# CHEMISTRY

## FOR IIT JEE ASPIRANTS OF CLASS 12 FOR CHEMISTRY

## PRACTICAL ORGANIC CHEMISTRY

Scq Type

**1.** Which of the following compounds will answer Lassaigne's test for nitrogen.

A. $NH_2NH_2$

B. $NH_4Cl$

C. $NaCN$

D. $NaNO_3$

**Answer: C**

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**2.** The molecular mass of an organic compound which contains only one nitrogen atom can be

A. 73

B. 76

C. 146

D. 152

**Answer: A**

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**3.** Which of the following will give Lassaigne's test for nitrogen

A. $NH_4NO_3$

B. $NH_2NH_2$

C. $KNO_3$

D. Cyasnogen

**Answer: D**

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**4.** An organic compound having carbon, hydrogen andsulphus contsains $4\%$ of sulphur. The minimum molecular weight of the compound is

A. 200

B. 400

C. 600

D. 800

**Answer: D**

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**5.** When $0.32g$ of a compound is heated with conc. $HNO_3$ and $BaCl_2, 0.932gBaSO_4$ is obtained. The percentage of sulphur in the compound is

A. 20

B. 40

C. 60

D. 80

**Answer: B**

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**6.** The oxygen is estimated in the organic compound by

A. Aluise's method

B. Victor-Meyer method

C. Carius method

D. There is no direct mehtod.

**Answer: D**

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**7.** The percentage composition of a compound $C = 90\,\%$ and $H = 10\,\%$ . A possible formula of the compounds is

A. $C_8H_{10}$

B. $C_{15}H_{30}$

C. $C_{15}H_{20}$

D. $C_{15}H_{15}$

**Answer: C**

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**8.** The empirical formula of a compound is $CH_2O$ and its molecular mass is 120. The molecular formula of the comound is

A. $C_2H_4O_2$

B. $C_3H_6O_3$

C. $C_4H_8O_4$

D. $CH_2O$

**Answer: C**

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**9.** The best method for the separation of naphthalene and benzoic acid from their mixture is

A. Sublimation

B. Distillation

C. Crystallization

D. Chromatography

**Answer: C**

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**10.** A mixture of $n$-Butylamine and Petrol can be separated by using

A. $HCl$

B. $NaOH$

C. $Na_2CO_3$

D. $NaHCO_3$

**Answer: A**

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**11.** Which of the following compounds does not show Lassaigne's test for nitrogen

A. Phenylhydrazine

B. Azobenzene

C. Urea

D. Hydrazine

**Answer: D**

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**12.** In lassaigne's test a blue colour is obtained if the organic compound contains nitrogen. The blue colour is due to

A. $K_4\left(Fe(CN)_6\right]$

B. $Fe_4\left[Fe(CN)_6\right]_3$

C. $Na_3\left[Fe(CN)_6\right]$

D. $Cu_2[Fe(CN)_6]$

**Answer: B**

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**13.** Which of the following organic compound will give red colour in Lassaigne's test?

A. $C_6H_5CN$

B. 


C. $NH_2 - \overset{\overset{O}{\|}}{C} - NH_2$

D. 


**Answer: D**

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**14.** In the test of sulphur violet colour of sodium thionitroprusside is formed. What is the formula of sodium thionitroprusside.

A. $Na_2\left[Fe(CN)_5NO\right]$

B. $Na_2\left[Fe(CN)_5NOS\right]$

C. $Na_4\left[Fe(CN)_5NOS\right]$

D. $Na_4\left[Fe(CN)_5NO\right]$

**Answer: C**

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**15.** The % of sulphur in an organic compound whose 0.32 gm. Produde 0.23 gm of $BaSO_4$ (At. Wt $Ba = 137$, $S = 32$)

A. $1.0$

B. $10.0$

C. $23.5$

D. 32.1

**Answer: B**

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**16.** Sodium extract is heated with con. $HNO_3$ before testing for halogens because

A. Silver halides are insoluble in $HNO_3$.

B. $Na_2S$ and $NaCN$ are decomposed by $HNO_3$

C. $Ag_2S$ in soluble in $HNO_3$

D. $AgCN$ in soluble in $HNO_3$.

**Answer: B**

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**17.** To determinent the weight of a halogen in orangic compound, the compound is heated fuming $HNO_3$ in presence of

A. $Ag$

B. $AgNO_3$

C. $CH_3CONH_2$

D. $Ag_2SO_4$

**Answer: B**

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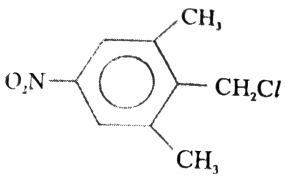
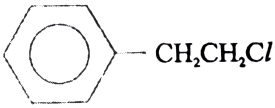
**18.** Detection of the chlorine is possible without preparing sodium extract in

A. 


B. $ChCl_3$

C. 


D. $CH_2 = CH - CH_2Cl$

**Answer: D**

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**19.** During the testing for phosphorus in organic compounds, a yellow solution or precipitate is formed due to the formation of

A. $Mg_3(PO_4)_2$

B. Magnesium pyrophosphate

C. Magnesium hydrogen phosphate

D. $P_4O_{10}$

**Answer: B**

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**20.** In Lassaigne's test, the organic compound is fused with a piece of sodium metal in order to

A. increase the ionization of the compound

B. decrease the melting of the compund

C. increase the melting point of the compound

D. convert the covalent compund into a mixture of ionic compounds.

**Answer: D**

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**21.** In the Lassaigne's test for the detection of nitrogen in an organic compound, the appearance of blue coloured compound is due to

A. $K_3[Fe(CN)_6]$

B. $K_4[Fe(CN)_6]$

C. $Fe(CN)_6$

D. $Fe\left[Fe(CN)_6\right]_3$

**Answer: D**

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**22.** In the Lassaigne's test, the blood red colouration is due to the formation of

A. $Fe(CNS)$

B. $NaCNS$

C. $NH_4CNS$

D. $Fe(CNS)_3$

**Answer: D**

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**23.** In Lassaigne's test for nitrogen the blue colour is due to the formation of

A. Potasium fericyanide

B. Sodium cyanide

C. Sodium ferrocyanide

D. Ferr-ferrocynaide

**Answer: D**

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**24.** In Kjeldahl's method, nitrogen present is estimated as :

A. $N_2$

B. $NO$

C. $NH_3$

D. $NO_2$

**Answer: C**

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**25.** The percentate of sulphur in the organic, when $0.2595g$ of a sulphur containing organic compound in a quantitative analysis by Carius method yielded $0.35g$ of barium sulphate is

A. $14.52\ \%$

B. $16.52\ \%$

C. $18.25\ \%$

D. $19.52\ \%$

**Answer: C**

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**26.** If $0.228g$ of silver salt of dibasic acid gabe a residue of $0.162g$ of silver on ignition then molecular weight of the acid is

A. 70

B. 80

C. 90

D. 100

**Answer: C**

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**27.** In Carius tube the compound $ClCH_2 - COOH$ was heated with fuming $HNO_3$ and $AgNO_3$.After filtration and washing,a white ppt.was formed

The ppt. is

A. $AgCl$

B. $AgNO_3$

C. $Ag_2SO_4$

D. $ClCH_2COOHAg$

**Answer: A**

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**28.** Lassaigne's test for the detection of nitrogen fails in

A. $NH_2CONHNH_2$

B. $NH_2NH_2.HCl$

C. $NH_2CONH_2$

D. $C_6NHNH_2.HCl$

**Answer: B**

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**29.** The compound that does not give a blue colour in Lassaigne's test is

A. Aniline

B. Glycine

C. Hydrazine

D. Urea

**Answer: C**

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**30.** The Lassaigne's extract is boiled with dil. $HNO_3$ before testing for halogens because

A. Silver halides are solube in $HNO_3$

B. $Na_2S$ and $NaCN$ are decomposed by $HNO_3$

C. $Ag_2S$ is soluble is $HNO_3$

D. $AgCN$ is soluble is $HNO_3$

**Answer: B**

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**31.** In Carius tube the compound $ClCH_2 - COOH$ was heated with fuming $HNO_3$ and $AgNO_3$.After filtration and washing,a white ppt.was formed

The ppt. is

A. $AgNO_3$

B. $AgCl$

C. $Ag_2SO_4$

D. $ClCH_2COOHAg$

**Answer: B**

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**32.** If 0.24 g of a volatile liquid upon vaporization gives 45 ml of vapours at NTP.What will be the vapour density of the substance ? (Density of $H_2 = 0.089gL^{-1}$)

A. $95.39$

B. $39.95$

C. $99.53$

D. $59.93$

**Answer: D**

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**33.** In sodium fusion test of roganilc compound, the nitrogen of a organic compound is converted into [If only $C$, $H$, $N$ are present

A. $NaCN$

B. $NaNH_2$

C. $NaNO_2$

D. $Na_3N$

**Answer: A**

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**34.** Which of the following will give blood red colour with $FeCl_5$ in sodium extract?

A. $NH_2CONH_2$

B. $NH_2CSNH_2$

C. $CH_5NHNH_2$

D. $CH_3C \equiv N$

**Answer: B**

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**35.** Sulphide ions react with $Na_2\left[Fe(NO)(CN)_5\right]$ to form a purple coloured compound $Na_4\left[Fe(CN)_5(NOS)\right]$. In the reaction, the oxidation state of iron:

A. Sulphur, $Na_4\left[Fe(CN)_2NOS\right]$

B. Nitrogen, $Na_4\left[Fe(CN)_6\right]$

C. Sulphur, $Na_2\left[Fe(CN)_4NOS\right]$

D. Sulphur, $Na_2[Fe(CN)NOS]$

**Answer: A**

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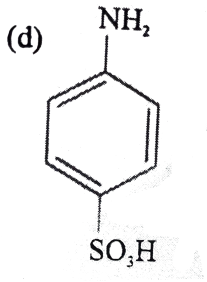
**36.** Which of the following will not give test for $N$ in sodium extract?

A. $CH_5NHNH_2$

B. $NH_2CONH_2$

C. $NH_2 - NH_2$

D. (d) 


**Answer: C**

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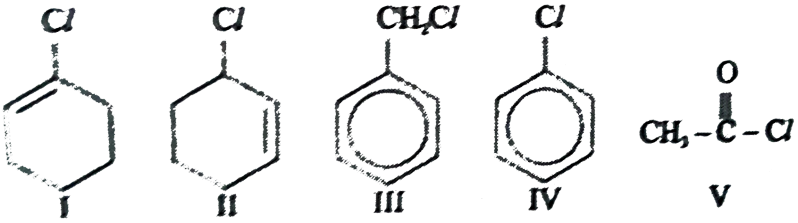
**37.** Which of the following compounds, when heated with $HNO_3$ (conc), cooled and then treated with $AgNO_3$ a white pot, is formed. The compound can be




A. I,II,III or IV

B. II,III

C. IV and V

D. I,II,III,V

**Answer: B**

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**38.** A substance was known by its mode of synthesis to contain $10$ atoms of carbon per molecule along with unknown number of atoms of chlorine, hydrogen and oxygen. Analysis showed 60.5% carbon 5.5% hydrogen, 16.10% oxygen and 17.9% chlorine. The molecular formula of compound is

A. $C_{10}H_8Cl_2$

B. $C_{10}H_{11}O_2Cl$

C. $C_{10}H_{10}Ocl$

D. $C_{10}H_{12}O_2Cl$

**Answer: B**

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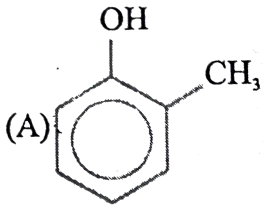
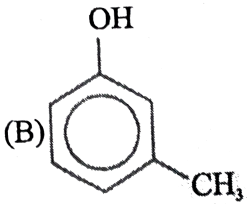
**39.** Compound $A, C_7H_8O$, is insoluble in water, dilute $HCl$, and aquenous $NaHCO_3$, it dissolves in dilute $NaOH$. When $A$ is treated with bromine water is is converted rapidly into a compound of formula $C_7H_5Obr_3$. The structure of $A$ is

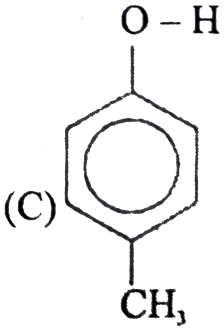
A.



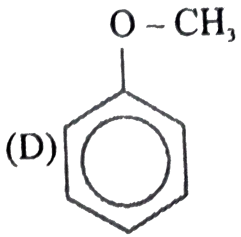

B.




C.



D.




**Answer: B**

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**40.** Compounds I and II can be distinguished by using reagent.

(I) -4-Amino-2-methylbut-3-en-ol

(II) -4-Amino-2,2dimethylbut-3-yn-1-ol

A. $NaNO_2 / HCl$

B. $Br_2 / H_2O$

C. $HCl / ZnCl_2$ (anhydrous)

D. $Cu_2Cl_2 / NH_4OH$

**Answer: C**

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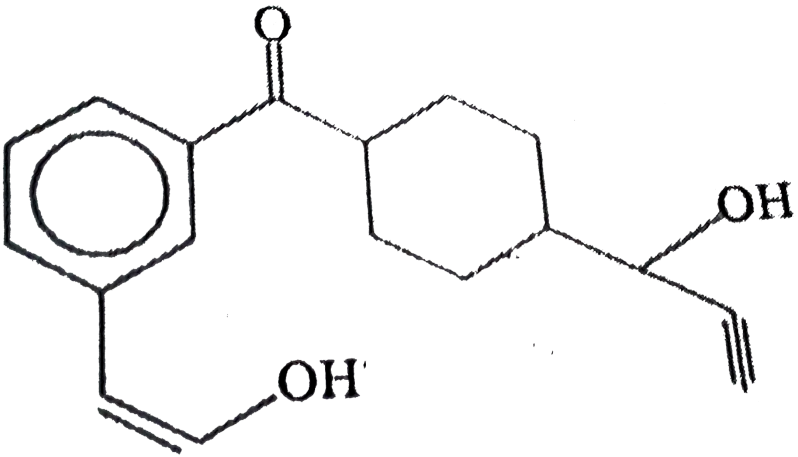
**41.** A set of reagents (1 to 8) are successively rected with the following compound




1. $NaHCO_3$ 2. 2,4, DNP

3. $Na$ metal 4. $AgNO_3 + NH_4OH$

5. Fehling's solution 6. $Cu_2 + NH_4OH$

7. $Br_2 / H_2O$ 8. $NaNO_2 + HCl$

THe reagents which give positive test with the given compound are:

A. 1,2,3,4,5,

B. 3,4,5,6,8

C. 1,2,3,4,8

D. All reagents except 1 and 8

**Answer: D**

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**42.** Which one of the following will not give white precipitate with ammonical silver nitrate solution

A. $CH_3 = C^\circ C - CH_3$

B. $CH_3 - \underset{\underset{CH_3}{|}}{CH} - C \equiv \ - CH_3$

C. $CH_3 - CH_2 - CH = CH_2$

D. all of these

**Answer: D**

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**43.** Which of the following alcohols will show positive iodoforms test?

A. $CH_3 - \overset{\overset{OH}{|}}{CH} - CH_2 - NO_2$

B. $CH_3 - \overset{\overset{OH}{|}}{CH} - CH_2 - COOH$

C. $ICH_2 - \overset{\overset{OH}{|}}{CH} - CH_2 - CH_3$

D. none of these

**Answer: C**

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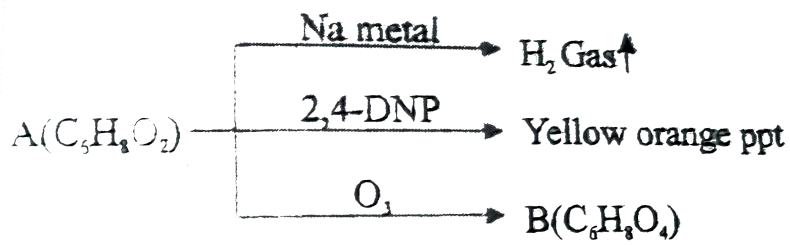
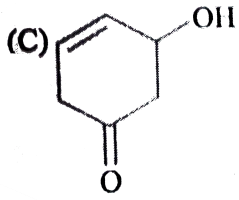
**44.** The compound $A$ gives following reactions.

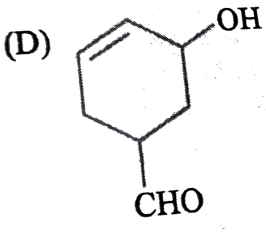



It structure can be

A. $CH_2 = CH - (CH_2)_2 - \underset{\underset{O}{||}}{C} - CH_2OH$

B. $OHC - (H_2C)_2 - HC = HC - COOH$

C. 


D. 


**Answer: C**

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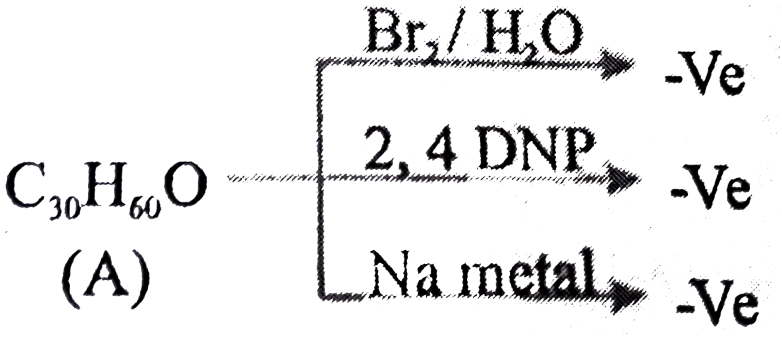
**45.** In compound $A(C_{30}H_{60}O)$ following tests are observed negatively. A can be




A. an unsaturated ether

B. an epoxide

C. a cyclic ketone

D. a cycloalanol

**Answer: B**

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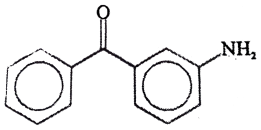
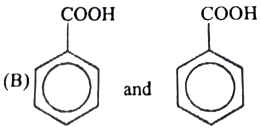
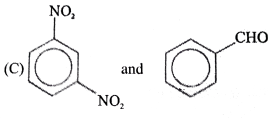
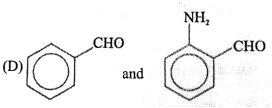
**46.** A mixture of two organic compound gives red coloured precipitate with cuprous chloride and silver mirror on heating with Zn and $NH_4Cl$ followed by $AgNO_3 + NH_4OH$ solution . The mixture contains :

A. 


B. 


C. 


D. 


**Answer: C**

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**47.** Give the correct order of initials $T$ or $F$ for following statements. Use $T$ if statement is true and $F$ if it is false.

$X$ (molecular formula, $C_7H_6O_2$) is an aromatic which solid which liberates colourles, odourless gas on reacting with $Na\overset{14}{H}CO_3$

$S_1$ : Only three of the five functional isomers of $X$ (including $'X'$ itself) will gie positive 2, 4-DNP test.

$S_2$: The liberated colourless, odourles gas will containng radioactive $.^{14}C$.

$S_3$: Except $'X'$ no other functional isomer will liberate colourles odourless gas with $NaH\overset{14}{C}O_3$.

$S_4$: The DU of higher homolog of $'X'$ will be four.

A. TTTF

B. FTTF

C. FTTT

D. TTFF

**Answer: D**

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Mcq Type

**1.** Which of the following organic compounds will give white precipitate with $AgNO_3$?

A. $C_6H_5NH_3^+Cl^-$

B. $NaCl$

C. 2, 4, 6-Trinitrochlorobenzene

D. Benzyl chloride

**Answer: A::B::C::D**

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**2.** Ethanol and ethanal are distinguished by

A. Fehling's solution test

B. Tollen's reaget test

C. Iodoform test

D. Cerric ammonium nitrate

**Answer: A::B::D**

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**3.** $HCOOH$ and $CH_3COOH$ can be distinguished by

A. Tollen's reagent

B. Fehling's solution

C. $KKnO_4$

D. $NaHCO_3$

**Answer: A::B::C::D**

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**4.** The desiccants used for absorbing water during Liebig's method for estimation of carbon and hydrogen are

A. anhydrous $CaCl_2$

B. anhdyrous $Na_2SO_4$

C. $Mg(ClO_4)_2$

D. $MgSO_4.7H_2O$

**Answer: A::C**

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**5.** $HCOOH$ and $CH_3COOH$ can be distinguished by

A. Tollen's reagent

B. Fehling's solution

C. $KMnO_4$

D. $NaHCO_3$

**Answer: A::B::C::D**

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6. $HCOOH$ and $HCHO$ may be distinguished by

A. Tollen's test

B. sodium bicarbonate test

C. 2,4,-DNP test

D. Benedict's test

**Answer: B::C**

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7. $CH_3CHO$ and $C_6H_5CH_2CHO$ can be distinguished chemically by

A. Tollelen's test

B. Benedict's test

C. Iodoform test

D. 2,4-DNP test

**Answer: B::C**

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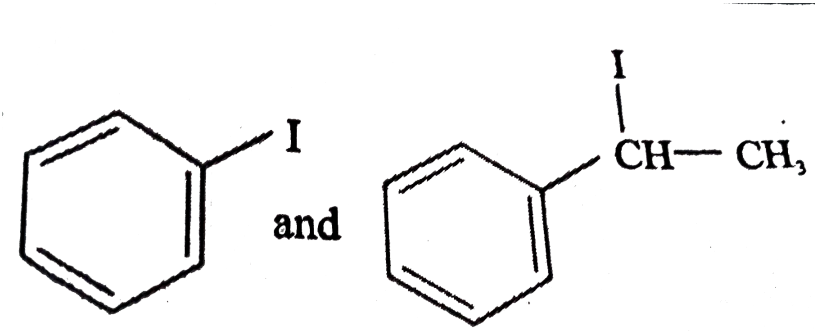
8. 

can be distinguished by

A. adding aqeuous $AgNO_3$

B. iodoform test

C. aqueous sodium hydroxide followed bny oxidation, followed by 2,4-DNP test

D. adding $NaHCO_3$

**Answer: A::B::C::D**

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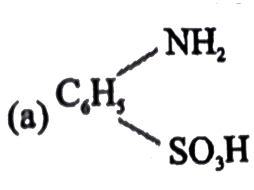
**9.** Which of the following will give blood red colour with $FeCl_5$ in sodium extract?

A. 

B. $H_2N - \overset{S}{\overset{||}{C}} - NH_2$

C. $CH_3 - \overset{O}{\overset{||}{C}} - NH_2$

D. $H_2N - \overset{O}{\overset{||}{C}} - NH_2$

**Answer: A::B**

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**10.** A compound that gives a psitive idoform test is

A. $CH_3 - \overset{\overset{O}{||}}{C} - COOH$

B. $CH_3 - \overset{\overset{OH}{||}}{C}H - COOH$

C. $CH_3 - \overset{\overset{OH}{||}}{C}H - CH_3$

D. $CH_3CH_2OH$

**Answer: A::B::C::D**

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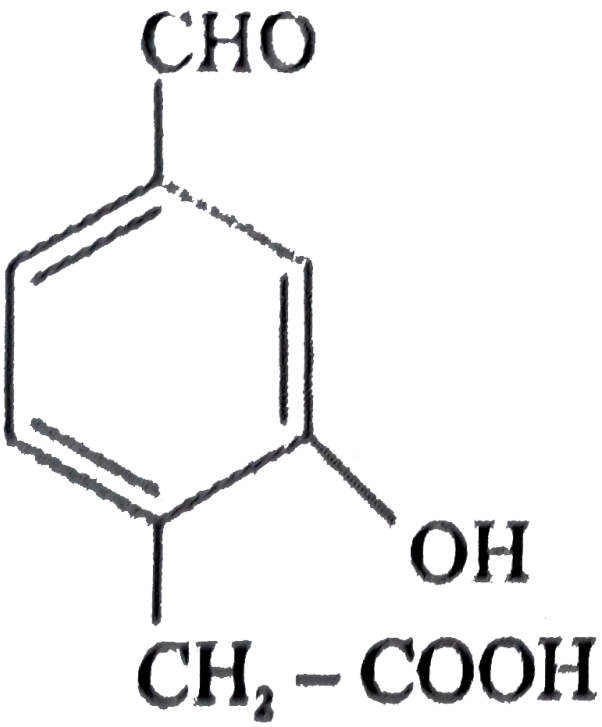
**11.** An organic compound has the structure




It will give

A. cerric ammonium nitrate test

B. give brisk effervescence with sodium bicarbonate

C. it will give a characteristic colouration with neutral ferric chloride, after decarbodylation and reduction by Clemmenson's method

D. it will give Fehling's test

**Answer: B::C**

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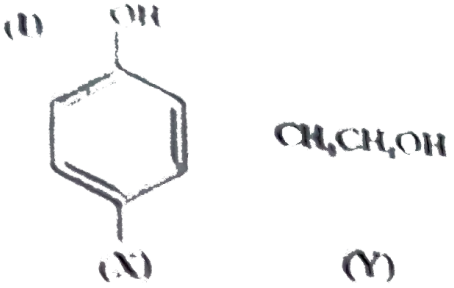
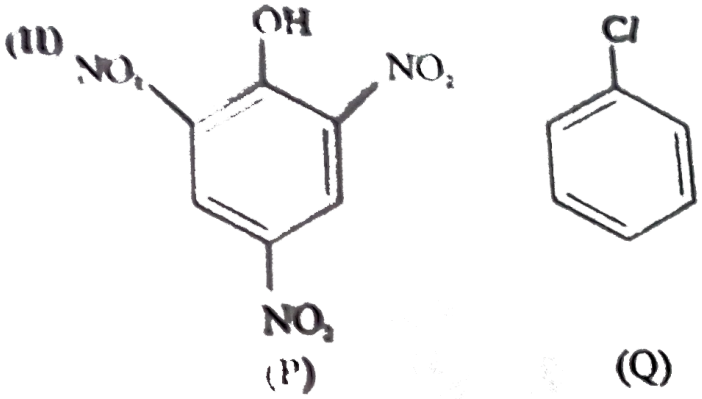
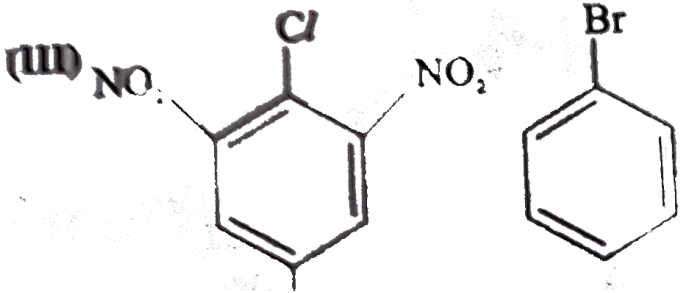
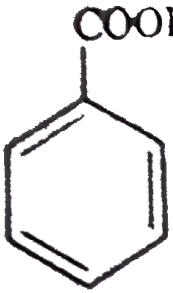
**12.** The most reactive among the following pairs towards $NaOH$ is



(Z) (R)

(IV) 

HCOOH

(S) (T)

A. In I-X

B. In II-Q

C. In III-Z

D. In IV-T

**Answer: A::B**

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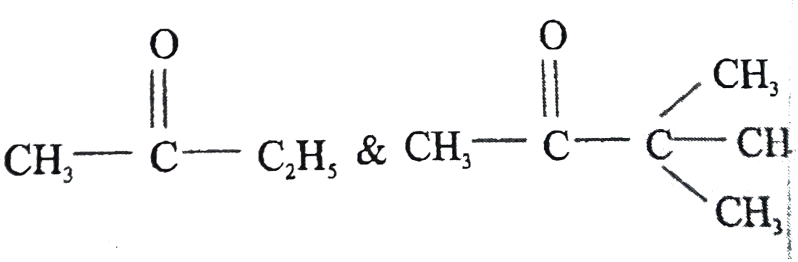
13. $CH_3 - \overset{\overset{O}{||}}{C} - C_2H_5$ & $CH_3 - \overset{\overset{O}{||}}{C}$-



cannot be distinguished by

A. 2,4,-DNP

B. iodoform reactiion

C. $NaHSO_3$

D. Na metal

**Answer: A::B::D**

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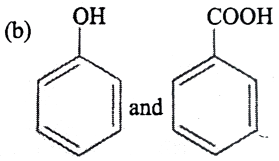
**14.** Which of the these can be distinguished by adding $HCl$ or $Na_2CO_3$?

A. $R - NH_2$ and $R - Cl$

B. (b) 


C. $CH_3CH_2OH$ and $CH_3\underset{\underset{OH}{|}}{C}HCH_3$

D. $CH_3 - \underset{\underset{O}{||}}{C} - CH_3$ and $CH_3CH_2CHO$

**Answer: A::B**

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**15.** Which of the following reactions occur during the detection of nitorgen in organic substances by Lassaigne's test?

A. $Na + C + N \rightarrow NaCN$

B. $FeSO_4 + 6NaCN \rightarrow Na_4\left[Fe(CN)_6\right] + Na_2SO_4$

C.

$$Na_4\left[Fe(CN)_6\right] + 2Fe_2(SO_4)_3 \rightarrow Fe_4\left[Fe(CN)_6\right]_3 + 6Na - (2)SO_4$$

D. none of these

**Answer: A::B::C::D**

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**16.** A compund reacts with $CHCl_3$ and $KOH$ gives offensive smelling compound $A$. '$A$' can be

A. Primary aliphatic amine

B. Primary aromatic amine

C. $2^\circ$ amine

D. Tertiary amine

**Answer: A::B**

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**17.** $HCOOH$ and $HCHO$ may be distinguished by

A. Tollen's test

B. sodium bicarbonate test

C. 2,4,DNP test

D. Benedict's test

**Answer: B::C**

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**18.** Benzaldehyde and $CH_3COCl$ can be distinguished by

A. Tollen's test

B. Bendict's test

C. Iodoform test

D. 2,4,DNP test

**Answer: B::C**

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**19.** Acetic acid and $CH_3COCl$ can be distinguished by

A. $NaHCO_3$test

B. $Na$ metal test

C. Ester formation test

D. $Br_2(aq)$ test

**Answer: A::B**

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**20.** An organic compund contains $52\ \%$ carbon. If could be

A. ethanol

B. dimethyl ether

C. diethyl ether

D. acetic acid

**Answer: A::B**

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**21.** Which of the following will evolve $CO_2$ on reaction with $NaHCO_3$?

A. Salicylic acid

B. picric acid

C. Benzoic acid

D. 4-Nitrobenzoic acid

**Answer: A::B::C::D**

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**22.** Which of the following wil give benzoic acid on acidic hydrolysis?

A. Phenyl cyanide

B. Benzoyl chloride

C. Benzyl chloride

D. Methyl benzoate

**Answer: A::B::D**

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**23.** Which of the following does not give brick red ppt. with Fehling solution ?

A. $HCHO$

B. $HCOOH$

C. Glucose

D. Fructose

**Answer: A::B::C::D**

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**24.** Which of the following compounds can be purified by steam distillation?

A. Salicyladehyde

B. Bromobenzene

C. p-Hydroxybenzaldehyde

D. Nitrobenzene

**Answer: A::B::D**

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**25.** Which of the following compounds can be purified by vaccum distillation?

A. Glycerine

B. Glycerol

C. Propane-1,2,3-triol

D. Rthanol

**Answer: A::B::C::D**

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**26.** Chromatography technique is used in the separation of:

A. Volatile liquids

B. Glycerol

C. Plant pigments

D. Sugars

**Answer: B::C::D**

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**27.** Mixed melting point of an organic compound is determine to

A. check the purity of an organic compound

B. check whether the two compounds are same

C. check whether the two compounds are differents

D. check whether the two compounds can be separated by fractional crystallization.

**Answer: A::B::C**

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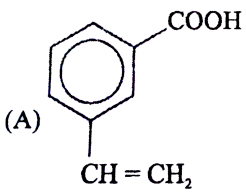
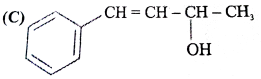
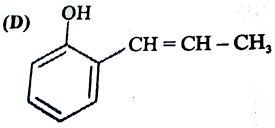
**28.** Compound $'P'(C_{10}H_{12}O)$ evolves $H_2$ gas with $Na$ metal. It reaches with $Br_2/\mathrm{CCl}_4$ to give $'Q'(C_{10}H_{12}Br_2O)$. With $\frac{I_2}{N}aOH$ it forms iodoform andan acid $'R'(C_9H_8O_2)$. $'P'$ has geometrical and optical isomers. The sturcture of $'P'$ and $'R'$ should be

A. 


B. $PH - CH = CH - COOH$

C. 


D. 


**Answer: B::C**

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**29.** Compound $(X) C_9H_{10}O$ in inert to $Br_2/CCl_4$. Vigorous oxidation with hot alkaline $KMnO_4/O\overline{H}$ yields $C_6H_5COOH$ . $(X)$ gives precipitate with 2,4,-dinitrophenyl hydrazine. How casn these isomers be distinguished by the usual chemical tests?

Following are possible isomers of $X$:

(I) $C_6H(5) - CH_2 - CH_2 - CHO$

$$CH_6H_5 - \underset{\underset{CH_3}{|}}{CH} - CHO$$

(III) $C_6H_5 - CH_2 - \overset{\overset{O}{||}}{C} - CH_3$

(IV) $CH_6H_5 - \overset{\overset{O}{||}}{C} - CH_2 - CH_3$

A. I give red ppt with Fehling solution and II & III canbe distinguished by iodoform test

B. I & II canbe distinguished by simple chemcial method

C. I & II give red ppt. with Fehlilng solution and III & IV can be distinguished by iodoform test

D. II give red ppt. Fehling solution and I & IV can be distinguished by iodoform test.

**Answer: A::C**

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**30.** Which is/are the correct method for separatig a mixture of benzoic acid p- methylaniline & phenol

A. $\xrightarrow{aq.NaHCO_3} \xrightarrow{aq.NaOH}$

B. $\xrightarrow{aq.HCl} \xrightarrow{aq.NaHCO_3}$

C. $\xrightarrow{aq.NaOH} \xrightarrow{aq.NaHCO_3}$

D. $\xrightarrow{aq.NaOH} \xrightarrow{aq.HCl}$

**Answer: A::B**

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## Ar Type

**1.** A: $1^\circ, 2^\circ, 3^\circ$ Amines can be distinuished by diethyl oxalage.

R: $1^\circ$ amines from $N$-alkyl oxamide solid product $2^\circ$ amine form oxamic ester which is liquid $3^\circ$ amine do not react.

A. Both A and R are true and R is correct explanation of A

B. Both A and R are true but R is not correct explanation of A

C. A is true R is false.

D. A is false, R is true

**Answer: A**

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**2.** In the Victor Meyer's test, the colours given by $1^{\circ}$, $2^{\circ}$ and $3^{\circ}$ alcohols are respectively :

A. Both A and R are true and R is correct explanation of A

B. Both A and R are true but R is not correct explanation of A

C. A is true R is false.

D. A is false, R is true

**Answer: B**

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**3.** A: Aceteldehyde reacts with alkaline solution of sodium nitroprusside to give red colouration.

R: Acetaldehyde is a good reducing agent.

A. Both A and R are true and R is correct explanation of A

B. Both A and R are true but R is not correct explanation of A

C. A is true R is false.

D. A is false, R is true

**Answer: B**

View Text Solution

**4.** A: Secondary amines and phenols undergo Liebermann nitroso reaction.

R: Secondary amines are move basic than primary amines.

A. Both A and R are true and R is correct explanation of A

B. Both A and R are true but R is not correct explanation of A

C. A is true R is false.

D. A is false, R is true

**Answer: B**

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**5.** A: An organic compound on diazotisation followed by reaction with alkaline solution of $\beta$- naphthol gives orange dye.

R: An organic compound is aromatic amino compound which forms diazonium salts and undergoes coupling reaction to from azo dye.

A. Both A and R are true and R is correct explanation of A

B. Both A and R are true but R is not correct explanation of A

C. A is true R is false.

D. A is false, R is true

**Answer: A**

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**6.** Statement -1: Only one Aldehyde $'X'$ responds positively with all the tests of carbonyl compunds like Tollen's tests, Fehling test, `2,4,DNP test, as well as iodoform test.

Statement-2 All aldehydes respnds all the forur test given in assertion.

A. Statement -1 is True,Statement -2 is True, Statement -2 is a correct explanation for statement -1.

B. Statement -1 is True, Statement -2 is True, Statement 2 is NOT a correct explanation for Statement -1

C. Statement -1 is True, Statement-2 is False

D. Statement -1 is Fals, Statement -2 is True

**Answer: C**

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**7.** Statement-1:A mixture of p-Methylbenzoic acid and picric acid is separated by $NaHCO_3$ solution.

Statement-2:p-Methylbenzoic acid is soluble in $NaHCO_3$ because it gives effervesence of $CO_2$

A. Statement -1 is True,Statement -2 is True, Statement -2 is a correct explanation for statement -1.

B. Statement -1 is True, Statement -2 is True, Statement 2 is NOT a correct explanation for Statement -1

C. Statement -1 is True, Statement-2 is False

D. Statement -1 is Fals, Statement -2 is True

**Answer: D**

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Match The Column

**1.** (A) Vital Force Theory (i) Steam distillation

(B) Wohler (ii) Rectified spirit

(C) Azeotropic mixture (iii) Synthesis of urea

(D) Kolbe (iv) Berzelius

(E) Aniline (v) Synthesis of acetic acid

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**2.** Match the following:

| | |
|---|---|
| $(A)$Simple distillation | $(i)$to separate the liquids which are steam vola insoluble in water and contains non-volatile im |
| $(B)$Fractional distillation | $(ii)$to separate liquids which decomposes at a t below their normal boiling points |
| $(C)$Vaccum distillation | $(iii)$to separate two or more liquids which hav points close to each other |
| $(D)$Steam distillation | $(iv)$to separate liquid from non-volatile impur |

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3. Match the following columns

| Column-I<br>Mixture | Column-II<br>Method of separation |
|---|---|
| (a) Aniline and $CCl_4$ | (p) Chromatography |
| (b) Glycerol | (q) Steam distillation |
| (c) Benzoic acid | (r) Distillation under reduced pressure |
| (d) Amino acids from mixture | (s) Sublimation |

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4. Match the following columns

**Column-I (Reaction)**

(a) $Na_4[Fe(CN)_5NO] + Na_2S \rightarrow$

(b) $NaSCN + FeCl_3 \rightarrow$

(c) $Na_4[Fe(CN)_6] + Fe^{3+} \rightarrow$

(d) $Na_3PO_4 + (NH_4)_2MoO_4 \xrightarrow{HNO_3}$

**Column-II (Product/colour)**

(p) Yellow ppt. of $(NH_4)_3PO_4.12\ MoO_3$.

(q) Blue colouration due to $Fe_4[Fe(CN)_6]_3$

(r) Blood red colour due to $Fe(SCN)_3$

(s) Violet colour due to $Na_4[Fe(CN)_5NOS]$

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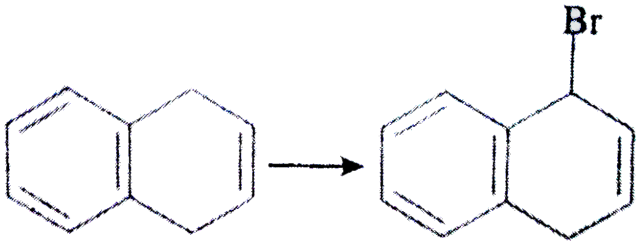
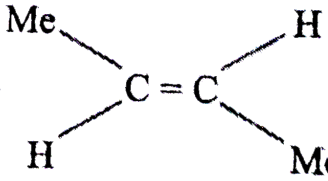
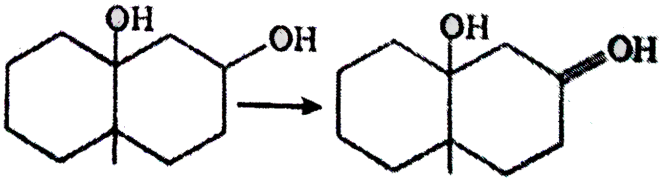
(p)




(q) $MeC \equiv CMe \rightarrow$

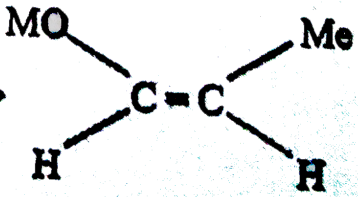



(r)




(s) $CH_3COOH \rightarrow CH_2=C=O$

(t) $MeC \equiv CMe \rightarrow$




5.

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**Column -I**

(a) Ammonical $AgNO_3$ (b) $I_2/NaOH$

(c) $NaHCO_3$ (d) Ozonolysis

**Column II**

(p)Detect or confirm the position of double bond

(q) Presence of strongly acidic group

(r) Presence of acetylinic group or CHO group

(s) Presence of $\underset{Cl}{\overset{|}{C}}H-CH_3$

6. (t) Presence of carboxylic group

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**Column -I**

(a) Cerric ammonium nitrate

(b) $FeCl_3$

(c) $NaHCO_3$

(d) Victor Meyer's test

**Column II**

(p) COOH

(q) P,S, t-$NO_2$ compound

(r) PhOH

(s) R-OH

7. (t) Presence of strongly acidic groups

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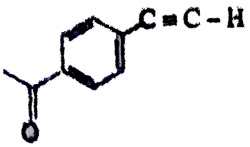
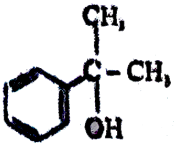
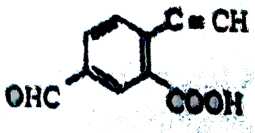
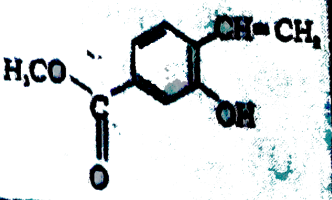
8.

| Column - I | Column - A |
| --- | --- |
| (A) Sodium metal | (X)  |
| (B) Sodium bicarbonate | (Y)  |
| (C) 2, 4-Dinitrophenylhydrazine | (Z)  |
| (D) Lucas reagent | (W)  |

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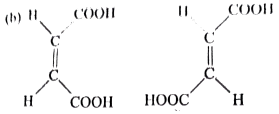
Comprehension Type

**1.** A mixture of carboxyliic acids $(X)$ and $(Y)$ cannot be separated by normal methods however when this mixture is treated with optically active quinine give optically acitve salts $(P)$ and $(Q)$. These two salts can be separated by fractional crystallization, separated and acidified with $HCl$ to from amines and carboxylic acids.

The compound $(X)$ and $(Y)$ may be

A. $CH_3COOH, CH_3CH_2COOH$

B. 


C. $(+)$ and $(-)$ - Tartaric acid

D. $CH_3CH_2CH_2COOH, CH_3CH_2CH_2CH_2COOH$

**Answer: C**

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**2.** A mixture of carboxylic acids $(X)$ and $(Y)$ cannot be separated by normal methods howerver when this mixture is treated with optically active quinine give optically acitve salts $(P)$ and $(Q)$. These two salts can be separated by fractional crystallization, separated and acidified with $HCl$ to from amines and carboxylic acids.

$(P)$ and $(Q)$ are separated by fractiional crystallization due to

A. difference in boiling point

B. difference in solubility

C. difference in melting poilnt

D. difference in thermal stability

**Answer: B**

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**3.** What is the diastereoisomer of $(+)$ - tartaric acid?

A. $(-)$ - Tartaric acid

B. Maleic acid

C. meso-Tartaric acid

D. all of these

**Answer: C**

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**4.** To arrive at the molecular formula and at the structural formula the different steps involved are

(a) Qualitative analysis, (b) Quantitative analysis

In the qualitative analysis the different steps involved are

(a) Extra element detection

(b) Functional group analysis

In the quantitative analysis the percentage of every element is determined and then the emperical and molecular formulae are

determined. Both these are followed by structural elucidation.

Which of the following tests will phloroglucinol give?

A. $NaHCO_3$ test

B. Iodoform test

C. Oxime test with $NH_2OH$

D. Cerric ammonium nitrate test

**Answer: C**

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**5.** To arrive at the molecular formula and at the structural formula the different steps involved are

(a) Qualitative analysis, (b) Quantitative analysis

In the qualitative analysis the different steps involved are

(a) Extra element detection

(b) Functional group analysis

In the quantitative analysis the percentage of every element is

determined and then the emperical and molecular formulae are determined. Both these are followed by structural elucidation.

Which of the following reagents can be used to identify benzene in on go?

A. Bromine water test

B. $CHCl_3 + AlCl_3$ (anhydrous) test

C. $I_2 + NaOH$

D. No test is available

**Answer: B**

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**6.** To arrive at the molecular formula and at the structural formula the different steps involved are

(a) Qualitative analysis, (b) Quantitative analysis

In the qualitative analysis the different steps involved are

(a) Extra element detection

(b) Functional group analysis

In the quantitative analysis the percentage of every element is determined and then the emperical and molecular formulae are determined. Both these are followed by structural elucidation.

The number of $-OH$ groups in a compound not containing any other functional group can be determined by

A. $CH_3COCl$

B. $CHMgBr$

C. $CH_3OCH_3$

D. Both (a) and (b)

**Answer: D**

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**7.** Test Q: A compound $'X'$ was fused with $Na$ metal and the extract gave a white precipitate with $AgNO_3$. The Lassaigne's extract gave a red colouration with neturl $FeCl_3$. Test -R while compound $'Y'$ when fused

with $Na$ methal and subsequent analysis on its Lasaigne's extract did not give any characteristic test. Test -S while compund $Y$ on fusion with fusion mixture (sodium carbonate $+$ potassium nitrate) $Na_2O_2$, followed by extraction, followed by addition of conc. $HNO_3$ and ammonium molybdate give a yelow precipitate.

The formula of yellow precipitate is

A. will contain halogens

B. may contain halogens

C. may contain only sulphur

D. will contain only nitrogen

**Answer: B**

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**8.** Test Q: A compound $'X'$ was fused with $Na$ metal and the extract gave a white precipitate with $AgNO_3$. The Lassaigne's extract gave a red colouration with neturl $FeCl_3$. Test -R while compound $'Y'$ when fused

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The chemical reaction taking place in $Y$, when it is fused with fusion mixture ils

A. $3Na + P + 4O \rightarrow Na_3PO_4$

B. $3Na_2CO_3 + 2P + [O] \rightarrow 2Na_3PO_4 + 3CO_2$

C. $3KNO_3 + P + 3O \rightarrow K_3PO_4 + 3NO_2 + O_2$

D. none of these

**Answer: B**

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**9.** Test Q: A compound $'X'$ was fused with $Na$ metal and the extract gave a white precipitate with $AgNO_3$. The Lassaigne's extract gave a red

colouration with neturl $FeCl_3$. Test -R while compound $'Y'$ when fused with $Na$ methal and subsequent analysis on its Lasaigne's extract did not give any characteristic test. Test -S while compund $Y$ on fusion with fusion mixture (sodium carbonate $+$ potassium nitrate) $Na_2O_2$, followed by extraction, followed by addition of conc. $HNO_3$ and ammonium molybdate give a yelow precipitate.

The formula of yellow precipitate is

A. $(NH_4)_3PO_4$

B. $MO(PO_4)$

C. $(NH_4)_3PO_4.12MoO_3$

D. $Mo(PO_4\_(2)$

**Answer: C**

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**10.** Steam distillation is used to purify a compound which is steam principle volatile and insoluble in water. The impurities should not be

steam volatile. It is based on the principle that liquid will boil when partial vapour presure of liquid and partial vapour pressure of steam both become equal to atmospheric presure $P = p_1 + p_2$.

It reduces the boiling point of liquid.

$$\frac{\text{Wt. of water distilled}}{\text{Wt. of substance distilled}} = \frac{\text{M. Wt. of water} \times V.P. \quad \text{of steam}}{M.Wt. \text{ of substance} \times \text{V.P. substance}}$$

Whilch of the following is steam volatile?

A. o- nitrophenol

B. p-nitophenol

C. p-hydroxybenzaldehyde

D. Ethanol

**Answer: A**

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**11.** Steam distillation is used to purify a compound which is steam principle volatile and insoluble in water. The impurities should not be

steam volatile. It is based on the principle that liquid will boil when partial vapour presure of liquid and partial vapour pressure of steam both become equal to atmospheric presure $P = p_1 + p_2$.

It reduces the boiling point of liquid.

$$\frac{\text{Wt. of water distilled}}{\text{Wt. of substance distilled}} = \frac{\text{M. Wt. of water} \times V.P. \quad \text{of steam}}{M.Wt. \text{ of substance} \times \text{V.P. substance}}$$

Calculate weight of aniline distilled if weight of water distilled is $100g$ when $P_{\text{organic compound}} = 100mmHg$ and $P_{H_2O} = 200mmHg$.

A. $250g$

B. $258g$

C. $100g$

D. $25.8g$

**Answer: B**

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**12.** Steam distillation is used to purify a compound which is steam principle volatile and insoluble in water. The impurities should not be steam volatile. It is based on the principle that liquid will boil when partial vapour presure of liquid and partial vapour pressure of steam both become equal to atmospheric presure $P = p_1 + p_2$.

It reduces the boiling point of liquid.

$$\frac{\text{Wt. of water distilled}}{\text{Wt. of substance distilled}} = \frac{\text{M. Wt. of water} \times V.P. \quad \text{of steam}}{M.Wt. \text{ of substance} \times \text{V.P. substance}}$$

Which of the following cannot be separated by steam distillation?

A. Nitrobenzene

B. Essential oil

C. Aniline

D. Glycerol

**Answer: D**

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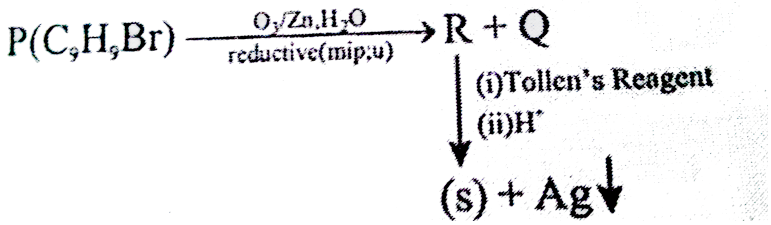
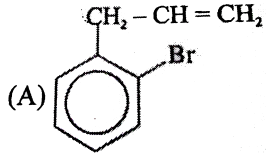
**13.** Observe the following sequence of reactions

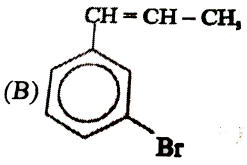


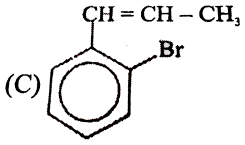

$P$ shows geometrical isomersm. $Q$ gives positive Tollen's test and the oxidation product of Tollen's test followed by acidification is the strongest acids among its all position isomers.

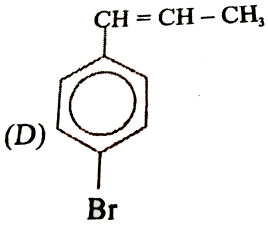
$R$ gives positive lab test with 2,4,-DNP, Fehling solution and $I_2 / NaOH$ reagents.

The compound $P$ can be

A. 


B. 


C. 

D. 


**Answer: B**

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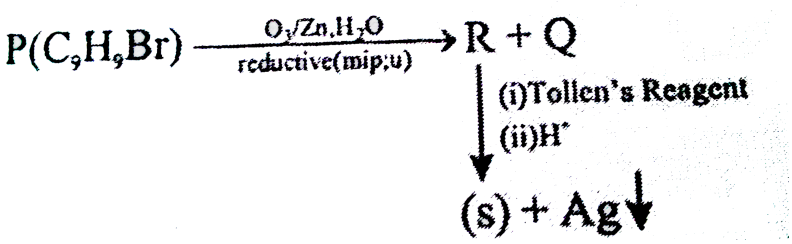
**14.** Observe the following sequence of reactions



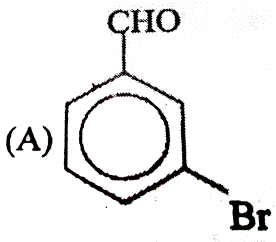

$P$ shows geometrical isomers. $Q$ gives positive Tollen's test and the oxidation product of Tollen's test followed by acidification is the strongest acis among its all position isomers.

$R$ gives positive lab test with 2,4,-DNP, Fehling solutioni and $I_2 / NaOH$ reagents.

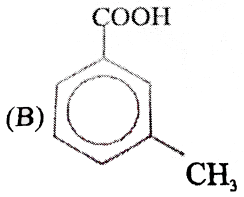
What could be the structure of $Q$?

$[GOC - POC]$

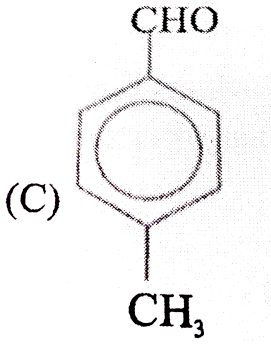
A.



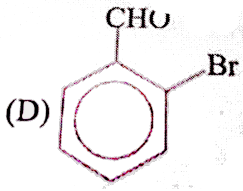

B.




C.




D.




**Answer: B**

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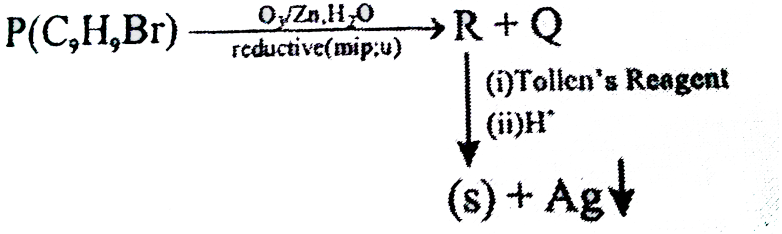
**15.** Observe the following sequence of reactions




$P$ shows geometrical isomersm. $Q$ gives positive Tollen's test and the oxidation product of Tollen's test followed by acidification is the strongest acis among its all position isomers.

$R$ gives positive lab test with 2,4,-DNP, Fehling solutioni and $I_2 / NaOH$ reagents.

Identify the structure of $R[GOC - POC]$

A. $HCOOH$

B. $CH_3CHO$

C. $BrCH_2CHO$

D. $H - \overset{O}{\overset{||}{C}} - Br$

**Answer: C**

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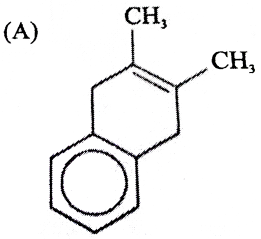
**16.** An aromatic compound $T(C_{10}H_{10}O_2)$ give 2 moles of $CHI_3$ and compound $U(C_8H_4O_4Na_2)$ on treatment with $I_2$ and $NaOH$. After acidification $U$ gives two mononitro products on nitration. [GOC-POC]

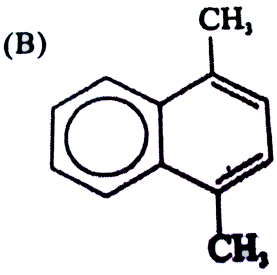
Compound $(T)$ can also be obtained by ozonolysis of $V$, in this ozonolysis one mole of $OHC-CHO$ is obtained alongwith $(T)$.

Possible structure for Compound $V$ could be

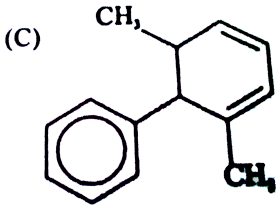
A.



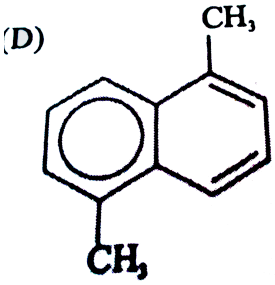

B.



C.




D.




**Answer: B**

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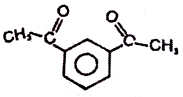
**17.** An aromatic compound $T(C_{10}H_{10}O_2)$ give 2 moles of $CHI_3$ and compound $U(C_8H_4O_4Na_2)$ on treatment with $I_2$ and $NaOH$. After acidification $U$ gives two mononitro products on nitration. [GOC-POC]

Compound $(T)$ can also be obtained by ozonolysis of $V$, in this ozonolysis one mole of $OHC-CHO$ is obtained alongwith $(T)$.

Which of the following statement is true [GOC-POC]

A. $T$ is (A) T is 

B. Compound $(V)$ decolourises pink colour of diluted solution of $KMnO_4$

C. All isomers (only acidic) of $U$ after acidifcation gives one mole of $CO_2$ with $NaHCO_3$

D. After acidifacition of $(U)$, it is most acidic in its all other isomers.

**Answer: D**

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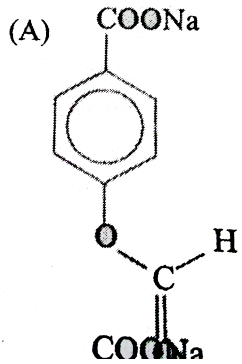
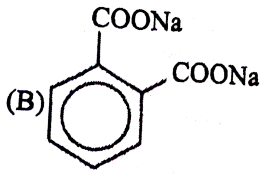
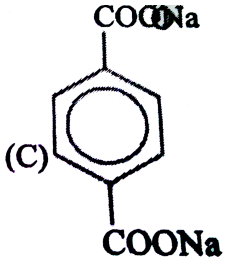
**18.** An aromatic compound $T(C_{10}H_{10}O_2)$ give 2 moles of $CHI_3$ and compound $U(C_8H_4O_4Na_2)$ on treatment with $I_2$ and $NaOH$. After acidification $U$ gives two mononitro products on nitration. [GOC-POC]

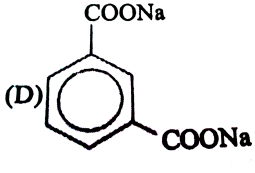
Compound $(T)$ can also be obtained by ozonolysis of $V$, in this ozonolysis one mole of $OHC-CHO$ is obtained alongwith $(T)$.

Compund $U$ is [GOC-POC]

A. 


B. 


C. 


D. 


**Answer: B**

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Subjective Type

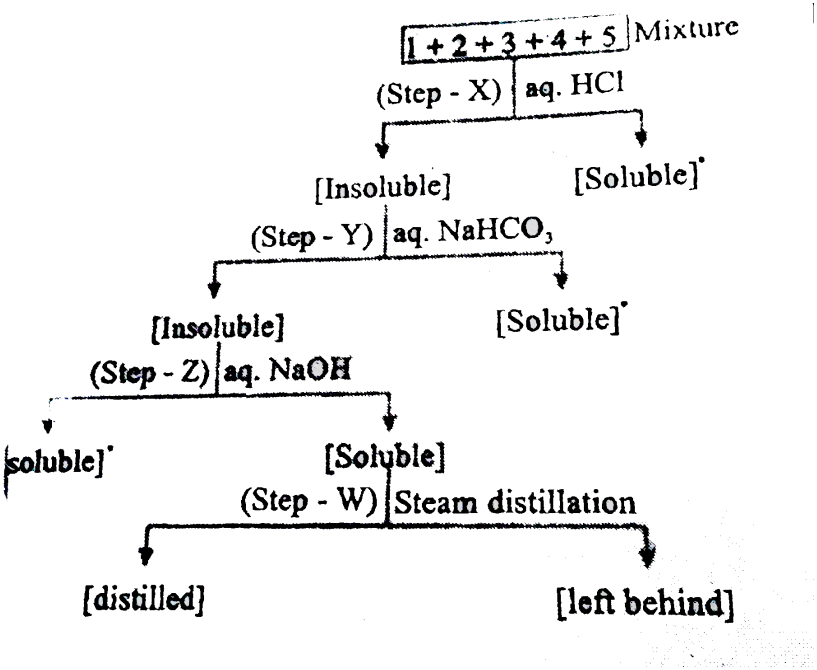
**1.** A water insoluble organic mixture contained following compounds.

(1) = Benzoic acid (2) = Salicylaldehyde

(3) = p-Hdroxybenzaldehyde

(4) = a-Naphthylamine (5) = Naphthalene

The following sequence of reagents are used to separate this mixture

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Others

**1.** Compound $P(C_6H_{10})$ does not have any geometrical isomer. On ozonolysis, two product $R(C_3H_4O)$ and $Q(C_3H_6O)$ are formed. $R$ gives negative iodoform test while $Q$ respnds positively towards $I_2/NaOH$ solution. $S$, another isomer of $P$ is an unsymetrical alkene nad on ozonolysis produces $T(C_6H_{10}O_2)$ which also gives a yellow precipate with $I_2/NaOH$ solution and also gives positive test with Tollen's reagent. Which of the following does not represent any of the molecules amongst $P$, $Q$, $R$, $S$ & $T$

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