JEE Main January 2024

Question Paper With Text Solution

29 January | Shift-2

CHEMISTRY

MATRIX

JEE Main & Advanced | XI-XII Foundation| VI-X Pre-Foundation

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1. Which of the following statements arecorrect about Zn, Cd and Hg ?

A. They exhibit high enthalpy of atomization as the d-subshell is full.

B. Zn and Cd do not show variable oxidation state while Hg shows +I and +II.

C. Compounds of Zn, Cd and Hg are paramagnetic in nature.

D. Zn, Cd Hg are called metals.

Choose the **most appropriate** from the options given below.

(1) B, D only (2) A, D only (3) C, D only (4) B, C only

Question ID : 405859810

Ans. Official Answer NTA (1)

Sol.

2. The element having the highest first ionization enthalpy is

(1) Si (2) Al (3) N (4) C

Question ID : 405859806

Ans. Official Answer NTA (3)

Sol.

3. A reagent which gives brilliant red precipitate with Nickel ions in basic medium is

(1) meta-dinitrobenzene (2) neutral $FeCl_3$

(3) sodium nitroprusside (4) dimethyl glyoxime

Question ID : 405859823

Ans. Official Answer NTA (4)

Sol.

4. Chromatographic technique/s based on the principle of differential adsorption is/are

A. Column chromatography

B. Thin layer chromatography

C. Paper chromatography

Choose the **most appropriate** answer from the options given below :

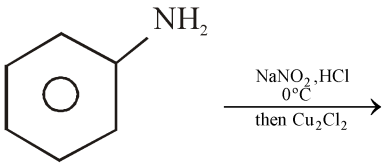
(1) A only (2) C only (3) B only (4) A & B only

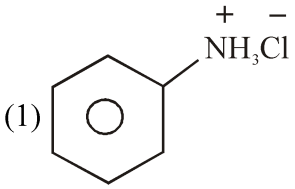
Question ID:

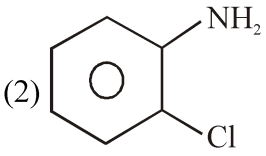
Ans. Official Answer NTA (4)

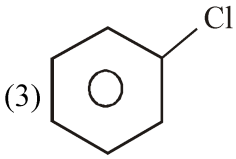
Sol.

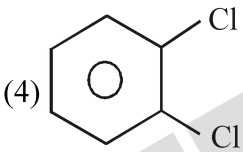
65. The product A formed in the following reaction is



(1) 

(2) 

(3) 

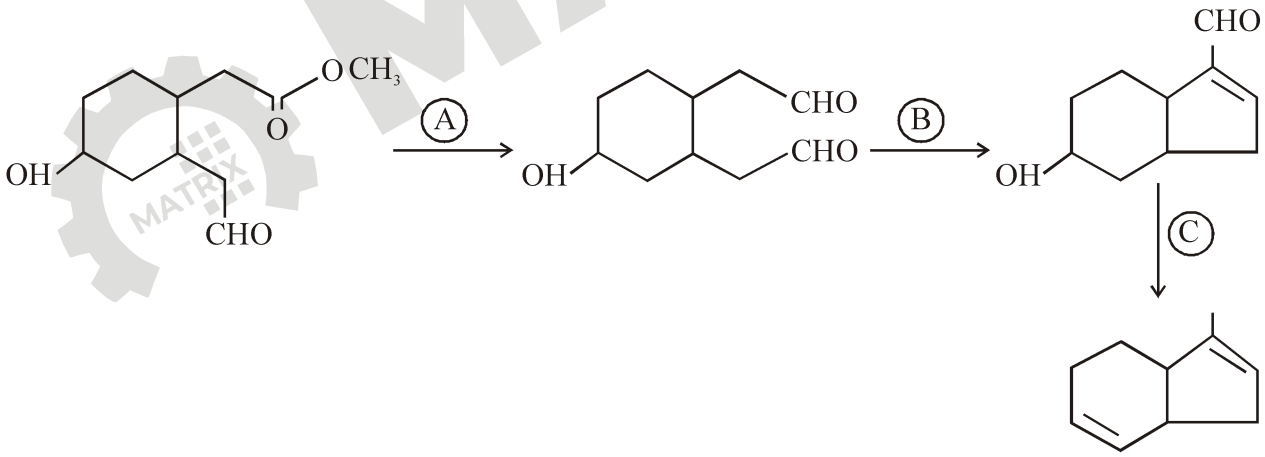
(4) 

Question ID : 405859816

Ans. Official Answer NTA (3)

Sol.

6. Identify the reagents used for the following conversion



(1) A = DIBAL-H, B = $NaOH_{(alc)}$, C = Zn/HCl

(2) A = $LiAlH_4$, B = $NaOH_{(aq)}$, C = NH_2-NH_2/KOH, ethylene glycol

(3) A = $LiAlH_4$, B = $NaOH_{(alc)}$, C = Zn/HCl

(4) A = DIBAL-H, B = $NaOH_{(aq)}$, C = NH_2-NH_2/KOH, ethylene glycol

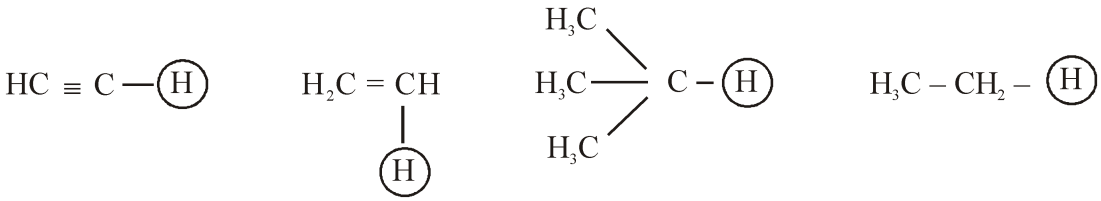
Question ID : 405859818

Ans. Official Answer NTA (4)

Answer by Matrix is (1)

Sol.

7. The ascending acidity order of the following H atoms is



A B C D

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

Question ID : 405859815

Ans. Official Answer NTA (4)

Sol.

8. Which of the following acts as a strong reducing agent ? (Atomic number : Ce = 58, Eu = 63, Gd = 64, Lu = 71)

(1) Lu^{3+} (2) Gd^{3+} (3) Ce^{4+} (4) Eu^{2+}

Question ID : 405859809

Ans. Official Answer NTA (4)

Sol.

9. On passing a gas, 'X', through Nessle's regent, a brown precipitate is obtained. The gas 'X' is

(1) NH_3 (2) H_2S (3) Cl_2 (4) CO_2

Question ID : 405859824

Ans. Official Answer NTA (1)

Sol.

10. Match List I with List II

List I (Compound)	**List II (pK_a value)**
A. Ethanol	I. 10.0
B. Phenol	II. 15.9
C. m-Nitrophenol	III. 7.1
D. p-Nitrophenol	IV. 8.3

Choose the correct answer from the options given below :

(1) A-IV, B-I, C-II, D-III (2) A-I, B-II, C-III, D-IV

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

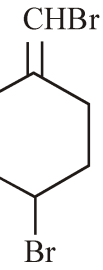
(4) A-III, B-IV, C-I, D-II

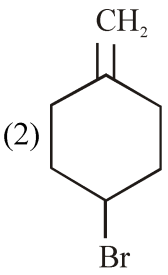
Question ID : 405859820

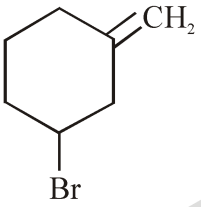
Ans. Official Answer NTA (3)

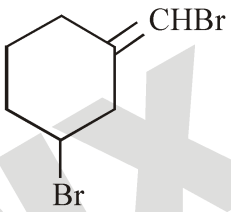
Sol.

11. Which one of the following will show geometrical isomerism ?

(1) 

(2) 

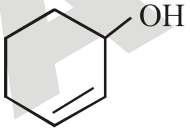
(3) 

(4) 

Question ID : 405859813

Ans. Official Answer NTA (4)

Sol.

12. According to IUPAC system, the compound 

is named as

(1) Cyclohex-1-en-3-ol

(2) Cyclohex-1-en-2-ol

(3) Cyclohex-2-en-1-ol

(4) 1-Hydroxyhex-2-ene

Question ID : 405859814

Ans. Official Answer NTA (3)

Sol.

13. Math List I with List II

List I	**List II**
(Spectral Series for Hydrogen)	**(Spectral Region/Higher Energy State)**
A. Lyman	I. Infrared region
B. Balmer	II. UV region
C. Paschen	III. Infrared region
D. Pfund	IV. Visible region

Choose the correct answer from the options given below :

(1) A-II, B-IV, C-III, D-I (2) A-I, B-III, C-II, D-IV

(3) A-I, B-II, C-III, D-IV (4) A-II, B-III, C-I, D-IV

Question ID : 405859805

Ans. Official Answer NTA (1)

Sol.

14. Alkyl halide is converted into alkyl isocyanide by reaction with

(1) NH_4CN (2) AgCN (3) NaCN (4) KCN

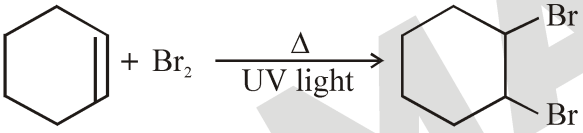
Question ID : 405859817

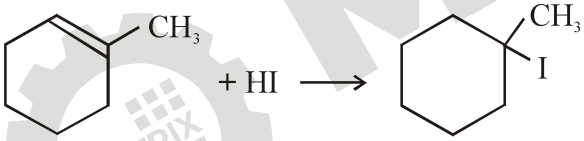
Ans. Official Answer NTA (2)

Sol.

15. Which of the following reaction is correct ?

(1) $C_2H_5CONH_2 + Br_2 + NaOH \rightarrow C_2H_5CH_2NH_2 + Na_2CO_3 + NaBr + H_2O$

(2) 

(3) 

(4) $CH_3CH_2CH_2NH_2 \xrightarrow[H_2O]{HNO_2, 0°C} CH_3CH_2OH + N_2 + HCl$

Question ID : 405859821

Ans. Official Answer NTA (3)

Sol.

16. Anomalous behavior of oxygen is due to its

(1) small size and low electronegativity

(2) small size and high electronegativity

(3) large size and high electronegativity

(4) large size and low electronegativity

Question ID : 405859807

Ans. Official Answer NTA (2)

Sol.

17. Given below are two statements :

Statement I : Fluorine has most negative electron gain enthalpy in its gropu.

Statement II : Oxygen has least negative electron gain enthalpy in its group.

In the light of the above statements, choose the **most appropriate** from the options given below.

(1) Both statement I and statement II are true

(2) Statement I is true but statement II is false

(3) Both statement I and statement II are false

(4) Statement I is false but statement II is true

Question ID : 405859808

Ans. Official Answer NTA (4)

Sol.

18. The correct IUPAC name of K_2MnO_4 is

(1) Dipotassium tetraoxidomanganate (VII)

(2) Potassium tetraoxidomanganese (VI)

(3) Potassium tetraoxidomanganate (VI)

(4) Potassium tetraoxopermanganate (VI)

Question ID : 405859811

Ans. Official Answer NTA (3)

Sol.

19. Phenol treated with chloroform in presence of sodium hydroxide, which further bydrolyzed in presence of an acid results

(1) Benzene-1,3-diol

(2) Benzene-1,2-diol

(3) Salicylic acid

(4) 2-Hydroxybenzaldehyde

Question ID : 405859819

Ans. Official Answer NTA (4)

Sol.

20. Math List I with List II

List I	**List II**
(Bio Polymer)	**(Monomer)**
A. Starch	I. nucleotide
B. Cellulose	II. α-glucose
C. Nucleic acid	III. β-glucose
D. Protein	IV. α-amino acid

Choose the correct answer from the options given below :

(1) A-II, B-III, C-I, D-IV (2) A-IV, B-II, C-I, D-III

(3) A-I, B-III, C-IV, D-II (4) A-II, B-I, C-III, D-IV

Question ID : 405859822

Ans. Official Answer NTA (1)

Sol.

21. The total number of molecules with zero dipole moment among CH_4,BF_3,H_2O,HF,NH_3,CO_2 and SO_2 is.

Question ID : 405859827

Ans. Official Answer NTA (3)

Sol.

22. A constant current was passed through a solution of $AuCl_4^-$ ion between gold electrodes. After a period of 10.0 minutes, the nicrease in mass of cathode was 1.314g. The total charge passed through the solution is _____ $\times 10^{-2}$ F.

(Given atomic mass of Au = 197)

Question ID : 405859832

Ans. Official Answer NTA (2)

Sol.

23. If 50 mL of 0.5 M oxalic acid is required to neutralise 25 mL of NaOH solution, the amount of NaOH in 50 mL of given NaOH solution is _____ g.

Question ID : 405859825

Ans. Official Answer NTA (4)

Sol.

24. The total number of anti bonding molecular orbitals, formed from 2s and 2p atomic orbitals in a diatomic molecule is _____.

Question ID : 405859826

Ans. Official Answer NTA (4)

Sol.

25. Standard enthalpy of vapourisation for CCl_4 is 30.5 kJ mol^{-1}. Heat required for vapourisation of 284g of CCl_4 at constant temperature is _____ kJ.

(Given molar mass in g mol^{-1}; C = 12, Cl = 35.5)

Question ID : 405859828

Ans. Official Answer NTA (56)

Answer by Matrix is (56.2), But As per Information bulletine issued by NTA for Jee Main 2024 report your answer as nearest integer.

Sol.

26. The oxidation number of iron in the compound formed during brown ring test for NO_3^- ion is _____.

Question ID : 405859831

Ans. Official Answer NTA (1)

Sol.

27. The following concentrations were observed at 500K fo the formation of NH_3 from N_2 and H_2. At equilibrium ; $[N_2] = 2 \times 10^{-2}$M, $[H_2] = 3 \times 10^{-2}$ M and $[NH_3] = 1.5 \times 10^{-2}$ M. Equilibrium constant for the reaction is .

Question ID : 405859830

Ans. Official Answer NTA (417)

Answer by Matrix is (416.67)

Sol.

28. Molality of 0.8 M H_2SO_4 solution (density 1.06 g cm^{-3}) is _____ $\times 10^{-3}$m.

Question ID : 405859829

Ans. Official Answer NTA (815)

Answer by Matrix is (814.9)

Sol.

29. The total number of 'Sigma' and 'Pi' bonds in 2-formylhex-4-enoic acid is _____.

Question ID : 405859834

Ans. Official Answer NTA (21)

Answer by Matrix is (22)

Sol.

30. The half-life of radioisotope bromine-82 is 36 hours. The fraction which remains after one day is _____ $\times 10^{-2}$

(Given antilog 0.2006 = 1.587)

Question ID : 405859833

Ans. Official Answer NTA (63)

Sol.