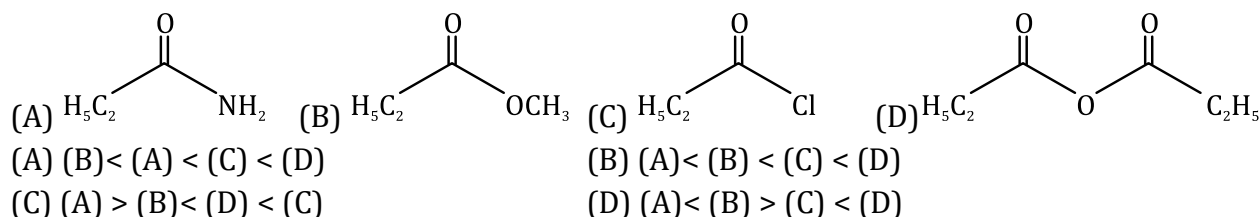
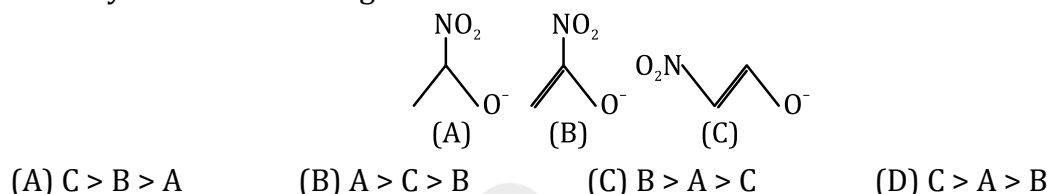


1. The increasing order of the reactivity of the following with LiAlH_4 is:



2. Stability order of following alkoxide ions is



3. Match List -I with List -II:

List-I

(Metal Ion)

- (a) Mn^{2+}
(b) As^{3+}
(c) Cu^{2+}
(d) Al^{3+}

List-II

(Group in Qualitative analysis)

- (i) Group -III
(ii) Group -IIA
(iii) Group -IV
(iv) Group-IIB

Choose the most appropriate answer from the options given below:

- (A) (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv) (B) (a)-(iii), (b)-(iv), (c)-(ii), (d)-(i)
(C) (a)-(i), (b)-(iv), (c)-(ii), (d)-(iii) (D) (a)-(iv), (b)-(ii), (c)-(iii), (d)-(i)

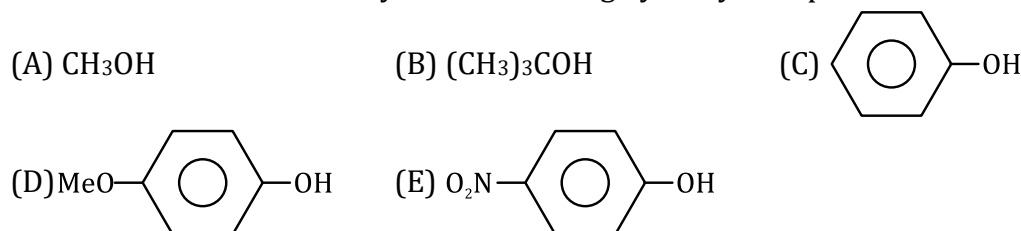
4. The dihedral angle in staggered form of Newman projection of 1,1,1 - Trichloro ethane is..... degree.

(Round off to the nearest integer)

(Round off to the nearest integer)

5. Compound 'P' on nitration with dil. HNO_3 yields two isomers (A) and (B). These isomers can be separated by steam distillation. Isomers (A) and (B) show the intramolecular and intermolecular hydrogen bonding respectively. Compound (P) on reaction with conc. HNO_3 yields a yellow compound 'C', a strong acid. The number of oxygen atoms is present in compound 'C' ____.

6. The correct order for acidity of the following hydroxyl compound is



Choose the correct answer from the options given below:

- (A) $C > E > D > B > A$ (B) $E > D > C > B > A$ (C) $D > E > C > A > B$ (D) $E > C > D > A > B$

7. Match List I with List II.

List I Isomeric pairs		List II Type of isomers	
A.	Propanamine and N-Methylethanamine	I.	Metamers
B.	Hexan-2-one and Hexan-3-one	II.	Positional isomers
C.	Ethanamide and Hydroxyethanimine	III.	Functional isomers
D.	o-nitrophenol and p-nitrophenol	IV.	Tautomers

Choose the correct answer from the options given below: -

(A) A-III, B-IV, C-I, D-II

(B) A-IV, B-III, C-I, D-II

(C) A-II, B-III, C-I, D-IV

(D) A-III, B-I, C-IV, D-II

8. The correct match between Item I and Item II is:

Item I

(Compound)

(A) Lysine

(B) Furfural

(C) Benzyl alcohol

(D) Styrene

Item II

(reagent)

(P) 1-Naphthol

(Q) Ninhydrin

(R) KMnO_4

(S) Ceric ammonium nitrate

(A) (A) \rightarrow (Q) ; (B) \rightarrow (P) ; (C) \rightarrow (S) ; (D) \rightarrow (R)

(B) (A) \rightarrow (Q) ; (B) \rightarrow (P) ; (C) \rightarrow (R) ; (D) \rightarrow (S)

(C) (A) \rightarrow (Q) ; (B) \rightarrow (R) ; (C) \rightarrow (Q) ; (D) \rightarrow (S)

(D) (A) \rightarrow (Q) ; (B) \rightarrow (R) ; (C) \rightarrow (S) ; (D) \rightarrow (P)

9. The correct match between items I and II is:

Item-I

(Mixture)

(A) H_2O : Sugar

(B) H_2O : Aniline

(C) H_2O : Toluene

Item-II

(Separation method)

(P) Sublimation

(Q) Recrystallization

(R) Steam distillation

(S) Differential extraction

(A) (A) \rightarrow (S) ; (B) \rightarrow (R) ; (C) \rightarrow (P)

(B) (A) \rightarrow (Q) ; (B) \rightarrow (R) ; (C) \rightarrow (S)

(C) (A) \rightarrow (R) ; (B) \rightarrow (P) ; (C) \rightarrow (S)

(D) (A) \rightarrow (Q) ; (B) \rightarrow (R) ; (C) \rightarrow (P)

10. Two liquids isohexane and 3-Methylpentane has boiling point 60°C and 63°C . They can be separated by

(A) Simple distillation and isohexane comes out first

(B) Fractional distillation and isohexane come out first.

(C) Simple distillation and 3-Methylpentane comes out first.

(D) Fractional distillation and 3-Methylpentane comes out first.

11. **Assertion:** Ozone is destroyed by CFCs in the upper stratosphere.

Reason: Ozone holes increase the amount of UV radiation reaching the earth.

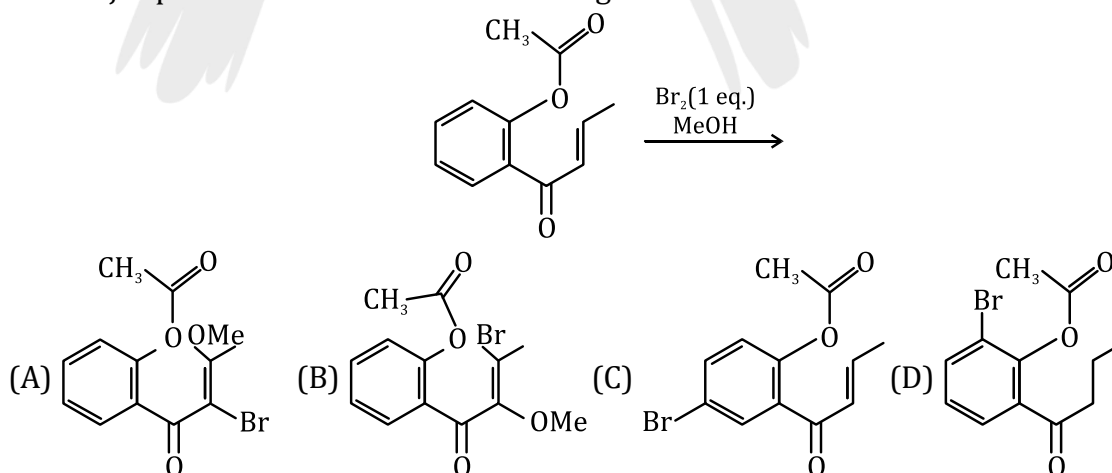
(A) Assertion and reason are incorrect.

(B) Assertion and reason are both correct, and the reason is the correct explanation for the assertion.

(C) Assertion and reason are correct, but the reason is not the explanation for the assertion.

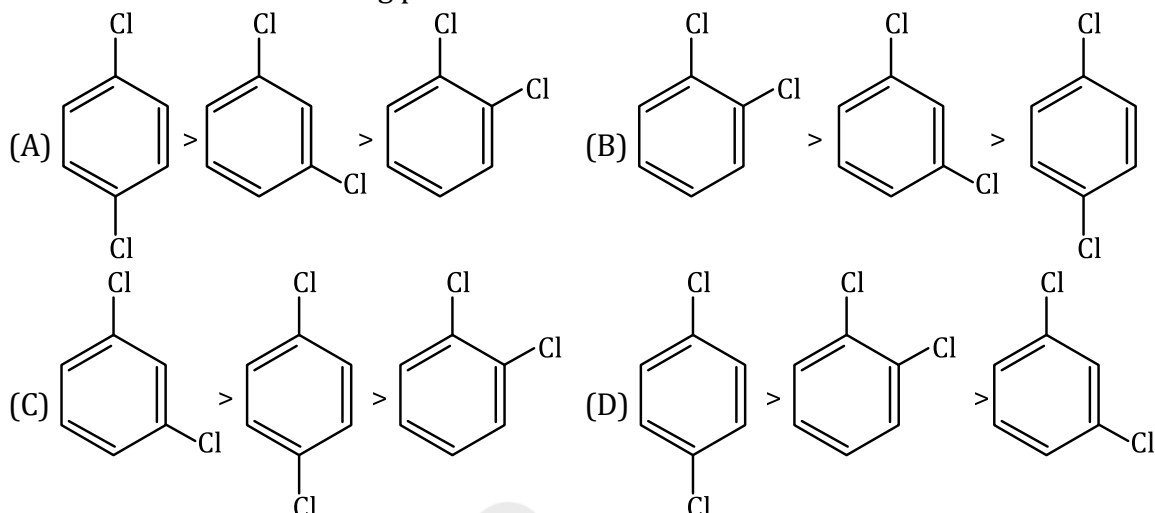
(D) Assertion is false, but the reason is correct.

12. The conversion of hydroxyapatite occurs due to presence of F^- ions in water. The correct formula of hydroxyapatite is:
 (A) $[3Ca_3(PO_4)_2 \cdot Ca(OH)_2]$ (B) $[3Ca(OH)_2 \cdot CaF_2]$
 (C) $[Ca_3(PO_4)_2 \cdot CaF_2]$ (D) $[3Ca_3(PO_4)_2 \cdot CaF_2]$
13. Given below are two statement
 Statement I : Chlorofluoro carbons breakdown by radiation in the visible energy and release chlorine gas in the atmosphere which then reacts with stratospheric ozone.
 Statement II: Atmospheric ozone reacts with nitric oxide to given nitrogen and oxygen gases, which add to the atmosphere. For the above statement choose the correct answer from the options given below:
 (A) Statement I is incorrect but statement II is true
 (B) Both statement I and II are false
 (C) Statement I is correct but statement II is false
 (D) Both statement I and II are correct
14. The mixture of chloroxylenol and terpineol is an example of:
 (A) Antiseptic (B) Pesticide (C) Disinfectant (D) Narcotic analgesic
15. Given below are two statements:
Statement I : In polluted water values of both dissolved oxygen and BOD are very low.
Statement II: Eutrophication results in decrease in the amount of dissolved oxygen.
 In the light of the above statements, choose the most appropriate answer from the options given below:
 (A) Both Statement I and Statement II are true
 (B) Both Statement I and Statement II are false
 (C) Statement I is true but Statement II is false
 (D) Statement I is false but Statement II is true
16. The major product obtained in the following conversion is:

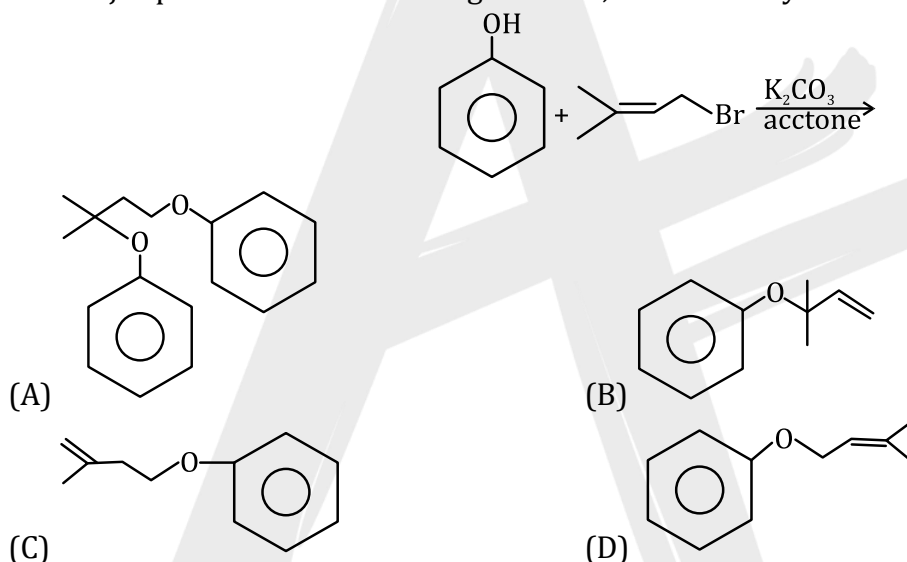


17. In the presence of sunlight, benzene reacts with Cl_2 to give product, X. The number of hydrogens in X is _____.

18. The correct order of melting point of dichlorobenzenes is



19. The major product of the following reaction, if it occurs by S_N2 mechanism is:



20. Given below are two statements, one is labelled as Assertion A and the other is labelled as Reason R

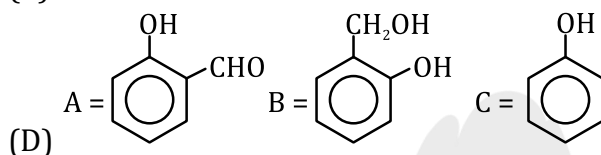
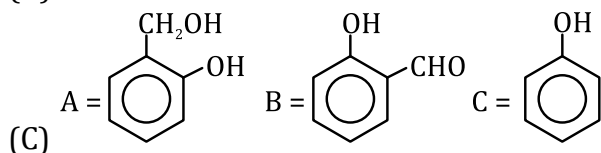
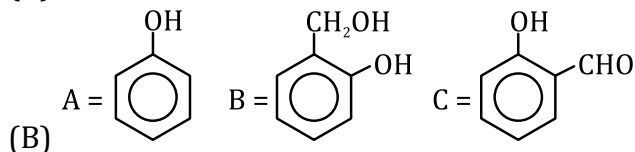
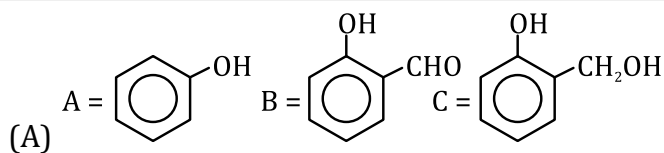
Assertion A:- Butylated hydroxyl anisole when added to butter increases its shelf life.

Reason R: Butylated hydroxyl anisole is more reactive towards oxygen than food.

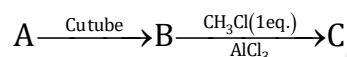
In the light of the above statements, choose the most appropriate answer from the options given below:-

- (A) Both A and R are correct and R is the correct explanation of A.
 (B) A is correct but R is not correct.
 (C) A is not correct but R is correct.
 (D) Both A and R are correct but R is NOT the correct explanation of A.

21. An organic compound A (C_6H_6O) gives dark green colouration with ferric chloride. On treatment with $CHCl_3$ and KOH , followed by acidification gives compound B. Compound B can also be obtained from compound C on reaction with pyridinium chlorochromate (PCC). Identify A, B and C.

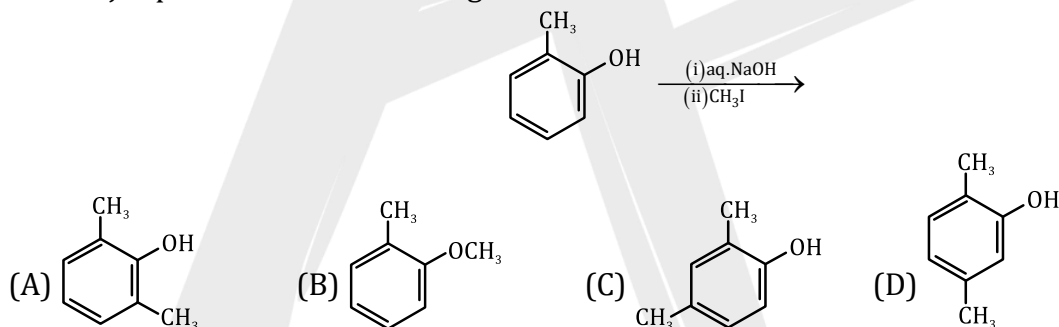


22. How many atoms lie in the same plane in the major product (C)?

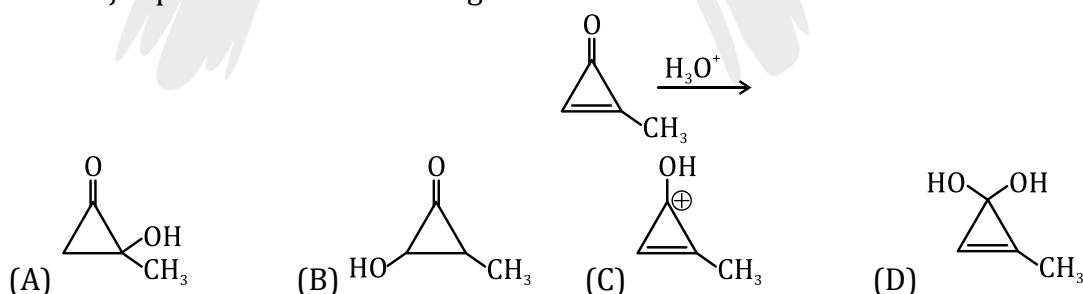


(Where A is the alkyne of lowest molecular mass)

23. The major product of the following reaction is:



24. The major product of the following reactions is



25. Given below are two statements :

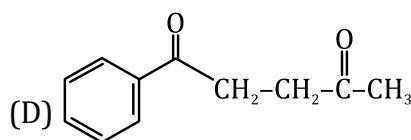
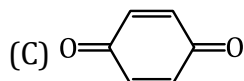
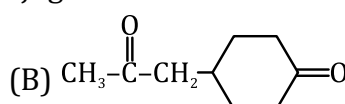
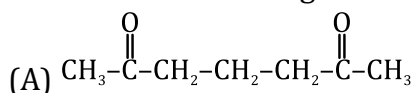
Statement I : The nucleophilic addition of sodium hydrogen sulphite to an aldehyde or a ketone involves proton transfer to form a stable ion.

Statement II: The nucleophilic addition of hydrogen cyanide to an aldehyde or a ketone yields amine as final product.

In the light of the above statements, choose the answer from the options given below :

- (A) Both Statement I and Statement II are true.
 (B) Statement I is true but Statement II is false.
 (C) Statement I is false but Statement II is true.
 (D) Both Statement I and Statement II are false.

26. Which of the following is an example of conjugated diketone?



27. Match List I with List II:

List -I (Chemical Reaction)		List-II (Reagent used)	
(a)	$\text{CH}_3\text{COOCH}_2\text{CH}_3 \rightarrow \text{CH}_3\text{CH}_2\text{OH}$	(i)	$\text{CH}_3\text{MgBr}/\text{H}_3\text{O}^+ (1.\text{equivalent})$
(b)	$\text{CH}_3\text{COOCH}_3 \rightarrow \text{CH}_3\text{CHO}$	(ii)	$\text{H}_2\text{SO}_4/\text{H}_2\text{O}$
(c)	$\text{CH}_3\text{C}\equiv\text{N} \rightarrow \text{CH}_3\text{CHO}$	(iii)	$\text{DIBAL-H}/\text{H}_2\text{O}$
(d)	$\text{CH}_3\text{C}\equiv\text{N} \rightarrow \text{CH}_3-\overset{\text{O}}{\parallel}\text{C}-\text{CH}_3$	(iv)	$\text{SnCl}_2, \text{HCl}/\text{H}_2\text{O}$

Choose the most appropriate match :

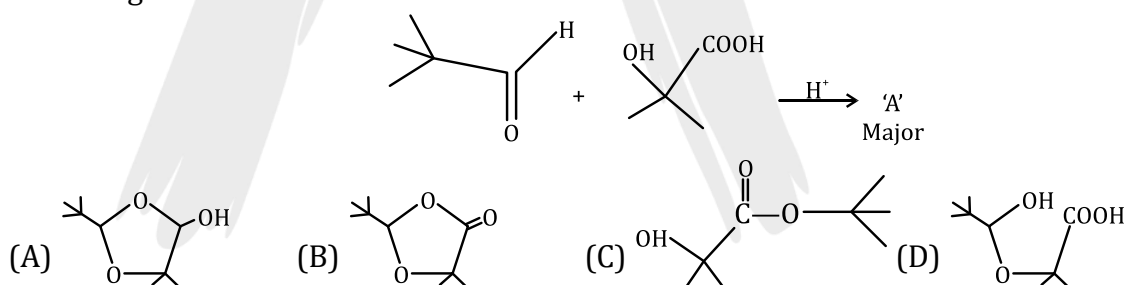
(A) a - ii, b - iv, c - iii, d - I

(B) a - iv, b - ii, c - iii, d - i

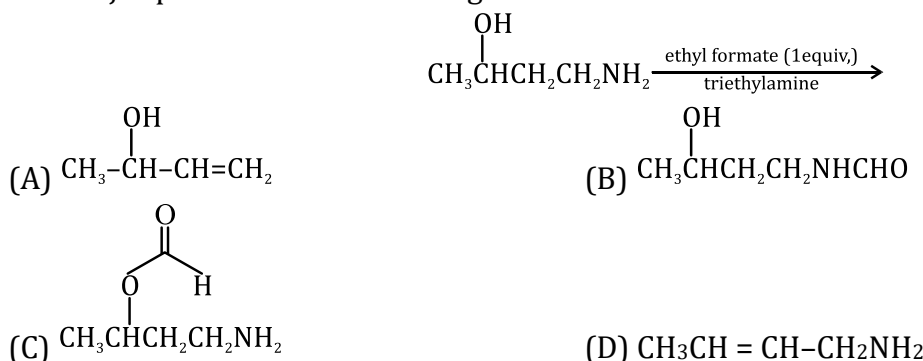
(C) a - ii, b - iii, c - iv, d - i

(D) a - iii, b - ii, c - i, d - iv

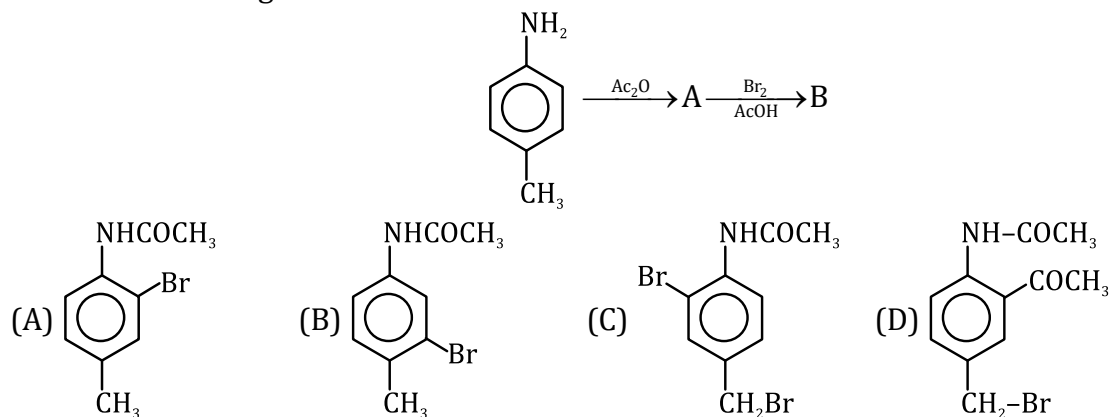
28. 'A' in the given reaction is



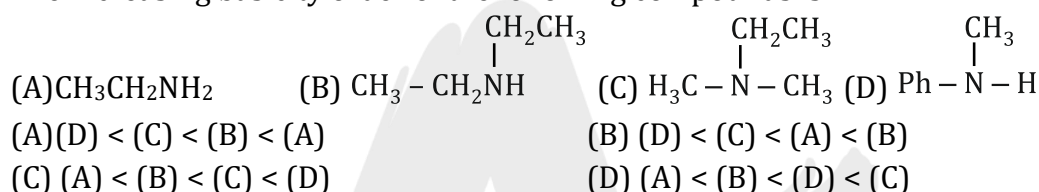
29. The major product of the following reaction is:



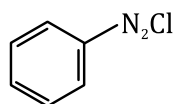
30. A and B are in the given reaction?



31. The increasing basicity order of the following compounds is:



32. Match List I with List II :



s reacted with reagents in List I to form products in List II products in List II.

List I (Reagent)		List II (Product)	
A.		I.	
B.	HBF_4, Δ	II.	
C.	Cu, HCl	III.	
D.	CuCN/KCN	IV.	

Choose the correct answer from the options given below:

- (A) A-IV, B-III, C-II, D-I (B) A-III, B-I, C-II, D-IV
 (C) A-I, B-III, C-IV, D-II (D) A-III, B-I, C-IV, D-II

33. Hydrolysis of sucrose gives:

- (A) α -D-(-)-Glucose and β -D-(-)-Fructose (B) α -D-(+)-Glucose and α -D-(-)-Fructose
 (C) α -D-(-)-Glucose and α -D-(-)-Fructose (D) α -D-(+)-Glucose and β -D-(-)-Fructose

34. A sugar 'X' dehydrates very slowly under acidic condition to give furfural which on further reaction with resorcinol gives the coloured product after sometime. Sugar 'X' is

- (A) Aldopentose (B) Aldotetrose (C) Oxalic acid (D) Ketotetrose

35. Match List I with List II

	List I Natural amino acid		List II One Letter code
(A)	Glutamine	(I)	Q
(B)	Glutamine	(II)	W
(C)	Tyrosine	(III)	E
(D)	Tryptophan	(IV)	Y

Choose the correct answer from the options given below:

- (A) (A)-III, B-IV, (C)-I, (D)-II (B) (A)-IV, B-III, (C)-I, (D)-II
 (C) (A)-III, B-I, (C)-IV, (D)-II (D) (A)-II, B-I, (C)-IV, (D)-III

36. Number of sp^2 hybrid carbon atoms in aspartame is-37. Sodium stearate $CH_3(CH_2)_{16}COO^-Na^+$ is an anionic surfactant which forms micelles in oil.

Choose the correct statement for it from the following:

- (A) It forms spherical micelles with $CH_3(CH_2)_{16}$ group pointing to wards the centre of sphere.
 (B) It forms non-spherical micelles with $-COO^-$ group pointing outwards on the surface.
 (C) It forms spherical micelles with $CH_3(CH_2)_{16}$ group pointing outwards on the surface of sphere.
 (D) It forms non-spherical micelles with $CH_3(CH_2)_{16}$ -group pointing towards the centre.

38. The reaction used for preparation of soap from fat is :

- (A) An addition reaction (B) Reduction reaction
 (C) Alkaline hydrolysis reaction (D) An oxidation reaction

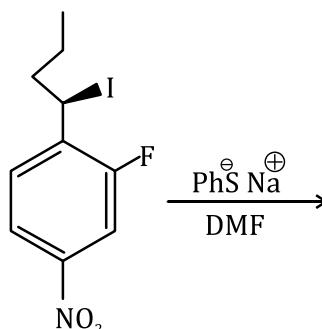
39. Thermal decomposition of a Mn compound (X) at 513 K results in compound Y, MnO_2 and a gaseous product. MnO_2 reacts with NaCl and concentrated H_2SO_4 to give a pungent gas Z. X, Y, and Z, respectively, are:

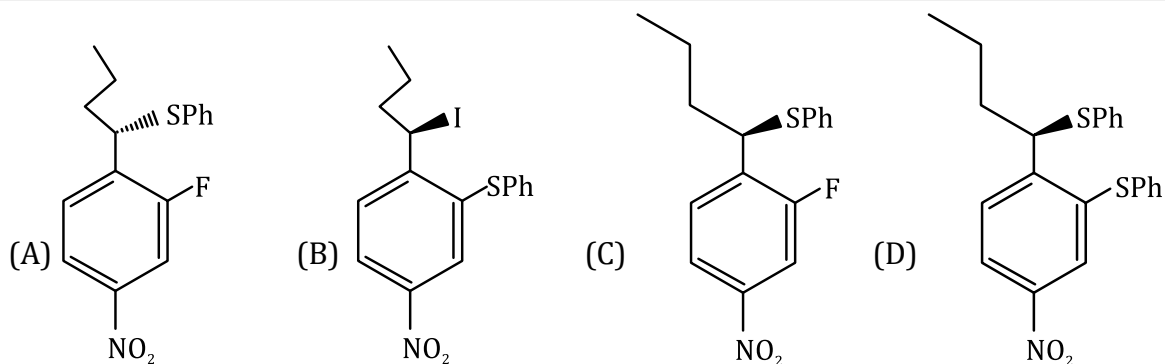
- (A) K_3MnO_4 , K_2MnO_4 and Cl_2 (B) K_2MnO_4 , $KMnO_4$ and SO_2
 (C) $KMnO_4$, K_2MnO_4 and Cl_2 (D) K_2MnO_4 , K_2MnO_4 and Cl_2

40. Accurate measurement of concentration of NaOH can be performed by following titration:

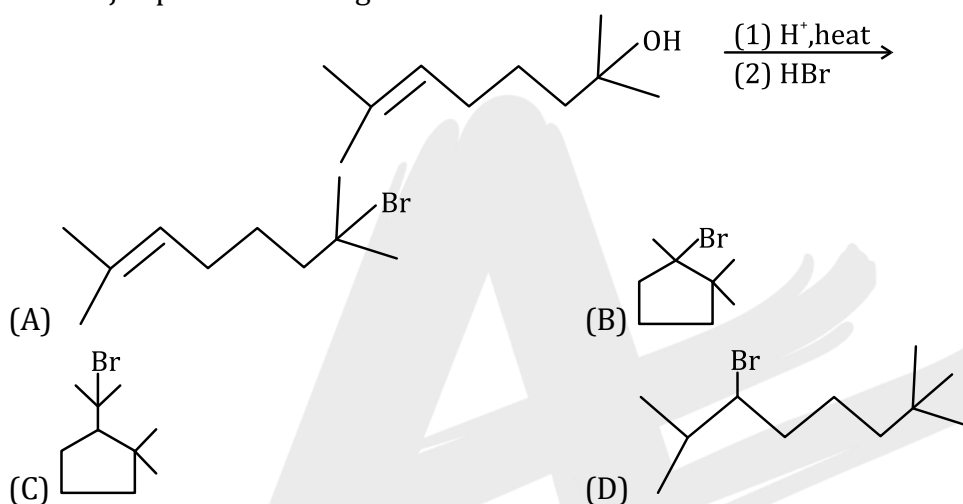
- (A) NaOH in burette and oxalic acid in conical flask
 (B) NaOH in burette and concentrated H_2SO_4 in conical flask
 (C) NaOH in volumetric flask and concentrated H_2SO_4 in conical flask
 (D) Oxalic acid in burette and NaOH in conical flask

41. The major product of the following reaction is:

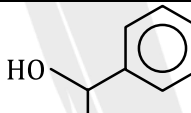

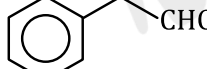
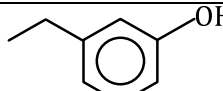




42. The major product in the given reaction is



43. Match List I with List II:

List I (Reagents used)		List II (Compound with Functional group detected)	
A.	Alkaline solution of copper sulphate and sodium citrate	I.	
B.	Neutral FeCl ₃ solution	II.	
C.	Alkaline chloroform solution	III.	
D.	Potassium iodide and sodium hypochloride	IV.	

Choose the correct answer from the options given below:

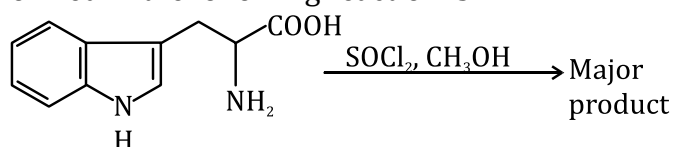
(A) A-III, B-IV, C-I, D-II

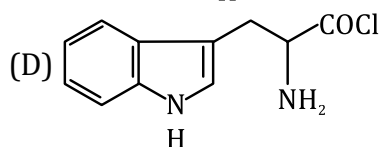
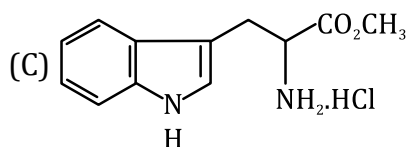
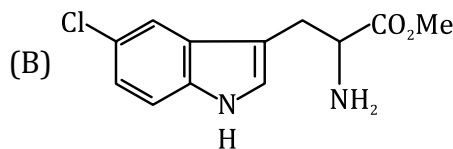
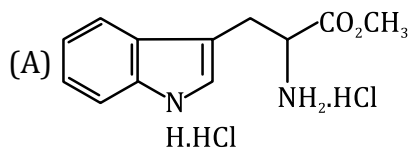
(B) A-III, B-IV, C-II, D-I

(C) A-IV, B-I, C-II, D-III

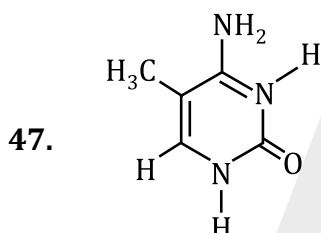
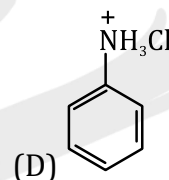
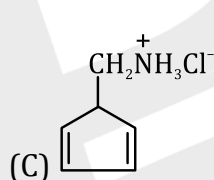
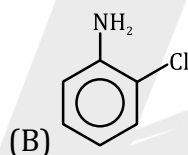
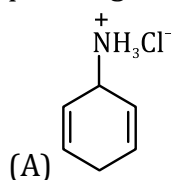
(D) A-II, B-IV, C-III, D-I

44. The major product formed in the following reaction is :





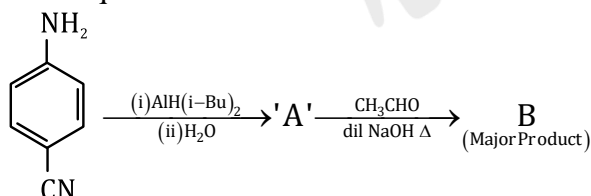
45. The delicate balance of CO_2 and O_2 is NOT disturbed by
 (A) Respiration (B) Burning of coal
 (C) Deforestation (D) Burning of petroleum
46. An organic compound 'A' contains nitrogen and chlorine. It dissolves readily in water to give a solution that turns litmus red. Titration of compound 'A' with standard base indicates that the molecular weight of 'A' is 131 ± 2 . When a sample of 'A' is treated with aq. NaOH, a liquid separates which contains N but not Cl. Treatment of the obtained liquid with nitrous acid followed by phenol gives orange precipitate. The compound 'A' is:



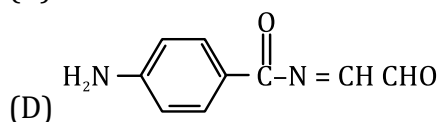
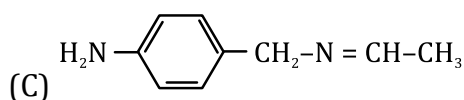
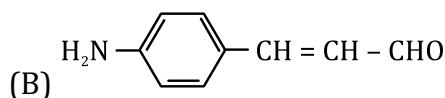
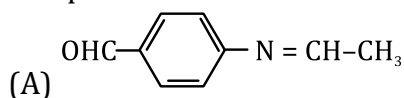
The compound 'A' is a complementary base of in DNA stands.

- (A) Uracil (B) Guanine (C) Adenine (D) Cytosine

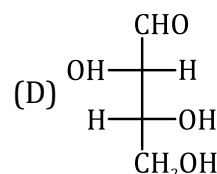
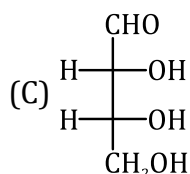
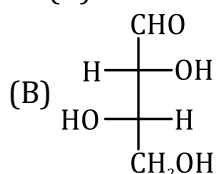
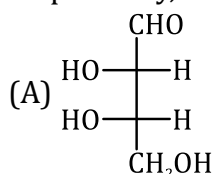
48. Consider the following reaction sequence:



The product 'B' is:



- 49 L-isomer of a compound 'A' ($C_4H_8O_4$) gives a positive test with $[Ag(NH_3)_2]^+$. Treatment of 'A' with acetic anhydride yield triacetate derivative. Compound 'A' produces an optically active compound (B) and an optically inactive compound (C) on treatment with bromine water and HNO_3 respectively, compound (A) is:



50. In bromination of Propyne, with Bromine 1, 1, 2, 2-tetrabromopropane is obtained in 27% yield. The amount of 1, 1, 2, 2 tetrabromopropane obtained from 1g of Bromine in this reaction is ____ $\times 10^{-1}$ g. (Nearest integer)
(Molar Mass: Bromine = 80g/mol)

Answer key

- | | | | | | | | | | | | | | |
|-----|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|
| 1. | (C) | 2. | (A) | 3. | (B) | 4. | (60) | 5. | (7) | 6. | (D) | 7. | (D) |
| 8. | (A) | 9. | (B) | 10. | (B) | 11. | (C) | 12. | (A) | 13. | (B) | 14. | (A) |
| 15. | (D) | 16. | (A) | 17. | (6) | 18. | (D) | 19. | (D) | 20. | (A) | 21. | (A) |
| 22. | (13) | 23. | (B) | 24. | (C) | 25. | (B) | 26. | (C) | 27. | (C) | 28. | (B) |
| 29. | (B) | 30. | (A) | 31. | (B) | 32. | (D) | 33. | (D) | 34. | (A) | 35. | (C) |
| 36. | (9) | 37. | (A) | 38. | (C) | 39. | (A) | 40. | (D) | 41. | (A) | 42. | (C) |
| 43. | (B) | 44. | (C) | 45. | (A) | 46. | (D) | 47. | (C) | 48. | (B) | 49. | (A) |
| 50. | (3) | | | | | | | | | | | | |