

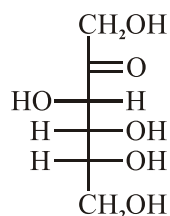
SECTION-A

1. Fructose is an example of :-

- (1) Pyranose
- (2) Ketohexose
- (3) Aldohexose
- (4) Heptose

Official Ans. by NTA (2)

Sol. Fructose is a ketohexose.



2. The set of elements that differ in mutual relationship from those of the other sets is :

- (1) Li – Mg
- (2) B – Si
- (3) Be – Al
- (4) Li – Na

Official Ans. by NTA (4)

Sol. Li–Mg, B–Si, Be–Al show diagonal relationship but Li and Na do not show diagonal relationship as both belongs to same group and not placed diagonally.

3. The functional groups that are responsible for the ion-exchange property of cation and anion exchange resins, respectively, are :

- (1) $-\text{SO}_3\text{H}$ and $-\text{NH}_2$
- (2) $-\text{SO}_3\text{H}$ and $-\text{COOH}$
- (3) $-\text{NH}_2$ and $-\text{COOH}$
- (4) $-\text{NH}_2$ and $-\text{SO}_3\text{H}$

Official Ans. by NTA (1)

Sol. Cation exchanger contains $-\text{SO}_3\text{H}$ or $-\text{COOH}$ groups while anion exchanger contains basic groups like $-\text{NH}_2$.

4. Match List-I and List-II :

List-I	List-II
(a) Haematite	(i) $\text{Al}_2\text{O}_3 \cdot x\text{H}_2\text{O}$
(b) Bauxite	(ii) Fe_2O_3
(c) Magnetite	(iii) $\text{CuCO}_3 \cdot \text{Cu}(\text{OH})_2$
(d) Malachite	(iv) Fe_3O_4

Choose the correct answer from the options given below :

- (1) (a)-(ii), (b)-(iii), (c)-(i), (d)-(iv)
- (2) (a)-(iv), (b)-(i), (c)-(ii), (d)-(iii)
- (3) (a)-(i), (b)-(iii), (c)-(ii), (d)-(iv)
- (4) (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

Official Ans. by NTA (4)

Sol.	Ore	Formula
(a)	Haematite	Fe_2O_3
(b)	Bauxite	$\text{Al}_2\text{O}_3 \cdot x\text{H}_2\text{O}$
(c)	Magnetite	Fe_3O_4
(d)	Malachite	$\text{CuCO}_3 \cdot \text{Cu}(\text{OH})_2$

5. The correct pair(s) of the ambident nucleophiles is (are) :

- (A) AgCN/KCN
 - (B) $\text{RCOOAg}/\text{RCOOK}$
 - (C) $\text{AgNO}_2/\text{KNO}_2$
 - (D) AgI/KI
- (1) (B) and (C) only
 - (2) (A) only
 - (3) (A) and (C) only
 - (4) (B) only

Official Ans. by NTA (3)

Sol. Ambident nucleophile

- (A) KCN & AgCN
- (C) AgNO_2 & KNO_2

6. The set that represents the pair of neutral oxides of nitrogen is :

- (1) NO and N_2O
- (2) N_2O and N_2O_3
- (3) N_2O and NO_2
- (4) NO and NO_2

Official Ans. by NTA (1)

Sol. N_2O and NO are neutral oxides of nitrogen NO_2 and N_2O_3 are acidic oxides.

7. Match List-I with List-II :

List-I	List-II
(a) $[\text{Co}(\text{NH}_3)_6]$ $[\text{Cr}(\text{CN})_6]$	(i) Linkage isomerism
(b) $[\text{Co}(\text{NH}_3)_3(\text{NO}_2)_3]$	(ii) Solvate isomerism
(c) $[\text{Cr}(\text{H}_2\text{O})_6]\text{Cl}_3$	(iii) Co-ordination isomerism
(d) <i>cis</i> - $[\text{CrCl}_2(\text{ox})_2]^{3-}$	(iv) Optical isomerism

Choose the correct answer from the options given below :

- (1) (a)-(iii), (b)-(i), (c)-(ii), (d)-(iv)
- (2) (a)-(iv), (b)-(ii), (c)-(iii), (d)-(i)
- (3) (a)-(ii), (b)-(i), (c)-(iii), (d)-(iv)
- (4) (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv)

Official Ans. by NTA (1)

- Sol. Complex Type of Isomerism**
- (a) $[\text{Co}(\text{NH}_3)_6] [\text{Cr}(\text{CN})_6]$ Co-ordination isomerism
 (b) $[\text{Co}(\text{NH}_3)_3 (\text{NO}_2)_3]$ Linkage isomerism
 (c) $[\text{Cr}(\text{H}_2\text{O})_6]\text{Cl}_3$ Solvate isomerism
 (d) *cis*- $[\text{CrCl}_2(\text{ox})_2]^{3-}$ Optical isomerism

8. Primary, secondary and tertiary amines can be separated using :-

- (1) Para-Toluene sulphonyl chloride
 (2) Chloroform and KOH
 (3) Benzene sulphonic acid
 (4) Acetyl amide

Official Ans. by NTA (1)

Sol. Primary amines react with Para Toluene sulphonyl chloride to form a precipitate that is soluble in NaOH.

Secondary amines reacts with para toluene sulphonyl chloride to give a precipitate that is insoluble in NaOH.

Tertiary amines do not react with para toluen.

9. The common positive oxidation states for an element with atomic number 24, are :

- (1) +2 to +6 (2) +1 and +3 to +6
 (3) +1 and +3 (4) +1 to +6

Official Ans. by NTA (1)

Sol. $\text{Cr}(Z=24)$

$[\text{Ar}] 4s^1 3d^5$ Cr shows common oxidation states starting from +2 to +6.

10. Match List-I with List-II :

List-I Chemical Compound	List-II Used as
(a) Sucralose	(i) Synthetic detergent
(b) Glyceryl ester of stearic acid	(ii) Artificial sweetener
(c) Sodium benzoate	(iii) Antiseptic
(d) Bithionol	(iv) Food preservative

Choose the correct match :

- (1) (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)
 (2) (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)
 (3) (a)-(iii), (b)-(ii), (c)-(iv), (d)-(i)
 (4) (a)-(i), (b)-(ii), (c)-(iv), (d)-(iii)

Official Ans. by NTA (2)

Sol. Artificial sweetner : Sucralose

Antiseptic : Bithionol

Preservative : Sodium Benzoate

Glyceryl ester of stearic acid : Sodium steasate

11. Given below are two statements :

Statement-I : 2-methylbutane on oxidation with KMnO_4 gives 2-methylbutan-2-ol.

Statement-II : n-alkanes can be easily oxidised to corresponding alcohol with KMnO_4 .

Choose the correct option :

- (1) Both statement I and statement II are correct
 (2) Both statement I and statement II are incorrect
 (3) Statement I is correct but Statement II is incorrect
 (4) Statement I is incorrect but Statement II is correct

Official Ans. by NTA (3)

Sol. Alkane are very less reactive, tertiary hydrogen can oxidise to alcohol with KMnO_4 .



2-methyl-butane

12. Nitrogen can be estimated by Kjeldahl's method for which of the following compound ?

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

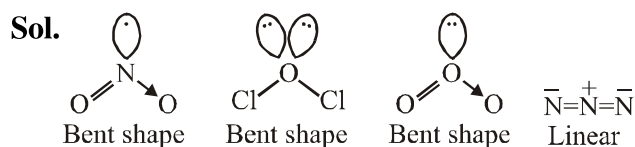
Official Ans. by NTA (2)

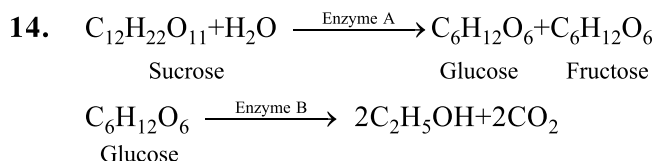
Sol. Kjeldahl method is not applicable to compounds containing nitrogen in nitrogroup, Azo groups and nitrogen present in the ring (e.g Pyridine) as nitrogen of these compounds does not change to Ammonium sulphate under these conditions.

13. Amongst the following, the linear species is :

- (1) NO_2 (2) Cl_2O
 (3) O_3 (4) N_3^-

Official Ans. by NTA (4)





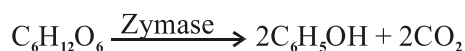
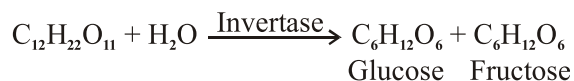
In the above reactions, the enzyme A and enzyme B respectively are :-

- (1) Amylase and Invertase
- (2) Invertase and Amylase
- (3) Invertase and Zymase
- (4) Zymase and Invertase

Official Ans. by NTA (3)

Sol. Informative

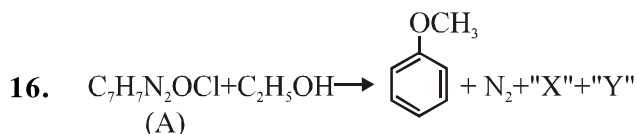
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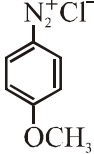
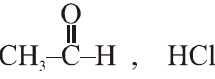
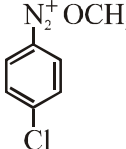
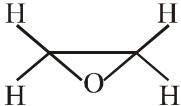
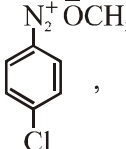
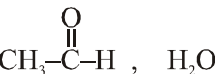
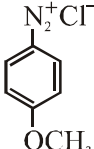
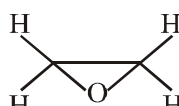
15. One of the by-products formed during the recovery of NH_3 from Solvay process is :

- (1) $\text{Ca}(\text{OH})_2$
- (2) NaHCO_3
- (3) CaCl_2
- (4) NH_4Cl

Official Ans. by NTA (3)

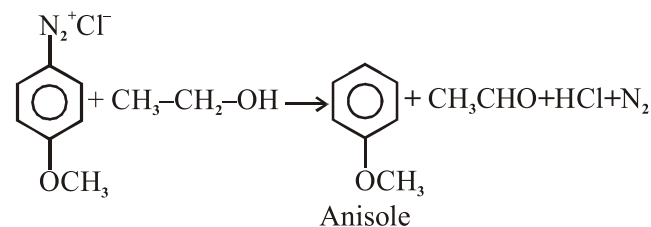


In the above reaction, the structural formula of (A), "X" and "Y" respectively are :

- (1)  ,  , HCl
- (2)  ,  , HCl
- (3)  ,  , H_2O
- (4)  ,  , H_2O

Official Ans. by NTA (1)

Sol.



17. For the coagulation of a negative sol, the species below, that has the highest flocculating power is :

- (1) SO_4^{2-}
- (2) Ba^{2+}
- (3) Na^+
- (4) PO_4^{3-}

Official Ans. by NTA (2)

Sol. To coagulate negative sol, cation with higher charge has higher coagulation value.

18. Which of the following statement(s) is (are) incorrect reason for eutrophication ?

- (A) excess usage of fertilisers
- (B) excess usage of detergents
- (C) dense plant population in water bodies
- (D) lack of nutrients in water bodies that prevent plant growth

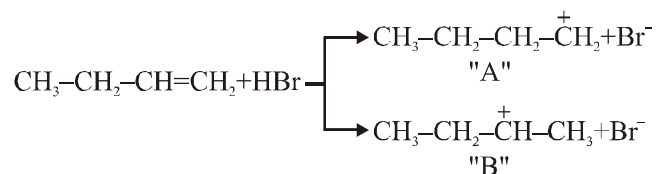
Choose the most appropriate answer from the options given below :

- (1) (A) only
- (2) (C) only
- (3) (B) and (D) only
- (4) (D) only

Official Ans. by NTA (4)

Sol. The process in which nutrient enriched water bodies support a dense plant population which kills animal life by depriving it of oxygen and results in subsequent loss of biodiversity is known as eutrophication.

19. Choose the correct statement regarding the formation of carbocations A and B given :-



- (1) Carbocation B is more stable and formed relatively at faster rate
- (2) Carbocation A is more stable and formed relatively at slow rate
- (3) Carbocation B is more stable and formed relatively at slow rate
- (4) Carbocation A is more stable and formed relatively at faster rate

Official Ans. by NTA (1)

