow precipitate by 2, 4-DNP

26. Match the following :

Compounds		Lab Test
(A)		(P) Brady's reagent test
(B)		(Q) Tollen's reagent test
(C)		(R) Liberates H_2 with Na
(D)	HCOOH	(S) Haloform test

Practice Test-2 ((IIT-JEE (ADVANCED Pattern))

OBJECTIVE RESPONSE SHEET (ORS)

Que.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Ans.										
Que.	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Ans.										
Que.	**21**	**22**	**23**	**24**						
Ans.										
Que.	**25**									
Ans.	**(A)**		**(B)**		**(C)**		**(D)**			
Que.	**26**									
Ans.	**(A)**		**(B)**		**(C)**		**(D)**			

APSP Answers

PART - I

1.	(1)	**2.**	(2)	**3.**	(3)	**4.**	(3)	**5.**	(2)
6.	(1)	**7.**	(2)	**8.**	(3)	**9.**	(4)	**10.**	(3)
11.	(3)	**12.**	(1)	**13.**	(2)	**14.**	(1)	**15.**	(3)
16.	(1)	**17.**	(3)	**18**	(3)	**19.**	(4)	**20.**	(2)
21.	6.00	**22.**	2.00	**23.**	2.00	**24.**	2.00	**25.**	56.00

PART - II

1.	(1)	**2.**	(2)	**3.**	(4)	**4.**	(3)	**5.**	(2)
6.	(4)	**7.**	(4)	**8.**	(2)	**9.**	(1)	**10.**	(2)
11.	(4)								

PART - III

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

PART - IV

1.	(C)	**2.**	(D)	**3.**	(C)	**4.**	(B)	**5.**	(C)
6.	(D)	**7.**	(CD)	**8.**	(ABCD)	**9.**	(BC)	**10.**	(BCD)
11.	(ABC)	**12.**	6	**13.**	4	**14.**	6	**15.**	8(5+3)
16.	4	**17.**	8	**18.**	40	**19.**	4	**20.**	(D)
21.	(A)	**22.**	(D)	**23.**	(AC)	**24.**	(B)		

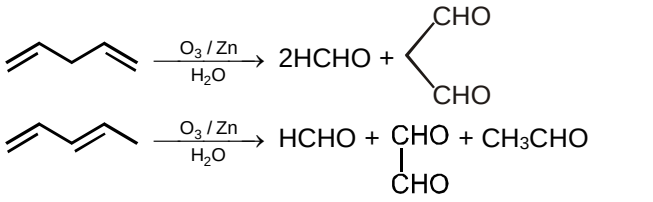
25. (A) - P,S; (B) - P,Q; (C) - Q,R,S; - (D) R

26. (A) - PQR; (B) - PQRS; (C) - PRS; (D) – QR

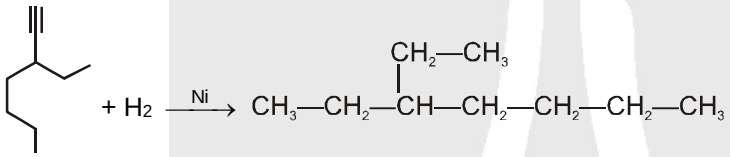
APSP Solutions

PART - I

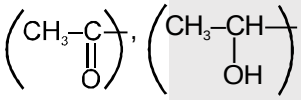
1.



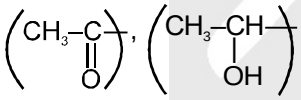
2.



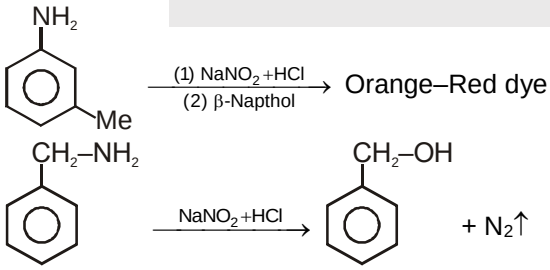
3. Terminal alkyne gives white precipitate with Tollen's reagent and 1º alcohol do not react appreciably with Lucas reagent.

4.  groups gives positive iodoform test.

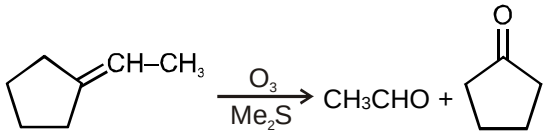
5. (a) Both does not give the test with aq. $NaHCO_3$.
(b) II give +ve test with neutral $FeCl_3$ due to presence of phenolic –OH group, but (I) does not.
(c) In (I) aromatic aldehyde does not give Fehling test but (II) gives.
(d) In (I) and (II) acidic hydrogen atom is present so both give +ve test with Na metal.

6.  groups gives positive iodoform test.

7.

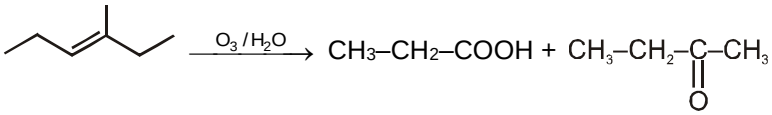


8.



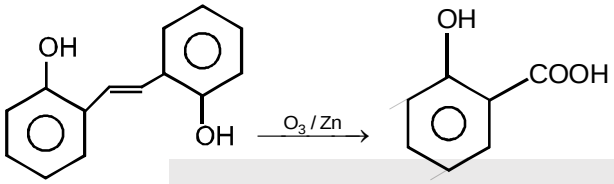
9. 1º, 2º and 3º amine mixture can be seperated by Hinsberg reagent.

10. Phenol does not gives Lucas reagent test.

11. 

12. 1º and 2º amine can be differentiated by Carbylamine test.

13. Aromatic 1º amine gives positive azo dye test.

14. 

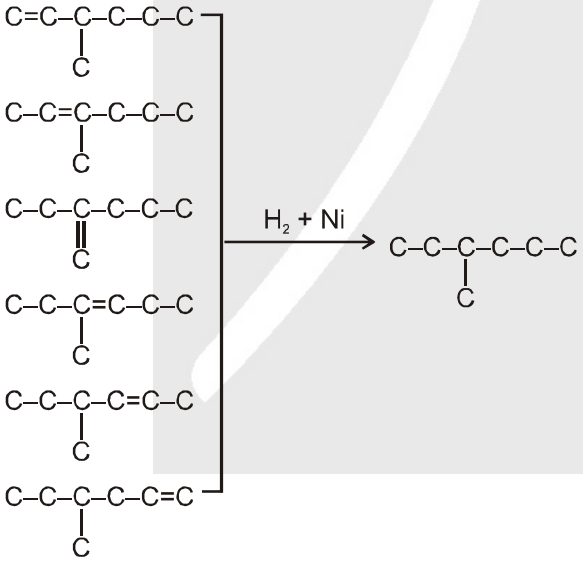
15. Lucas reagent is used to distinguish alcohol and phenol.

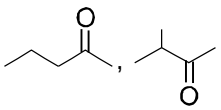
16. $CH_3–CH_2–NH_2 + CHCl_3 + KOH \longrightarrow CH_3CH_2NC$

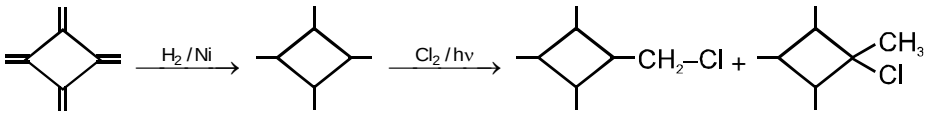
$CH_3–CO–CH_3 + Ca(OCl)_2 \longrightarrow CHCl_3 + (CH_3COO)_2Ca$

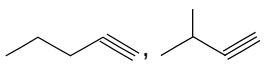
17. Amines give positive Hinsberg test.

18. Acetaldehyde and Propyne can be distinguish by tollen's reagent and Iodoform test.

21. 

22. 

23. 

24. C_5H_8  (Molecular Mass = 68)

PART - II

1. If nitrogen is present in organic compound, then sodium extract contains $Na_4[Fe(CN)_6]$

$$Na + C + N \xrightarrow{\text{fuse}} NaCN$$

$$FeSO_4 + 6NaCN \longrightarrow \underset{(A)}{Na_4[Fe(CN)_6]} + Na_2SO_4$$

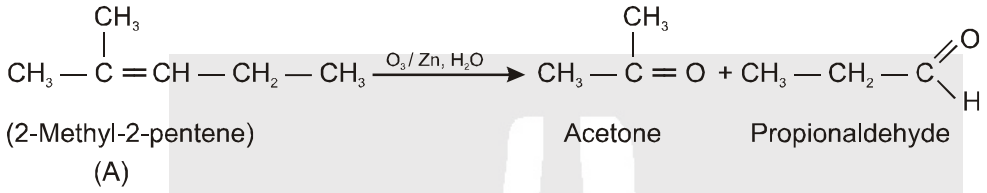
A changes to prussian blue $Fe_4[Fe(CN)_6]_3$ on reaction with $FeCl_3$

$$4FeCl_3 + 3Na_4[Fe(CN)_6 \longrightarrow Fe_4[Fe(CN)_6]_3 + 12\ NaCl$$

2. 2,3-Dimethylbutane has two chemically different hydrogen atoms so it can give two monochlorinated structural compounds.

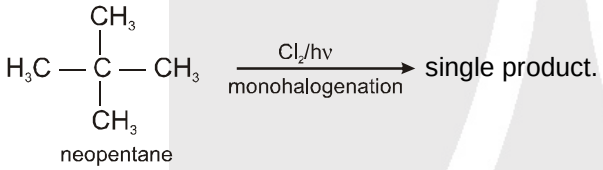
3. Neutral $FeCl_3$ reacts with phenol and give violet coloured complex.

4.



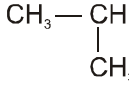
(2-Methyl-2-pentene) (A) | Acetone | Propionaldehyde

5.



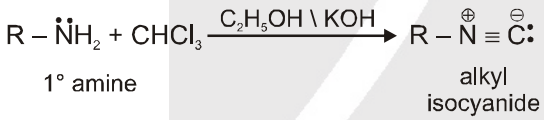
neopentane — monohalogenation — single product.

6.



isobutyl alcohol doesn't give positive iodoform test.

7.



1° amine — alkyl isocyanide

8. Mass of organic compound = 1.4 g

let it contain x mmole of N atom.

organic compound $\longrightarrow NH_3$

x m mole

$2NH_3 + H_2SO_4 \longrightarrow (NH_4)_2SO_4$. ($1^{st}$)

6 mmole initially taken.

$H_2SO_4 + 2NaOH \longrightarrow Na_2SO_4 + 2H_2O$ (2^{nd})

2 mmole reacted

Hence m moles of H_2SO_4 reacted in 2nd equation = 1

$\Rightarrow$ m moles of H_2SO_4 reacted from 1st equation = 6 – 1 = 5 m moles

$\Rightarrow$ m moles of NH_3 in 1st equation = 2 × 5 = 10 m moles

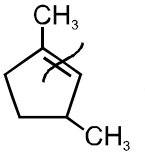
$\Rightarrow$ m moles of N atom in the organic compound = 10 m moles

$\Rightarrow$ mass of N = $10 \times 10^{-3} \times 14 = 0.14$ g

$\Rightarrow$ % of N = $\frac{0.14}{1.4} \times 100 = 10$ %

9. $\%\ X = \dfrac{\text{Atomic mass of Br}}{\text{Molecular mass of AgBr}} \times \dfrac{\text{Wt. of AgBr}}{\text{Wt. of organic Bromide}} \times 100$

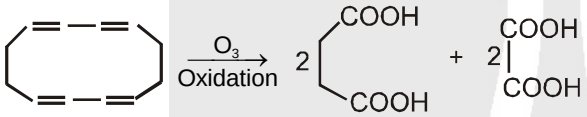
Thus $\%\ Br = \dfrac{80}{188} \times \dfrac{141}{250} \times 100 = 24$

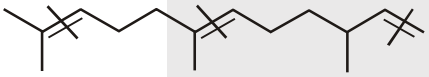
10.  $\longrightarrow$ $CH_3-\underset{\underset{O}{\|}}{C}-CH_2-CH_2-\underset{\underset{CH_3}{|}}{CH}-CHO$ (5-keto-2-methyl hexanal)

11. Nitrogen in aniline is estimated by Kjeldahl's method.

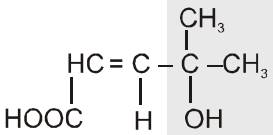
PART - IV

1. The given compound gives Tollen's reagent and 2,4-DNP test i.e. the compound is aldehyde. Further it gives no Iodoform test. From the given molecular formula C_8H_8O is expected. Therefore the correct answer is (C).

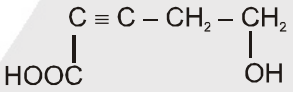
2. 

3.  $\xrightarrow{O_3\ /\ Zn}$ 2-methylpentanedial+4-oxopentanal+formaldehyde+acetone.

4. $CH_3-\underset{\underset{OH}{|}}{CH}-CH=CH_2$ gives bromine water test, Lucas reagent test and haloform test.

5. 

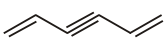
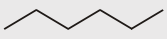
(I)

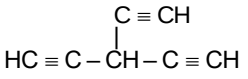
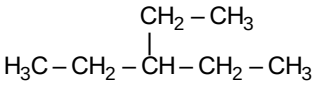


(II)

(I) gives immediate turbidity by Lucas reagent and (II) does not give turbidity appriciably.

6. Terminal alkyne and –CH=O group gives positive test with tollens reagent.

7.  $\xrightarrow{H_2\ /\ Ni}$  $\xrightarrow[h\nu]{Cl_2}$ 3 monochloro product

 $\xrightarrow{H_2\ /\ Ni}$  $\xrightarrow[h\nu]{Cl_2}$ 3 monochloro product

Both structures give three monochloro structural isomeric products.

8. $C_3H_4 \Rightarrow CH_3-C\equiv C-H \xrightarrow{Na} CH_3-C\equiv C^{\ominus}Na + \frac{1}{2}H_2$

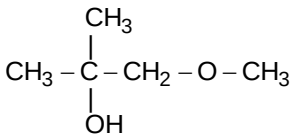
$Br_2 + H_2O \rightarrow$ +ve

Bayer's Reagent $\rightarrow$ +ve

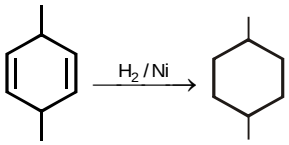
$Cu_2Cl_2 + NH_4OH \rightarrow$ +ve

$AgNO_3 + NH_4OH \rightarrow$ +ve

9. $CH_3–O–C\equiv C–H$ gives white precipitate with tollen's reagent and Liberates H_2 gas with Na metal.

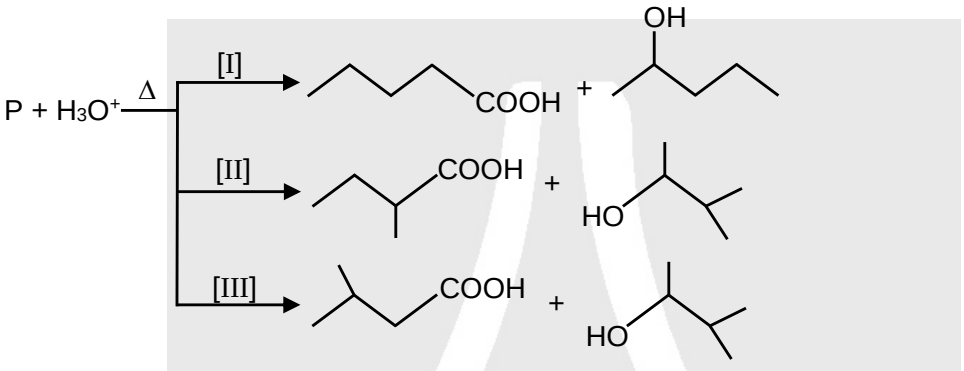


gives instant turbidity with anhydrous $ZnCl_2$/HCl and Liberates half mole H_2 gas with sodium metal.

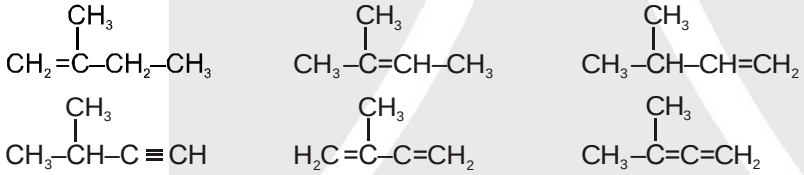
10. X =  3 structural products

11. $CnH_2nO_2 = 172$

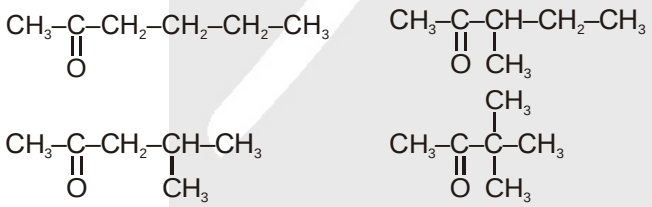
$\therefore$ n = 10



12.



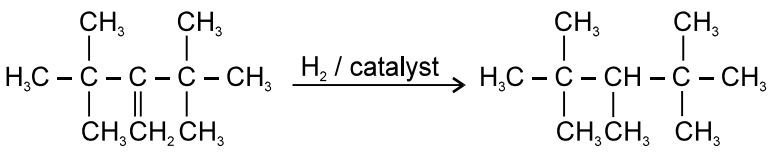
13.



14. Na Metal, HCl+$ZnCl_2$, $FeCl_3$, NaOH+Phenolpthalein, dill.$KMnO_4$, Br_2/H_2O gives positive test with ascorbic acid.

15. Compound (I), (IV), (V), (VII) and (IX) gives positive haloform compound (III), (VII) and (IX) gives positive Lucas reagent, x = 5, y = 3 so, (5 + 3) = 8.

16. Only one alkene

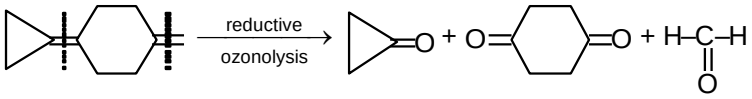


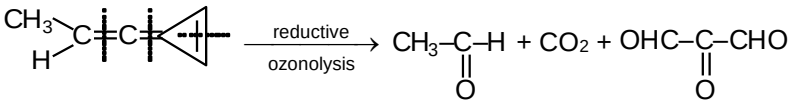
Three monochloro isomers are possible as it has three different types of 'H' atoms.

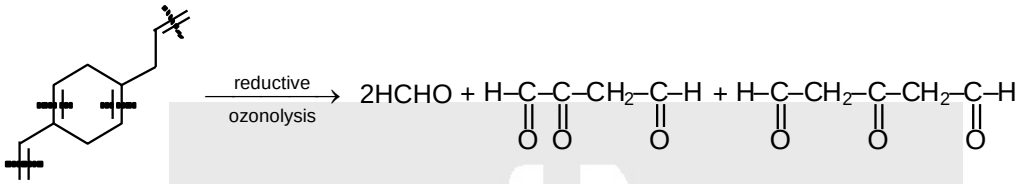
17. DU $\Rightarrow$ 1, must be acid $\therefore$ C_5H_{11}–COOH 8 isomers

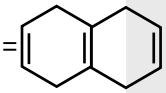
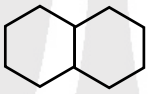
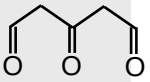
18. $(NH_4)_3PO_4.12MoO_3$

19. Cysteine, Methionine, Diethylthioether, Ethylmercaptan

20. 

21. 

22. 

(23-24) (P) =  (Q) =  (R) = 

(P) & (R) can decolorize bromine water.
(R) can answer Tollen's reagent test but (P) cannot.
There is no aromatic ring is any of the structures.

25. Due to unsaturation brown colour of Br_2/H_2O decolourises. Carboxylic acid gives CO_2 gas with $NaHCO_3$. Aldehydes gives black or silver ppt. with Tollen's reagent and terminal alkyne gives white ppt. with tollen's reagent. $\diagdown C = O$ group gives positive 2,4-DNP test.