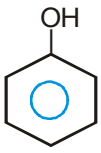
SOLVED EXAMPLES

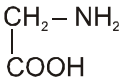
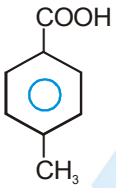
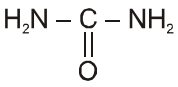
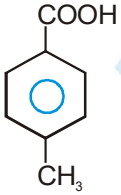
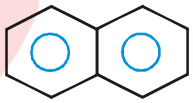
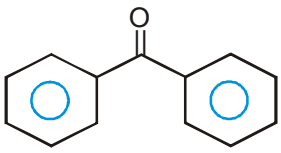
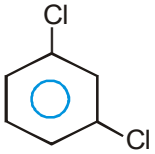
Ex.  + Glucose (Q) → Solvent (H_2O) → soluble / insoluble

(P)

Identify P, Q

Sol. I → Q, II → P

Ex. Binary mixtures - (Two components)

	A		B	Appropriate Solvent
(1)		+		H_2O
(2)		+		H_2O
(3)	Fructose	+		H_2O
(4)		+		aq. $NaHCO_3$
(5)		+		aq. NaOH
(6)		+		aq. HCl

Exercise # 1 [Single Correct Choice Type Questions]

1. Which of the following is a basic dye –
(A) Alizarin (B) Phthalein (C) Aniline yellow (D) Orange-I

2. Diazo coupling is useful to prepare some –
(A) Pesticides (B) Dyes (C) Proteins (D) Vitamins

3. Which of the following is an azo dye –
(A) Methyl orange (B) Phenolphthalein (C) Malachite green (D) Methylene blue

4. An antipyretic is –
(A) Quinine (B) Paracetamol (C) Luminal (D) Piperazine

5. Medicine which is an antibiotic is –
(A) Ampicillin (B) Aspirin (C) Chloroquine (D) None of these

6. Alizarin belongs to the class of –
(A) Vat dyes (B) Mordant dyes (C) Substantive dyes (D) Reactive dyes

7. Paracetamol is a/an –
(A) Both antipyretic and analgesic (B) Analgesic
(C) Antipyretic (D) Antimalarial

8. Which of the following compounds is aspirin –
(A) Methyl salicylate (B) Acetylsalicylic acid (C) Phenyl salicylate (D) Salicylic acid

9. Sulpha drugs are derivatives of –
(A) Benzene sulphonic acid (B) Sulphanilic acid (C) Sulphanilamide (D) p - aminobenzoic acid

10. Which of the following is a natural dye –
(A) Phenolphthalein (B) Alizarin (C) Martius yellow (D) Malachite green

11. The drugs used to get relief from pain are called :
(A) Antipyretics (B) Analgesics (C) Antibiotics (D) Antiseptics

12. Which of the following is not an antiseptic drug ?
(A) Iodoform (B) Dettol (C) Gammexane (D) Gentian violet

13. A medicine which promotes secretion of urine is called :
(A) Diuretic (B) Antipyretic (C) Analgesic (D) Sedative

14. Morphine is used as an
(A) Antipyretic (B) Antiseptic (C) Analgesic (D) Insecticide

15. Which of the following is not an alkaloid ?
(A) Reserpine (B) Morphine (C) Quinine (D) Phenylbutazone

16. The antibiotic used for curing tuberculosis is :
(A) Penicillin (B) Streptomycin (C) Tetracycline (D) Chloromycetin

17. The antiseptic action of Dettol is due to
(A) Chlorobenzene (B) Chloroxylenol (C) Chloroquine (D) Chloramphenicol

18. Which of the following is an ingrain dye ?
(A) Alizarin (B) Cellition fast blue B (C) Para red (D) Indigo

19. Which of the following is a direct dye ?
(A) Congo red (B) Martius yellow (C) Phenolphthalein (D) Both (A) and (B)

20. A dye which is obtained from a largely grown plant in India is
(A) Indigo (B) Turmeric (C) Malachite green (D) Martius yellow

21. Which of the following is a disperse dye ?
(A) Congo red **(B)** Alizarin **(C)** Butter yellow **(D)** Celliton fast pink B

22. A composite solid propellant is
(A) N_2O_4 + acrylic rubber **(B)** N_2O_4 + monomethylhydrazine (MMH)
(C) Polyurethane + ammonium perchloride **(D)** Nitrocellulose + nitroglycerine

23. Which of the following is an azo dye ?
(A) orange-I **(B)** Malachite green **(C)** Indigo **(D)** Martius yellow

24. Dyes which are prepared right on the fabric during dyeing process are called :
(A) Direct dyes **(B)** Azo dyes **(C)** Disperse dyes **(D)** Basic dyes

25. Which one is an acidic dye ?
(A) Methyl orange **(B)** Congo red **(C)** Orange-I **(D)** All the three

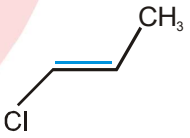
26. The PSLV rocket used
(A) Only solid propellants **(B)** Only monoliquid propellants
(C) Only biliquid propellants **(D)** Both solid and biliquid propellants

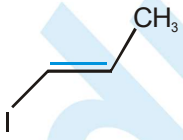
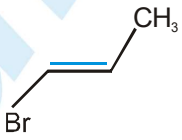
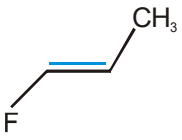
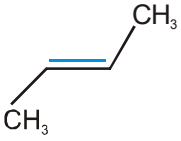
27. Octane number is zero for -
(A) Isoheptane **(B)** n-heptane **(C)** Isooctane **(D)** n-octane

28. Petroleum is obtained from water gas, name of the reaction involved is -
(A) Fischer-tropsch **(B)** Bergius **(C)** Dow's **(D)** Kjeldahl's

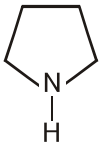
29. Which of the following represents a double base propellant ?
(A) Nitromethane **(B)** Nitrocellulose + nitroglycerine
(C) N_2O_4 + monomethylhydrazine **(D)** Liquid H_2 + liquid O_2

30. Which of the following represents a biliquid propellant ?
(A) Liquid N_2O_4 + unsymmetrical dimethylhydrazine (UDMH)
(B) Liquid N_2O_4 + acrylic rubber
(C) Nitroglycerine + nitrocellulose
(D) Polybutadiene + ammonium perchlorate

31. Which will have higher dipole moment than  ?

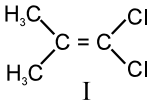
(A)  **(B)**  **(C)**  **(D)** 

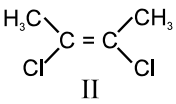
32. False statement about dipole moment is :
(A) Dipole moment is a vector quantity.
(B) Dipole moment depends on charge.
(C) Geometrical isomers have same dipole moment.
(D) Optical isomers have same dipole moment.

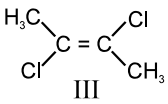
33. Which will have higher dipole moment than  ?

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

34. Arrange the following in decreasing order of dipole moments.


I


II


III

(A) I > II > III **(B)** III > II > I **(C)** III > I > II **(D)** II > I > III

35. Dipole moment is shown by :

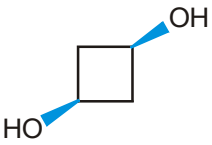
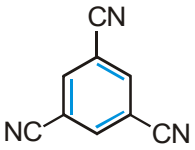
(A) 1,4–Dichlorobenzene **(B)** Trans–1–chloroprop–1–ene

(C) E–1,2 –Dibromoethene **(D)** $CH_2 = C = CH_2$

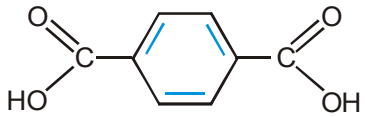
36. Which will have highest dipole moment ?

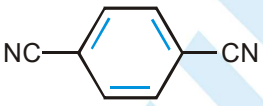
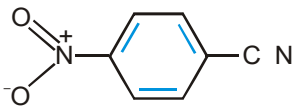
(A) CH_3–F **(B)** CH_3–Cl **(C)** CH_3–Br **(D)** CH_3–I

37. Which of the following has net dipole moment ?

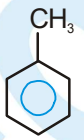
(A)  **(B)**  **(C)**  **(D)** 

38. Which compound should have zero dipole moment ?

(A)  **(B)** 

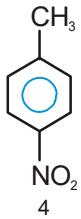
(C)  **(D)** 

39. The increasing order of dipole moment of following compounds is :


1

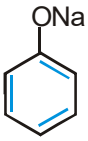

2

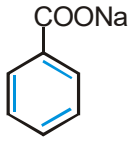

3

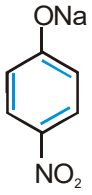

4

(A) 3 < 1 < 4 < 2 **(B)** 1 < 4 < 3 < 2 **(C)** 1 < 3 < 4 < 2 **(D)** 1 < 3 < 2 < 4

40. Which compound have maximum dipole moment ?

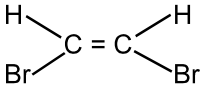
(A) 

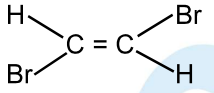
(B) 

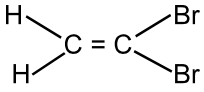
(C) 

(D) 

41. Which of the following isomers having molecular formula $C_2H_2Br_2$ has highest dipole moment and boiling point but lowest melting point.

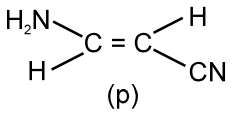
(A) 

(B) 

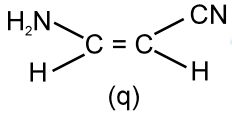
(C) 

(D) Not applicable to any single isomer

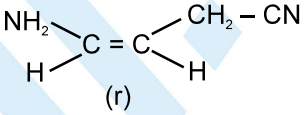
42. The correct order of dipole moment is :



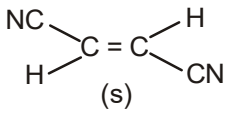
(p)



(q)



(r)



(s)

(A) p > r > q > s **(B)** q > p > r > s **(C)** r > s > q > p **(D)** p > q > r > s

43. Correct boiling point order for I to IV is :

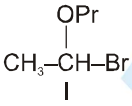
CH_3F (I) CH_3Br (II) CH_3Cl (III) CH_3I (IV)

(A) I > II > III > IV **(B)** IV > III > II > I **(C)** II > IV > I > III **(D)** IV > II > III > I

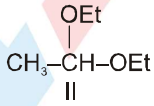
44. Which property of organic compound decreases boiling point.

(A) Increase in length of hydrocarbon chain **(B)** Increase in H-bonding
(C) Increase in molecular weight **(D)** Decrease in size of halogen

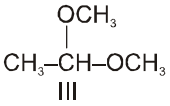
45. Decreasing order of boiling point of I - IV follows.



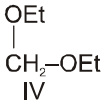
I



II



III



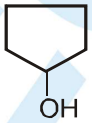
IV

(A) I > II > III > IV **(B)** I > II > IV > III **(C)** IV > III > II > I **(D)** II > I > III > IV

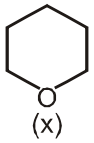
46. (I) 1,2-dihydroxy benzene (II) 1,3-dihydroxy benzene
(III) 1,4-dihydroxy benzene (IV) Hydroxy benzene
The increasing order of boiling points of above mentioned alcohols is

(A) I < II < III < IV **(B)** I < II < IV < III **(C)** IV < I < II < III **(D)** IV < II < I < III

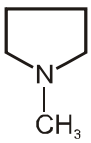
47. Arrange the following in decreasing order of their boiling points.



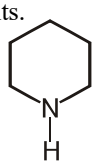
(w)



(x)



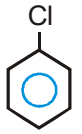
(y)



(z)

(A) w > x > z > y **(B)** w > x > y > z **(C)** w > z > y > x **(D)** w > z > x > y

48. The correct boiling point order is :



1

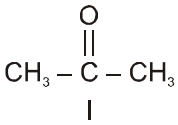
2

3

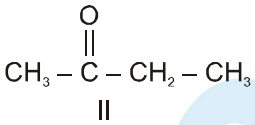
4

(A) 4 > 1 > 3 > 2 **(B)** 2 > 3 > 1 > 4 **(C)** 1 > 2 > 3 > 4 **(D)** 2 > 4 > 1 > 3

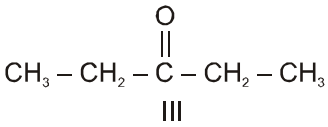
49. Decreasing order of boiling point of I to IV follow.



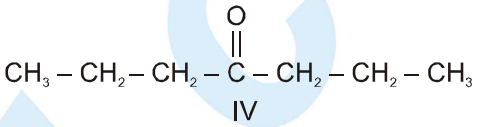
I



II



III



IV

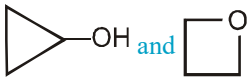
(A) I > II > III > IV **(B)** IV > III > II > I **(C)** II > III > IV > I **(D)** I > IV > III > II

50. Decreasing order of boiling point of I to IV follow

Methylformate	Ethylformate	Iso-propylformate	n-propylformate
I	II	III	IV

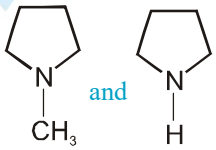
(A) I > II > III > IV **(B)** III > IV > II > I **(C)** IV > III > II > I **(D)** I > II > IV > III

51. In which case second has higher boiling point than first ?

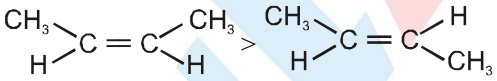
(A) 

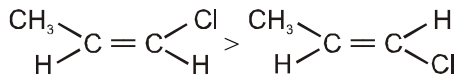
(B) 

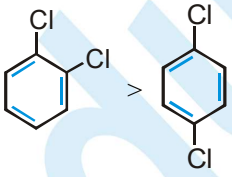
(C) 

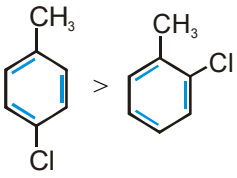
(D) 

52. Which order is correct regarding melting point ?

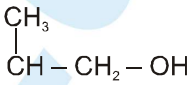
(A) 

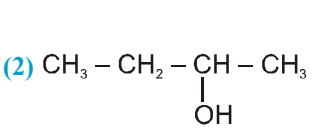
(B) 

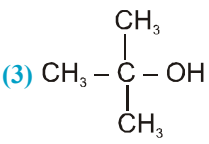
(C) 

(D) 

53. Identify the correct order of melting point of the following compounds

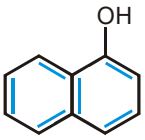
(1) 

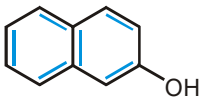
(2) 

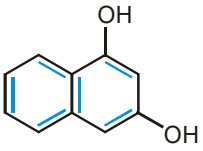
(3) 

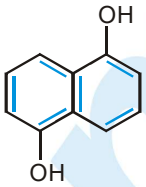
(A) 3 > 1 > 2 **(B)** 3 > 2 > 1 **(C)** 1 > 2 > 3 **(D)** 2 > 1 > 3

54. Which will have highest melting point ?

(A) 

(B) 

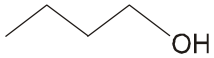
(C) 

(D) 

55. Which compound has highest melting point ?

(A) o-Dibromobenzene **(B)** m-Dibromobenzene
(C) p-Dibromobenzene **(D)** Bromobenzene

56. Which will have highest melting point ?

(A)  **(B)** 

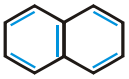
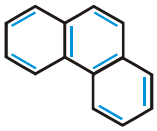
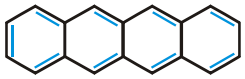
(C) 

(D) 

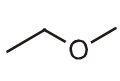
57. Which will have highest melting point ?

(A) orthohydroxyphenol **(B)** metahydroxyphenol
(C) parahydroxyphenol **(D)** paramethylphenol

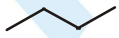
58. Which of the following compounds have highest melting point ?

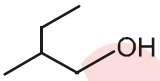
(A)  **(B)**  **(C)**  **(D)** 

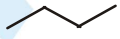
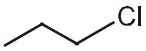
59. In which case first has higher melting point than second?

(A) 

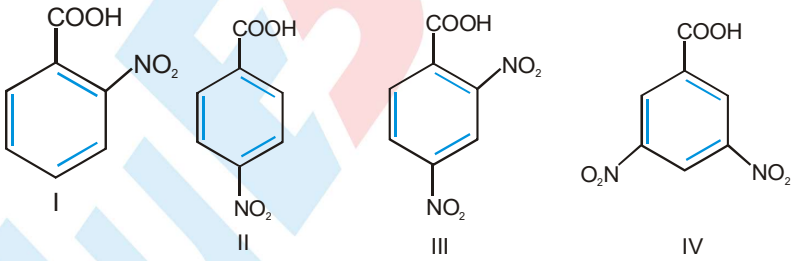
and 

(B)  and 

(C)  and 

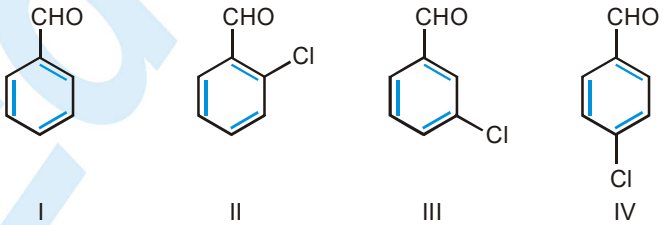
(D)  and 

60. Decreasing order of melting point of compound I to IV follows.



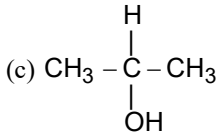
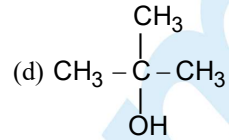
(A) I > II > III > IV **(B)** IV > III > II > I **(C)** III > IV > II > I **(D)** III > IV > I > II

61. Decreasing order of melting point of compound I - IV follows :



(A) IV > III > II > I **(B)** I > II > III > IV **(C)** II > III > IV > I **(D)** II > IV > III > I

62. The correct order of solubility in water is :

(a) CH_3OH (b) CH_3CH_2OH (c)  (d) 

(A) a > b > c > d **(B)** b > a > c > d **(C)** d > a > b > c **(D)** b > c > a > d

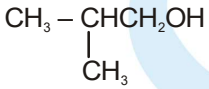
63. Which have maximum solubility in water, for nearly same molecular weight compounds.

(A) Alkane **(B)** Alkene **(C)** Alcohol **(D)** Ether

64. Which alcohol has least solubility in water ?

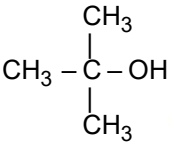
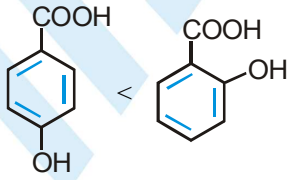
(A) Ethanol **(B)** Propan-1-ol **(C)** Butan-1-ol **(D)** Pentan-1-ol

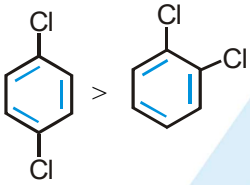
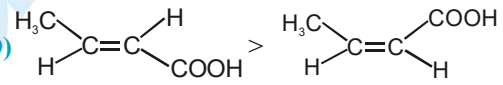
65. Which of the following has lowest solubility in water ?

(A) $CH_3CH_2CH_2OH$ **(B)** 

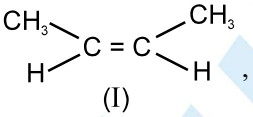
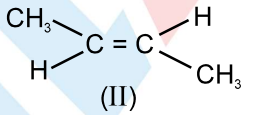
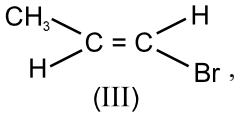
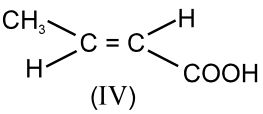
(C) $HOCH_2–CH_2OH$ **(D)** $C_6H_5CH_2CH_2OH$

66. Correct water solubility order/s amongst the following pairs is/are :

(A) $CH_3–CH_2–CH_2–CH_2–OH >$  **(B)** 

(C)  **(D)** 

67. Arrange the following in decreasing order of their solubility in water

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

(A) III > I > II > IV **(B)** III > IV > I > II **(C)** IV > III > I > II **(D)** IV > III > II > I

68. In which case first has higher solubility than second ?

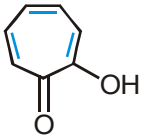
(I) Phenol, Benzene (II) Nitrobenzene, Phenol

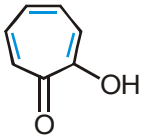
(III) o–Hydroxybenzaldehyde, p–Hydroxy benzaldehyde (IV) CH_3CHO, $CH_3–O–CH_3$

(V) o–Nitrophenol, p–Nitrophenol (VI) 

(A) only I **(B)** III, V **(C)** I, IV **(D)** I, IV, VI

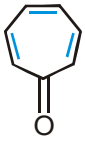
69. Which of the following statement is correct about tropolone?

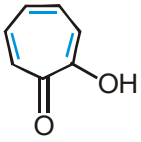


(A) Solubility of  (tropolone) is less than  (tropone).

(B) Tropolone has more stability and aromatic character than tropone.
(C) Tropolone has higher dipole moment than tropone.
(D) Tropolone has lower boiling point than tropone.

70. Decreasing order of solubility of following compounds is :


I


II


III


IV

(A) I > II > III > IV **(B)** II > I > III > IV **(C)** II > III > I > IV **(D)** IV > III > II > I

71 Two immiscible liquids are separated by :
(A) separating funnel **(B)** fractional distillation
(C) chromatography **(D)** sublimation

72. Sublimation is a process in which a solid :
(A) changes into another allotropic form
(B) changes into liquid form
(C) changes into vapour form directly from solid form
(D) none of the above

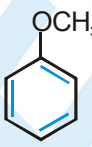
73. Anthracene is purified by :
(A) filtration **(B)** distillation **(C)** crystallisation **(D)** sublimation

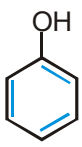
74. Which carboxylic acid has maximum solubility in water ?
(A) Malonic acid **(B)** Succinic acid **(C)** Salicylic acid **(D)** Phthalic acid

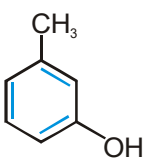
75. Methanol and acetone can be separated by :
(A) fractional distillation **(B)** distillation **(C)** steam distillation **(D)** vacuum distillation

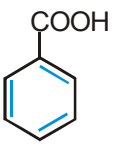
76. Glycerol is purified by :
(A) steam distillation **(B)** vacuum distillation **(C)** fractional distillation **(D)** simple distillation

77. Which of the following compounds does not form salt with NaOH ?

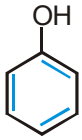
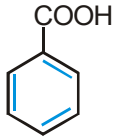
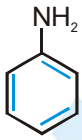
(A) 

(B) 

(C) 

(D) 

78. Which of the following compound cannot form salt with H_2O, $NaHCO_3$, NaOH and HCl ?

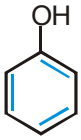
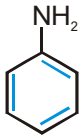
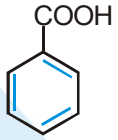
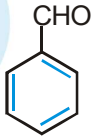
(A)  **(B)**  **(C)**  **(D)** 

79. The blood red colour in the combination test of nitrogen and sulphur in organic compound is due to the formation of :

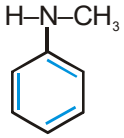
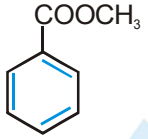
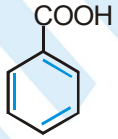
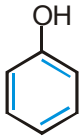
(A) ferric sulpho cyanide **(B)** ferric acetate

(C) ferrous sulpho cyanide **(D)** ferric cyanide

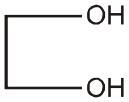
80. Which of the following compounds form salt with HCl ?

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

81. Which of the following compounds form salt with $NaHCO_3$?

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

82. Which of the following compounds can be separated by water ?

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

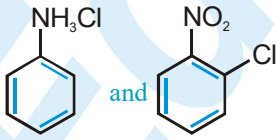
83. In Lassaigne's test, the organic compound is fused with sodium metal as to :

(A) hydrolyse the compound

(B) form a sodium derivative

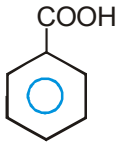
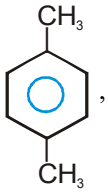
(C) convert nitrogen, sulphur or halogens if present into soluble ionic sodium compound

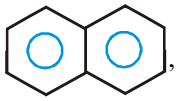
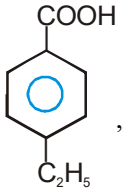
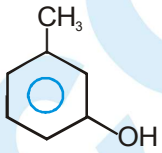
(D) burn the compound

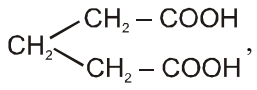
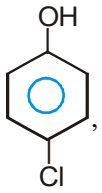
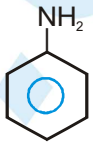
84  can be differentiated by :

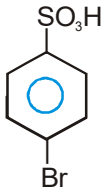
(A) Ammoniacal $AgNO_3$ **(B)** Fehling solution **(C)** $FeCl_3$ **(D)** Br_2 / H_2O

85. When the mixture of [A + B + C] is dissolved in $NaHCO_3$, A dissolves in $NaHCO_3$, B & C remain as a residue after that residue dissolves in aq. NaOH, C dissolves in it and B remains as residue. A, B and C will be respectively.

(A)  ,  , 

(B)  ,  , 

(C)  ,  , 

(D)  ,  , 

86. o-nitrophenol and p-nitrophenol can be separated by

(A) Fractional distillation **(B)** Steam distillation

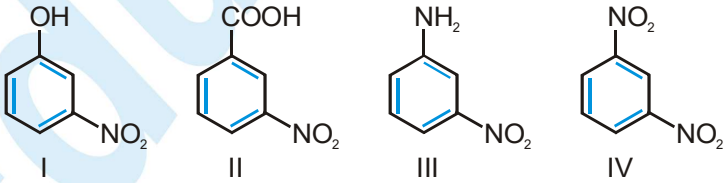
(C) Crystallization **(D)** Fractional crystallization

87. Which compound does not give positive Lassaigne's test for nitrogen ?

(A) Urea **(B)** Hydrazine

(C) Azobenzene **(D)** Phenyl hydrazine

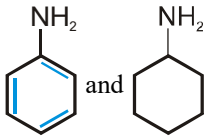
88. The order in which the reagent must be used to separate the compound I - IV is :



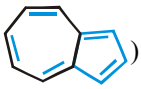
I II III IV

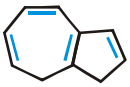
(A) NaOH, $NaHCO_3$, HCl **(B)** HCl, NaOH, $NaHCO_3$

(C) $NaHCO_3$, NaOH, HCl **(D)** NaOH, HCl, $NaHCO_3$

89.  and can be differentiated by :

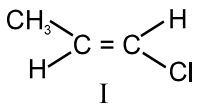
(A) $NaHCO_3$
(B) $CHCl_3$ and KOH
(C) $NaNO_2$, HCl then β-napthol
(D) NaOH

90. Azulene () has dipole moment 0.8 D because

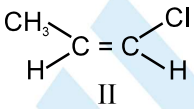
(A) It exists as aromatic compound  in which both the rings are aromatic.

(B) Charge separation permits conformational stability.
(C) The two rings are of different size.
(D) The molecules obey (4n + 2) Huckel rule.

91. Which of the following is correct set of physical properties of the geometrical isomers ?


I

&


II

	Dipole moment	Boiling point	Melting point	Stability
(A)	I > II	I > II	II > I	I > II
(B)	II > I	II > I	II > I	II > I
(C)	I > II	I > II	I > II	I > II
(D)	II > I	II > I	I > II	I > II

92. Decreasing order of boiling point of I to IV follow :

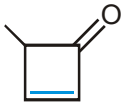
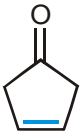
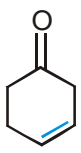
Methylacetate	Ethylacetate	Isopropylacetate	n-propylacetate
I	II	IIII	IV

(A) I > II > III > IV **(B)** III > IV > II > I **(C)** IV > III > II > I **(D)** I > II > IV > III

93. Which statement is incorrect ?
(A) Aspirin is an antibiotic.
(B) Methyl orange is an azo dye.
(C) Phenyl butazone is considered as a unsafe drug.
(D) The chemical name of aspirin is acetyl salicyclic acid

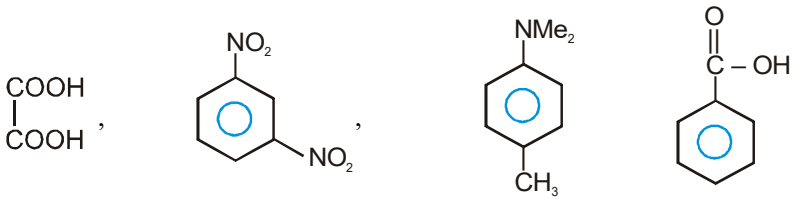
94. Which statement is incorrrect ?
(A) Salol is used as antiseptic.
(B) Tincture of iodine is 2-3% solution of iodoform in alcohol-water.
(C) Thiourea and benzenethiol can be separated by water.
(D) Aspartame is used as sweetening agent in cold drinks.

95. Which compound have maximum dipole moment ?

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

96. Which isomeric amine has lowest boiling point ?
(A) Primary amines **(B)** Secondary amine **(C)** Tertiary amine **(D)** Can not be predicted.

97. Which of the following is correct method for separating a mixture of following compounds ?



(A) $\xrightarrow{aq.NaHCO_3}$, $\xrightarrow{aq.NaOH}$, $\xrightarrow{aq.HCl}$

(B) $\xrightarrow{H_2O}$, $\xrightarrow{aq.NaHCO_3}$, $\xrightarrow{aq.HCl}$

(C) $\xrightarrow{aq.HCl}$, $\xrightarrow{aq.NaHCO_3}$, $\xrightarrow{aq.NaOH}$

(D) $\xrightarrow{aq.NaOH}$, $\xrightarrow{aq.NaHCO_3}$, $\xrightarrow{aq.HCl}$

98. A mixture of organic compounds A & B when dissolve in NaOH, A is soluble and its residue B gives positive test with Zn/ NH_4Cl followed by $AgNO_3 + NH_4OH$, (mulliken's barker test). Identify A & B

99. The correct orders about compounds I and II are :

I II

(A) B.P. $\longrightarrow$ I < II

(B) Water solubility $\longrightarrow$ I > II

(C) Acid strength $\longrightarrow$ I < II

(D) Melting point $\longrightarrow$ II > I

100. In which of the following pairs first has higher dipole moment than second ?

101. Which of the following compounds posses highest dipole moment.

(A) Naphthalene **(B)** Phenanthrene **(C)** Anthracene **(D)** Azulene

102. A mixture of two aromatic compound A and B when dissolve in NaOH, A is soluble and its residue B gives 2, 4 DNP test, identify compound A and B.

(A) Ph–COOH and Ph–OH

(B) $Ph-\overset{\overset{O}{\|}}{C}-Ph$ and $Ph-NH_2$

(C) $Ph-OH$ and $Ph-NH_2$

(D) $Ph-OH$ and $Ph-\overset{\overset{O}{\|}}{C}-Ph$

103. When a mixture of compound A & B dissolves in H_2O. A is soluble and gives smell of ammonia on heating with addition of conc. NaOH. Its residue B has sublimable nature. Identify A and B.

(A) $ArCONH_2$ and ArCOOH

(B) $R-\overset{\overset{O}{\|}}{C}-NH_2$ and 

(C) $\begin{matrix}COOH\\|\\COOH\end{matrix}$ and $Ar-NO_2$

(D) $Ar-\overset{\overset{O}{\|}}{C}-NH_2$ and 

104. Which of the following statement is not true ?

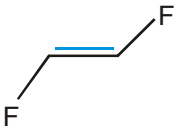
(A) Small aliphatic compound with at least two functional group which can form hydrogen bond are water soluble

(B) Most of the aromatic compounds are water insoluble due to large hydrophobic group of six carbon atom.

(C) Aromatic amines are soluble in aq. NaOH but insoluble in aq. HCl.

(D) Aromatic hydroxy compounds are soluble in aq. NaOH solution.

105. Which statement is incorrect ?

(A)  is having more melting point than 

(B) Oxalic acid is more soluble than adipic acid.

(C) Glycerol is more soluble in water than glycol.

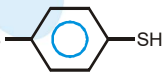
(D) p-methylphenol and p-methylbenzoic acid can be separated by NaOH.

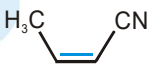
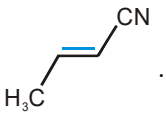
106. The boiling points of two miscible liquids, which do not form azeotropic mixture, are close to each other. Their separation is best carried out by :

(A) vacuum distillation **(B)** fractional distillation

(C) steam distillation **(D)** redistillation

107. Which statement is incorrect ?

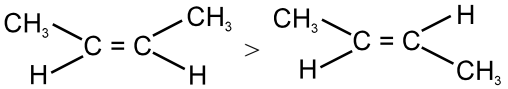
(A) Dipole moment of  is non zero.

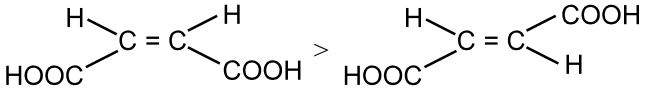
(B) Melting point of  is less than that of  .

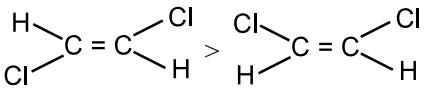
(C) Benzene, naphthalene and anthracene can be separated by water.

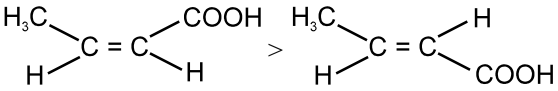
(D) Aniline and phenol can be separated by common acid HCl

108. The correct order for the given pair of isomers is :

(A)  (Melting point)

(B)  (Dipole moment)

(C)  (Boiling point)

(D)  (Water solubility)

109. Which of the following statement is incorrect ?

(A) Dicarboxylic acids are soluble in water and in aq. $NaHCO_3$.

(B) p-nitrochlorobenzene is soluble in aq. HCl

(C) m-chlorophenol is soluble in aqueous sodium hydroxide

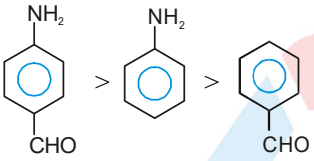
(D) Naphthalene and fumaric acid can be separated by water

110. Which is/are the correct method for separating a mixture of benzoic acid, p-methylaniline & phenol ?

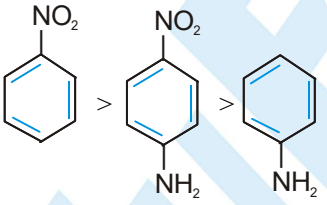
(A) $\xrightarrow{\text{aq. } NaHCO_3}$ $\xrightarrow{\text{aq. NaOH}}$ **(B)** $\xrightarrow{\text{aq. HCl}}$ $\xrightarrow{H_2O}$

(C) $\xrightarrow{\text{aq. NaOH}}$ $\xrightarrow{\text{aq. } NaHCO_3}$ **(D)** $\xrightarrow{\text{aq. NaOH}}$ $\xrightarrow{\text{aq. HCl}}$

111. Which of the following is listed for correct order of polarities :

(A) 

(B) $\underset{\text{(trans)}}{CH_3-CH=CH-NO_2} > \underset{\text{(cis)}}{CH_3CH=CH-NO_2}$

(C) 

(D) $CH_3–CH_3 > CH_3–CH_2–Cl$

Exercise # 2 Part # I [Assertion & Reason Type Questions]

Each question has 5 choices (A), (B), (C), (D) and (E) out of which only one is correct.

(A) STATEMENT-1 is true, STATEMENT-2 is true and STATEMENT-2 is correct explanation for STATEMENT-1
(B) STATEMENT-1 is true, STATEMENT-2 is true and STATEMENT-2 is not correct explanation for STATEMENT-1
(C) STATEMENT-1 is true, STATEMENT-2 is false
(D) STATEMENT-1 is false, STATEMENT-2 is true
(E) Both STATEMENTS are false

1. **Statement-1 :** Lassaigne's test is not shown by diazonium compounds.
   Statement-2 : Diazonium compounds lose N_2 on heating before they combine with fused sodium.

2. **Statement-1 :** Antipyretics bring down body temperature during high fever.
   Statement-2 : Tetracycline is a tranquillizer.

3. **Statement-1 :** Aspirin can cause ulcer in the stomach.
   Statement-2 : The ester group in aspirin gets hydrolysed to acid group in the stomach where the pH is 2.

4. **Statement-1 :** Mixture of glucose and *m*-dinitrobenzene can be separated by shaking it with water.
   Statement-2 : Glucose is soluble in water.

5. **Statement-1 :** A mixture of camphor and benzoic acid cannot be separated by sublimation.
   Statement-2 : Camphor on heating sublimes but benzoic acid does not.

6. **Statement-1 :** A mixture of *o*-nitrophenol and *p*-nitrophenol can be separated by steam distillation.
   Statement-2 : *o*-nitrophenol is steam volatile but *p*-nitrophenol is not though both are water soluble.

7. **Statement-1 :** Sulphanilamide is an antimalarial.
   Statement-2 : Malaria is a highly widespread infectious disease.

8. **Statement-1 :** Detergents are preferred to soaps for washing purposes.
   Statement-2 : Detergents having branched hydrocarbon chains are non-biodegradable.

9. **Statement-1 :** Phenol and benzoic acid can be separated by NaOH.
   Statement-2 : NaOH is a base which form salt with benzoic acid.

10. **Statement-1 :** Urea and naphthalene can be separated by water.
    Statement-2 : Polar compound is soluble in water but non-polar compounds are insoluble in water.

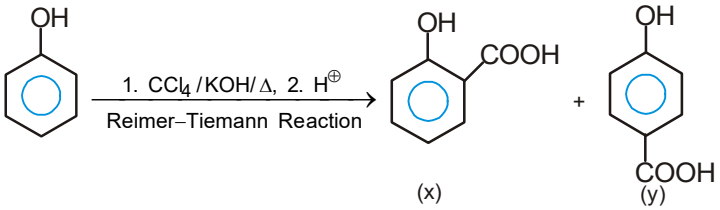
11. **Statement-1 :** p-Hydroxybenzoic acid has a lower boiling point that o-hydroxybenzoic acid.
    Statement-2 : o-Hydroxybenzoic acid has intramolecular hydrogen bonding.

12. **Statement-1 :** Cis form will always have more boiling point than trans form.
    Statement-2 : Boiling point depends on dipole moment, greater the dipole moment greater the boiling point.

13. **Statement-1 :** Trans form will always have more melting point than cis form.
    Statement-2 : Melting point depends on symmetry and trans is more symmetrical than cis.

Exercise # 3 Part # I [Matrix Match Type Questions]

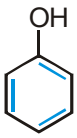
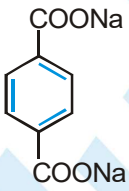
1. Compare the properties of two isomeric products x and y formed in the following reaction.



Match the following :

	Column-I		Column-II
(A)	Dipole moment	(p)	X > Y
(B)	H_2O solubility	(q)	Y = X
(C)	Boiling point	(r)	Y > X
(D)	Melting point	(s)	Can't say

2.

	Column-I		Column-II
(A)		(p)	insoluble in water with $\mu = 0$.
(B)		(q)	more soluble in water with $\mu \neq 0$.
(C)		(r)	most soluble in water with $\mu = 0$.
(D)		(s)	slightly soluble in water with $\mu \neq 0$.

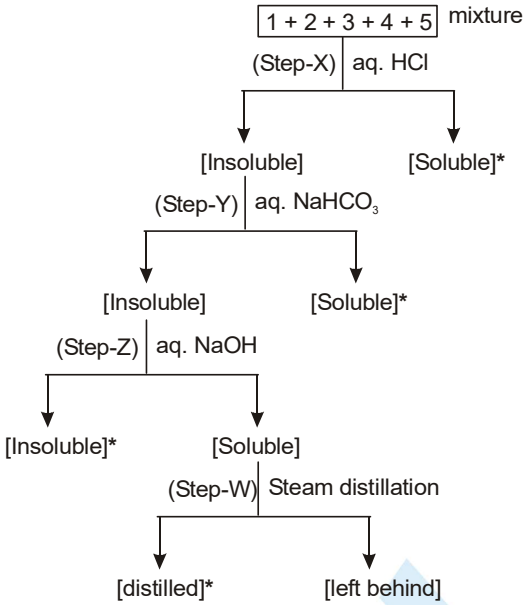
Part # II [Comprehension Type Questions]

Comprehension # 1

A water insoluble organic mixture contained following compounds

(1) Benzoic acid (2) Salicylaldehyde (3) p-Hydroxybenzaldehyde
(4) α-Naphthylamine (5) Naphthalene

The following sequence of reagents are used to separate this mixture



1. Soluble compound at step X is formed by compound :

(A) Benzoic acid **(B)** p-Hydroxybenzaldehyde

(C) α-Naphthylamine **(D)** Naphthalene

2. Soluble compound at step Y is formed by compound.

(A) Benzoic acid **(B)** p-Hydroxybenzaldehyde

(C) α-Naphthylamine **(D)** Naphthalene

3. Insoluble compound at step Z is formed by compound.

(A) p-Hydroxybenzaldehyde **(B)** Salicylaldehyde

(C) α-Naphthylamine **(D)** Naphthalene

Comprehension # 2

The boiling point of a liquid is the temperature where its kinetic energy is sufficient to overcome the intermolecular attractive forces.

Boiling point depends on following :

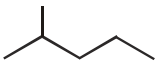
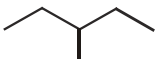
(A) Intermolecular H-bonding. **(B)** Molecular weight attraction.

(C) Dipole-dipole attraction. **(D)** Strength of vander Waal's forces.

1. Which will have maximum boiling point ?

(A) $\begin{matrix} CH_2-OH \\ | \\ CH_2-OH \end{matrix}$ **(B)** $\begin{matrix} CH_2-O-CH_3 \\ | \\ CH_2-OH \end{matrix}$ **(D)** $\begin{matrix} CH_2-O-CH_3 \\ | \\ CH_2-O-CH_3 \end{matrix}$ **(D)** $\begin{matrix} O-CH_3 \\ | \\ CH_2-O-CH_3 \end{matrix}$

2. Which will have maximum boiling point ?

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

3. Which will have maximum boiling point ?

(A) CH_3–Cl **(B)** CH_2Cl_2 **(C)** $CHCl_3$ **(D)** CCl_4

Comprehension # 3

Antibiotics are the chemical substances which are produced by micro-organisms like bacteria, fungi and moulds. Antibiotics can inhibit the growth or even destroy other micro-organisms. Now a days, synthetic antibiotics are also available. The first successful antibiotic produced was penicillin. The antibiotics may be either bacteriocidal (kills the organism in the body) or bacteriostatic (inhibits the growth of organism). Ampicillin and amoxicillin are modified antibiotics. Broad spectrum antibiotics are effective against several types of harmful micro-organisms.

1. Chloramphenicol is :

(A) antipyretic **(B)** broad spectrum antibiotic

(C) azo dye **(D)** tranquillizer

2. Which of the following is/are not an antibiotic ?

(A) Chloramphenicol **(B)** Sulphadiazine **(C)** Penicillin **(D)** Bithional

3. Which among the following antibiotics is bacteriostatic ?

(A) Penicillin **(B)** Ofloxacin

(C) Aminoglycosiders **(D)** Erythromycin

4. Which of the following antibiotics is/are the modification of penicillins ?

(A) Ofloxacin **(B)** Ampicillin **(C)** Amoxicillin **(D)** Tetracycline

5. Which of the following antibiotics is effective against tuberculosis ?

(A) Chloromycetin **(B)** Tetracycline **(C)** Penicillin **(D)** Streptomycin

Exercise # 4 [Subjective Type Questions]

1. Name the macromolecules that are chosen as drug-targets.
2. Define the term chemotherapy.
3. What are main constituents of dettol?
4. Name two semisynthetic modifications of penicillin.
5. What is the role of boric acid in talcum powder ?
6. Name a phenolic antibacterial used in body deodorants.
7. Why is use of aspartame limited to cold foods and drinks?
8. Name one estrogen which is a constituent of an oral contraceptive.
9. What type of drug is ofloxacin ?
10. Name two main raw materials used as starting materials for ceramic substances.
11. Give structural formula of a ceramic superconductor.
12. Name the three elements used in microalloys.
13. Name the medicine which can act both as an analgesic as well as an antipyretic.
14. Name two fixatives used in perfumes.
15. What is role of borax in cold creams ?
16. Name one fuel and one oxidiser in hybrid fuel.
17. Write the composition of a double-base propellant.
18. Name the fuel used in satellite SLV-3.
19. Why should not medicines be taken without consulting doctors?
20. Which forces are involved in holding the drugs to the active site of enzymes?
21. What is tincture of iodine? What is its use?

22. Why is bithional added to the toilet soap ?

23. Give one important use of each of the following in pharmacy ?

(i) Equanil **(ii)** Morphine

24. Explain the term, target molecules or drug-targets as used in medicinal chemistry.

25. What problem arises in using alitame as artificial sweetener?

26. Give names of two substances used as preservatives.

27. Give two examples of synthetic detergents.

28. If water contains dissolved calcium bicarbonate, out of soaps and synthetic detergents which one will you use for cleaning clothes?

29. Label the hydrophilic and hydrophobic parts in the following compounds.

(i) $CH_3(CH_2)_{10}CH_2OSO_3^-Na^+$

(ii) $CH_3(CH_2)_{15}N^+(CH_3)_3Br^-$

(iii) $CH_3(CH_2)_{16}COO(CH_2CH_2O)_nCH_2CH_2OH^-$

30. Give one important use of each of the following:

(i) Streptomycin **(ii)** Paracetamol **(iii)** Anti-fertility drugs

31. What are artificial sweetening agents? Give two examples.

32. Name the sweetening agent used in the preparation of sweet for a diabetic patient.

33. Why do soaps not work in hard water?

34. Name one medicinal compound each that is used to treat :

(i) hypertension

(ii) general body pain

35. Antacids and antiallergic drugs interfere with the function of histamines but why do these not interfere with the function of each other?

36. Low level of noradrenaline is the cause of depression, what types of drugs are needed to cure this problem? Name two drugs.

37. Why are cimetidine and ranitidine better antacids than sodium bicarbonate or magnesium or aluminium hydroxide.

38. What is talcum powder? What is its chemical composition? Give its one important use.

39. What are deodorants? What is the mechanism of their action?

40. Can you use soaps and synthetic detergents to check the hardness of water?

41. Explain the cleansing action of soaps.

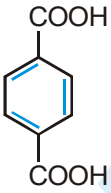
42. Why do we need to classify drugs in different ways ?

43. Which among the triatomic molecules have dipole moment ?

(a) CO_2 **(b)** CS_2 **(c)** $HgCl_2$ **(d)** H_2O **(e)** H_2S **(f)** SO_2

44. Which among the following have some dipole moment ?

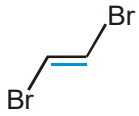
(a)  **(b)** 

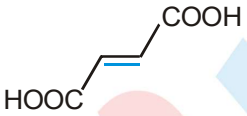
(c) 

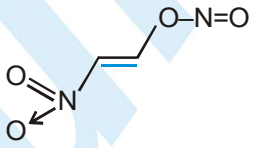
(d) 

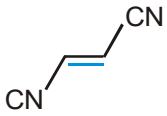
(e) 

45. Which among the following have zero dipole moment ?

(a) 

(b) 

(c) 

(d) 

46. Which of the following molecules would you expect to have non zero dipole moment ?

(a) CH_3Cl **(b)** $CHCl_3$ **(c)** CCl_4 **(d)** CH_3OH **(e)** CH_3OCH_3 **(f)** CO_2
(g) CH_4 **(h)** CH_3COCH_3

47. Which of the following molecules would you expect to have zero dipole moment ?

(a) CH_3CH_3 **(b)** $H_2C=O$ **(c)** CH_2Cl_2 **(d)** $H_2C=CH_2$ **(e)** $H_2C=CHBr$

48. Find the decreasing order of dipole moment in dichlorobenzene.

49. Place each of the following alkanes in order of increasing boiling point.

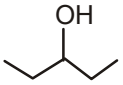
(a) Pentane, Isopentane, Neopentane, Isohexane
(b) n-Hexane, Isohexane, Neohexane, 2, 3-Dimethylbutan
(c) Iso-octane, n-Octane , 2, 2,3, 3-Tetramethylbutane ,n-Butane

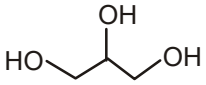
50. Which compound in each of the following pairs listed below has the higher boiling point ?

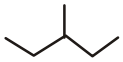
(a) pentanal or pentan-1-ol **(b)** benzaldehyde or benzyl alcohol
(c) acetone or butanone **(d)** pentane or pentanal

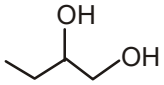
51. List of the following compounds in order of decreasing boiling point.

(A) 

(B) 

(C) 

(D) 

(E) 

52. Place each of the following alkane in order of their increasing melting point

(a) n-Pentane, Isopentane , Neopentane

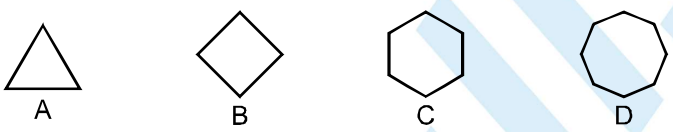
(b) n-Butane, n-Pentane, n-Hexane, n-Heptane

53. Which member of each pair will have higher M.P. ?

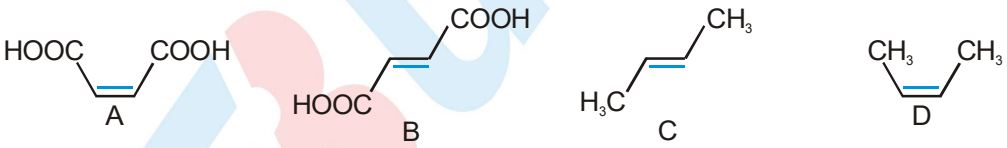
(a) Phenyl methanol and diphenyl methanol

(b) 1-hexanol and cyclohexanol

54. Find the decreasing order of melting point of compound A to D.



55. Find the decreasing order of boiling points of compound A to D.



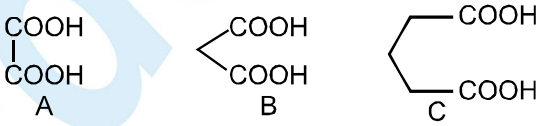
56. Find the decreasing order of boiling point of nearly same molecular weight compound of **(a)** to **(d)**.

(a) $CH_3–CH_2–CH_2–OH$ **(b)** $CH_3–O–CH_2–CH_3$ **(c)** $CH_3–CH_2–CH_2–CH_3$ **(d)** $CH_3–CH(CH_3)–CH_3$

57. Find the decreasing order of boiling point of following **(a)** to **(d)** compounds.

(a) CH_3CONH_2 **(b)** CH_3COOH **(c)** $HCOOCH_3$ **(d)** $CH_2=CH–CH_2–OH$

58. Find the decreasing order of melting point of compound A to C.



59. Find the decreasing order of melting point of compound A to D.

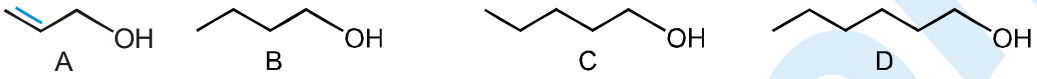
CH_3CONH_2 (A) CH_3COOH (B) $HCOOCH_3$ (C) $CH_2=CH–CH_2–CH_3$ (D)

60. Find the decreasing order of melting point of compound A to C.

$CH_2=CH-CH_2-CH_3$ (A) $CH_3-CH=CH-CH_3$ cis (B) $CH_3-CH=CH-CH_3$ trans (C)

61. CH_3F is more soluble in HF than H_2O Why ?

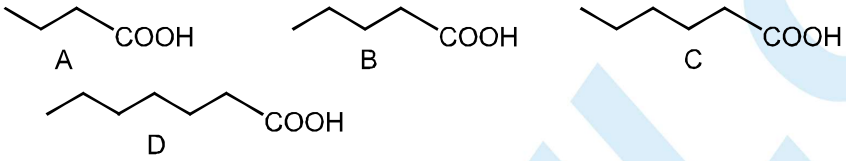
62. Find the decreasing order of solubility of A to D.



63. Find the decreasing order of solubility of A to C.

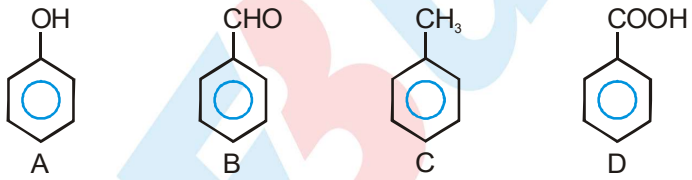
$(CH_3)_3N$ A $(CH_3CH_2)_3N$ B $(CH_3CH_2CH_2)_3N$ C

64. Find the decreasing order of solubility of A to D in water.



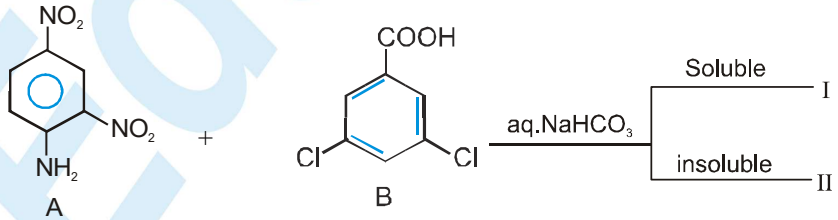
65. Find the decreasing order of solubility of A to D.

66. Find the decreasing order of solubility of A to D in water.



67. Which of the following compound/s have some solubility in water ?

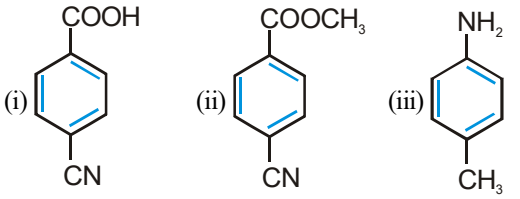
(i)  (ii)  (iii)  (iv) 

68. 

Identify I & II

69. Show the scheme to separate a mixture of organic compounds containing following components ; m-Dichlorobenzene, phenol , aniline and benzoic acid.

70. Which of the following compound can be separated by HCl ?

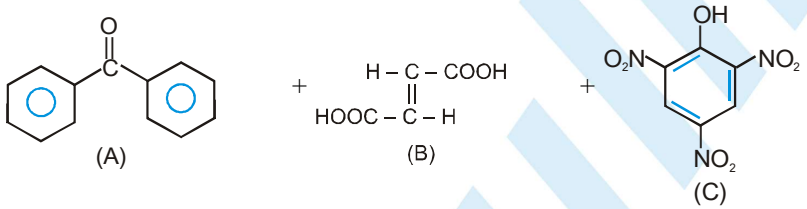


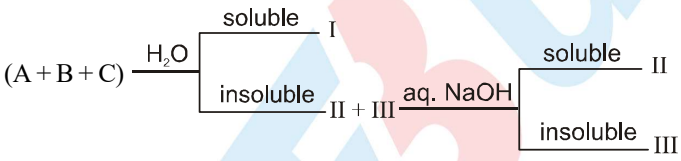
71. Explain why 1, 4-disubstituted benzenes have generally higher melting point than the corresponding 1, 2 or 1, 3 isomers.

72. How can you separate p-methylbenzenecarboxylic acid, p-methylphenol and p-methylaniline ?

73. How can you separate H_2NCONH_2 and naphthalene.

74.





Identify I, II, III

75. How can you separate m-nitrobenzenecarboxylic acid, m-nitrophenol and m-nitroaniline?

76. Arrange in decreasing order according to given properties

		1	2	3	4
Polarity (μ)	(P)	CCl_4	$CHCl_3$	CH_2Cl_2	CH_3Cl
Boiling Point (BP)	(Q)	CCl_4	$CHCl_3$	CH_2Cl_2	CH_3Cl
Solubility in benzene	(R)	CH_3–F	C_2H_5F	C_3H_7F	C_4H_9F
Boiling Point (BP)	(S)	CH_3 – F	CH_3–Cl	CH_3–Br	CH_3–I

77. Explain why benzene is having more melting point than 1, 3 and 1, 4-cyclohexadiene ?

Exercise # 5 Part # I [Previous Year Questions] [AIEEE/JEE-MAIN]

1. The compound formed in the positive test for nitrogen with the Lassaigne solution of an organic compound is - **[AIEEE - 2004]**

(1) $Fe_4[Fe(CN)_6]_3$ **(2)** $Na_3[Fe(CN)_6$ **(3)** $Fe(CN)_3$ **(4)** $Na_4[Fe(CN)_5NOS]$

2. Which one of the following has the minimum boiling point ? **[AIEEE - 2004]**

(1) n-butane **(2)** 1-butyne **(3)** 1-butene **(4)** Isobutene

3. Which one of the following method is neither meant for the synthesis nor for separation of amines ? **[AIEEE-2005]**

(1) Hinsberg method **(2)** Hofmann method **(3)** Wurtz reaction **(4)** Curtius reaction

4. Which one of the following types of drugs reduces fever ? **[AIEEE - 2005]**

(1) Tranquiliser **(2)** Antibiotic

(3) Antipyretic **(4)** Analgesic

5. Among the following mixtures, dipole-dipole as the major interaction, is present in **[AIEEE-2006]**

(1) benzene and ethanol **(2)** acetonitrile and acetone

(3) KCl and water **(4)** benzene and carbon tetrachloride

6. The hydrocarbon which can react with sodium in liquid ammonia is : **[AIEEE-2008]**

(1) $CH_3CH_2C\equiv CH$ **(2)** $CH_3CH=CHCH_3$

(3) $CH_3CH_2C\equiv CCH_2CH_3$ **(4)** $CH_3CH_2CH_2C\equiv CCH_2CH_2CH_3$

7. Which of the following reagents may be used to distinguish between phenol and benzoic acid ? **[AIEEE-2011]**

(1) Aqueous NaOH **(2)** Tollen's reagent

(3) Molisch reagent **(4)** Neutral $FeCl_3$

8. Aspirin is known as : **[AIEEE-2012]**

(1) Acetyl salicylic acid **(2)** Phenyl salicylate

(3) Acetyl salicylate **(4)** Methyl salicylic acid

9. Ortho-Nitrophenol is less soluble in water than p- and m- Nitrophenols because : **[AIEEE-2012]**

(1) o-Nitrophenol is more volatile steam than those of m- and p-isomers.

(2) o-Nitrophenol shows Intramolecular H-bonding

(3) o-Nitrophenol shows intermolecular H-bonding

(4) Melting point of o-Nitrophenol is lower than those of m- and p-isomers.

10. What is DDT among the following : **[AIEEE-2012]**

(1) Greenhouse gas **(2)** A fertilizer

(3) Biodegradable pollutant **(4)** Non-biodegradable pollutant

11. The gas leaked from a storage tank of the Union Carbide plant in Bhopal gas tragedy was : **[JEE(Mains)-2013]**

(1) Methylisocyanate **(2)** Methylamine

(3) Ammonia **(4)** Phosgene

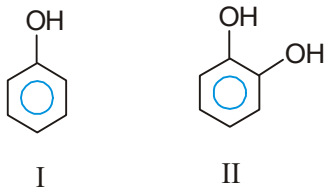
12. Which of the following is an anionic detergent? **[JEE(Mains)-2016]**

(1) Sodium lauryl sulphate **(2)** Cetyltrimethyl ammonium bromide

(3) Glyceryl oleate **(4)** Sodium stearate

Part # II [Previous Year Questions][IIT-JEE ADVANCED]

1. Arrange in the increasing order of boiling points :



[IIT-JEE 2006, 3/184]

(A) I < II < III < IV **(B)** I < II < IV < III **(C)** IV < I < II < III **(D)** IV < II < I < III

2. **Statement-1 :** Aniline on reaction with $NaNO_2$ / HCl at 0°C followed by coupling with β-naphthol gives a dark blue precipitate. **[IIT-JEE 2008,3/163]**

Statement-2 : The colour of the compound formed in the reaction of aniline with $NaNO_2$/HCl at 0°C followed by coupling with β-naphthol is due to the extended conjugation.

(A) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1.

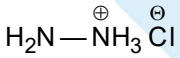
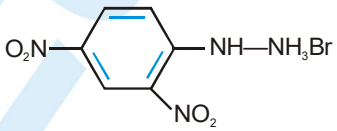
(B) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1

(C) Statement-1 is True, Statement-2 is False

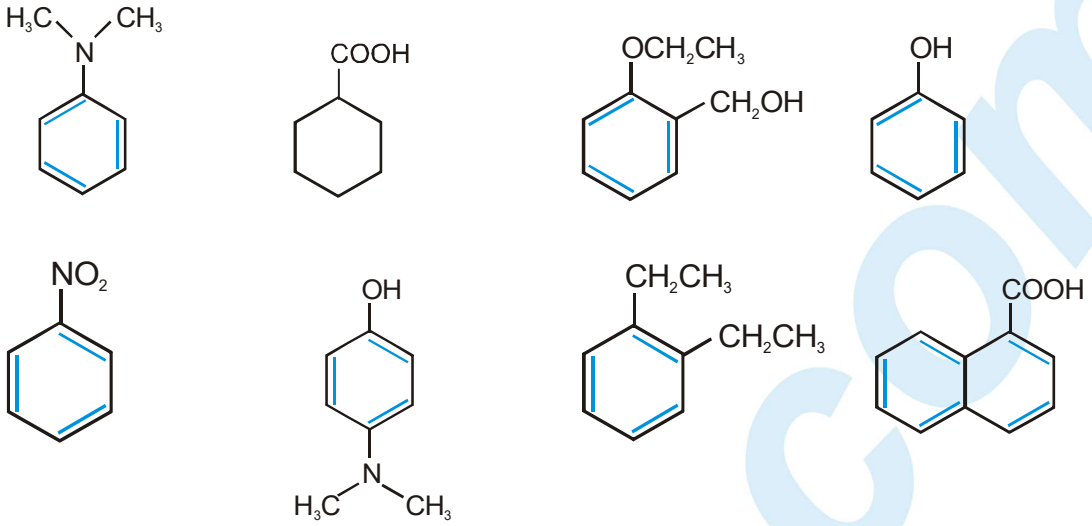
(D) Statement-1 is False, Statement-2 is True

3. Match the entries in **Column I** with the correctly related quantum number(s) in **Column II.**

[IIT-JEE 2008, 6/163]

	Column I		Column II
(A)		**(p)**	sodium fusion extract of the compound gives Prussian blue colour with $FeSO_4$
(B)		**(q)**	gives positive $FeCl_3$ test
(C)		**(r)**	gives white precipitate with $AgNO_3$
(D)		**(s)**	reacts with aldehydes to form the corresponding hydrazone derivative

4. Amongst the following, the total number of compounds soluble in aqueous NaOH is : **[IIT-JEE 2010, 3/184]**



5. The compound that does **not** liberate CO_2, on treatment with aqueous sodium bicarbonate solution, is

(A) Benzoic acid **(B)** Benzenesulphonic acid **[JEE(Advanced) 2013, 2/120]**

(C) Salicylic acid **(D)** Carbolic acid (Phenol)

ANSWER KEY

EXERCISE - 1

1. C **2.** B **3.** A **4.** B **5.** A **6.** B **7.** A **8.** B **9.** C **10.** B **11.** B **12.** C **13.** A

14. C **15.** D **16.** B **17.** B **18.** C **19.** D **20.** A **21.** D **22.** C **23.** A **24.** B **25.** D **26.** D

27. B **28.** A **29.** B **30.** A **31.** C **32.** C **33.** B **34.** A **35.** B **36.** B **37.** A **38.** C **39.** D

40. C **41.** C **42.** D **43.** D **44.** D **45.** A **46.** C **47.** D **48.** B **49.** B **50.** C **51.** D **52.** D

53. A **54.** D **55.** C **56.** B **57.** C **58.** D **59.** B **60.** B **61.** A **62.** A **63.** C **64.** D **65.** D

66. D **67.** C **68.** C **69.** B **70.** B **71.** B **72.** C **73.** D **74.** A **75.** A **76.** B **77.** A **78.** A

79. A **80.** B **81.** C **82.** A **83.** C **84.** A **85.** A **86.** B **87.** B **88.** C **89.** C **90.** A **91.** C

92. C **93.** A **94.** B **95.** A **96.** C **97.** B **98.** A **99.** D **100.** B **101.** D **102.** D **103.** B **104.** C

105. D **106.** B **107.** C **108.** B **109.** B **110.** A **111.** B

EXERCISE - 2 : PART # I

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

EXERCISE - 3 : PART # I

1. A → r, B → r, C → p, D → r **2.** A → p, B → s, C → q, D → r

PART # II

Comprehension # 1 : 1. C 2. A 3. D **Comprehension # 2 :** 1. A 2. A 3. D

Comprehension # 3 : 1. B 2. B, D 3. D 4. B, C 5. D

EXERCISE - 5 : PART # I

1. 1 **2.** 4 **3.** 3 **4.** 3 **5.** 2 **6.** 1 **7.** 4 **8.** 1 **9.** 2 **10.** 4 **11.** 1 **12.** 1

PART # II

1. A **2.** B **3.** A → r,s ; B → p, q, C → p,q, r, ; D → p,s **4.** D **5.** D