



SINCE 2013

VIDYAPEETH ACADEMY

IIT JEE | NEET | FOUNDATION

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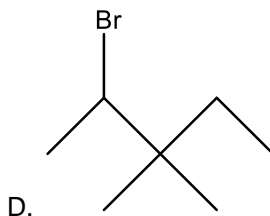
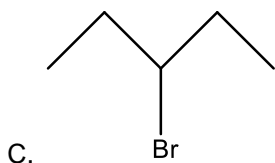
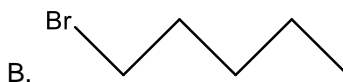
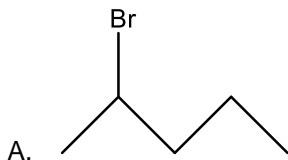
JEE Main 2023 (Memory based)

29 January 2023 - Shift 2

Answer & Solutions

CHEMISTRY

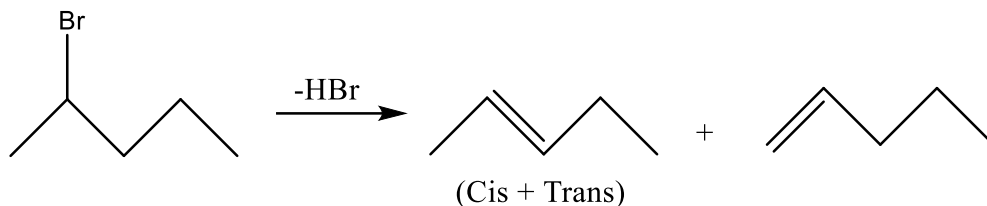
1. In which of the given molecules, dehydrohalogenation forms maximum number of isomers (excluding rearrangement)



Answer (A)

Solution:

A.



B. Only 1 Product

C. 2 Products

D. Only 1 Product

2. If Bohr's radius of H atom in ground state is 0.6 \AA , find out the Bohr's radius of He^+ ion in 3rd orbit of He^+ ion

A. 2.7 \AA

B. 0.9 \AA

C. 5.4 \AA

D. 1.8 \AA

Answer (A)

Solution:

$$r \propto \frac{n^2}{Z}$$

$$r = 0.6 \times \frac{n^2}{Z}$$

$$r = 0.6 \times \frac{(3)^2}{2}$$

$$r = 0.3 \times 9 = 2.7 \text{ \AA}$$

3. Which one of the following ones contains sulphide ions?

- A. Malachite
- B. Calamine
- C. Sphalerite
- D. Siderite

Answer (C)

Solution:

The chemical formulae of the given ores are

Malachite: $CuCO_3 \cdot Cu(OH)_2$

Calamine: $ZnCO_3$

Sphalerite: ZnS

Siderite: $FeCO_3$

Therefore, Sphalerite contains sulphide ions.

4. Match the correct column

List - I	List - II
A. Thermosetting	P. Neoprene
B. Thermoplastic	Q. Polyester
C. Elastomer	R. Polystyrene
D. Fiber	S. Urea formaldehyde resin

- A. A – P, B – R, C – Q, D – S
- B. A – S, B – R, C – P, D - Q
- C. A – S, B – R, C – Q, D - P
- D. A – P, B – R, C – S, D - Q

Answer (B)

Solution:

Urea formaldehyde resin is Thermosetting polymer

Polystyrene is Thermoplastic polymer

Neoprene is an Elastomer

Polyester is a Fiber

5. At 300 K the ratio of V_{rms} and V_{avg} of oxygen molecule is $\sqrt{\frac{\alpha\pi}{\alpha+5}}$, the value of α will be

- A. 1
- B. 2
- C. 3
- D. 4

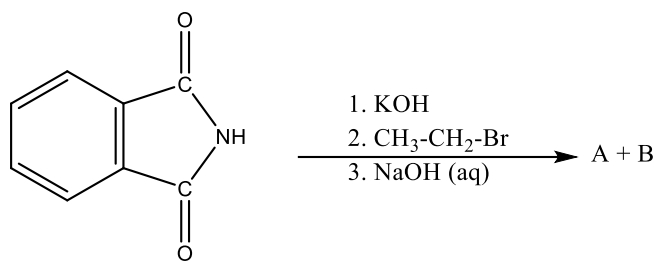
Answer (C)

Solution:

$$\frac{V_{rms}}{V_{avg}} = \sqrt{\frac{3\pi}{8}} = \sqrt{\frac{\alpha\pi}{\alpha+5}}$$

$$\therefore \alpha = 3$$

6.

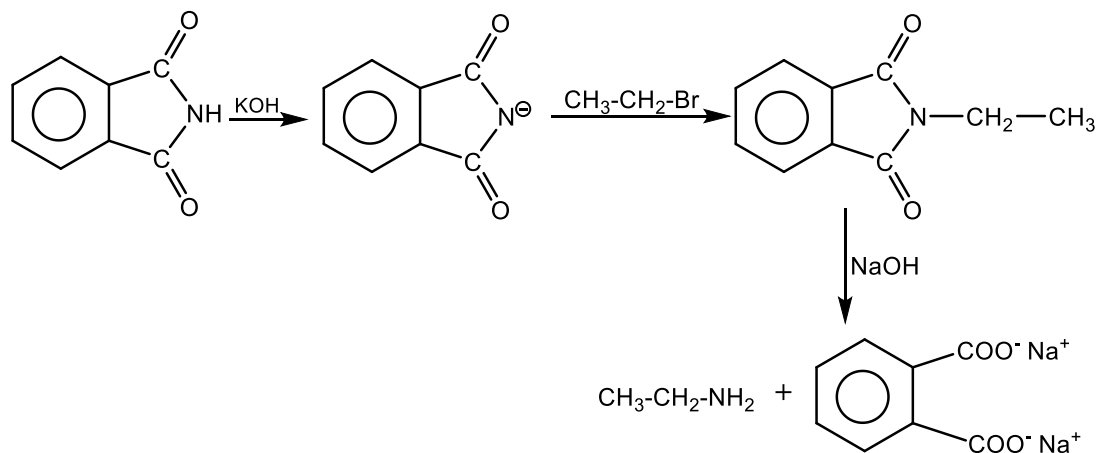


A and B are respectively are

- A. CH₃-CH₂-NH₂ and
- B. CH₃-CH₂-NH₂ and
- C. and
- D. and

Answer (A)

Solution:



7. Match List – I with List - II

List - I	List - II
A. Electroosmosis	P. Solvent moves from low concentration to high concentration of solution
B. Electrophoresis	Q. Solvent moves from high concentration to low concentration of solution
C. Reverse Osmosis	R. Dispersion medium (DM) moves towards oppositely charged electrode across semipermeable membrane
D. Osmosis	S. Colloidal particles move in the presence of electric field (DP & DM)

- A. A – R, B – S, C – Q, D – P
 B. A – Q, B – P, C – R, D – S
 C. A – P, B – Q, C – R, D – S
 D. A – P, B – R, C – Q, D – S

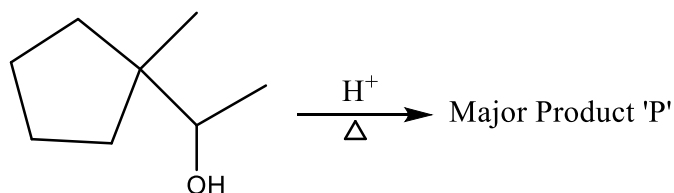
Answer (A)

Solution:

All options are definition based

- A. Electroosmosis – Movement of dispersion medium across semipermeable membrane in an electric field.
 B. Electrophoresis – Movement of DP & DM towards respective electrodes.
 C. Reverse Osmosis – Movement of solvent from higher concentration to lower concentration of solution.
 D. Osmosis - Movement of solvent from lower concentration to higher concentration of solution.

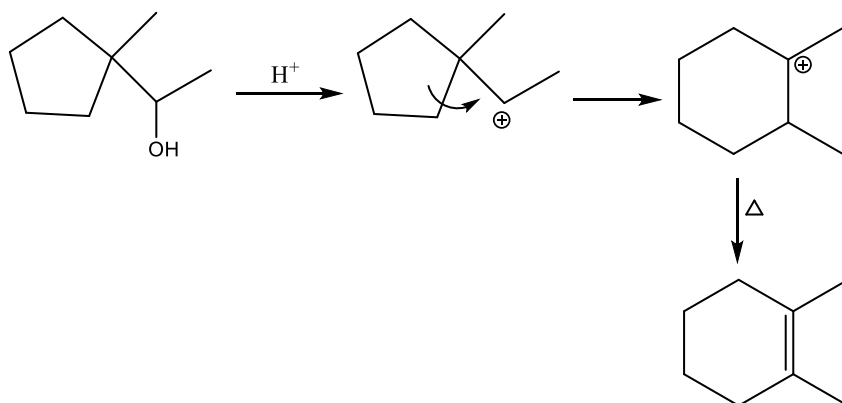
8. Consider the following reaction:



Find the number of α -H's in the major product is?

Answer (10.00)

Solution:



Number of α -H's in P =10

9. A 1:1 (by mole) mixture of A and B is passed to a container. Molar mass of A is 16 g, and molar mass of B is 32 g. And the half-life of A is 1 day and half-life of B is $\frac{1}{2}$ day. Then find the average molar mass of the remained mixture after 2 days (Round off the nearest integer)

Answer (19)

Solution:

$$\text{A: } 1 \text{ mole} \xrightarrow{1 \text{ day}} \frac{1}{2} \text{ mole} \xrightarrow{1 \text{ day}} \frac{1}{4} \text{ mole}$$

$$\text{B: } 1 \text{ mole} \xrightarrow{\frac{1}{2} \text{ day}} \frac{1}{2} \text{ mole} \xrightarrow{\frac{1}{2} \text{ day}} \frac{1}{4} \text{ mole} \xrightarrow{\frac{1}{2} \text{ day}} \frac{1}{8} \text{ mole} \xrightarrow{\frac{1}{2} \text{ day}} \frac{1}{16} \text{ mole}$$

$$M_{avg} = \frac{\frac{1}{4} \times 16 + \frac{1}{16} \times 32}{\frac{1}{4} + \frac{1}{16}} = \frac{6}{0.25 + 0.0625} = \frac{6}{0.3125} = 19.2$$

10. How many of the oxides given are acidic.

NO, NO₂, N₂O₃, Cl₂O₇, CO, SO₂, SO₃, N₂O

Answer (5)

Solution:

NO₂, N₂O₃, Cl₂O₇, SO₂, SO₃ are acidic oxides

11. The colour of CrO₅ in ether is:

- A. Yellow
- B. Green
- C. Blue
- D. Orange

Answer (C)

CrO₅ in ether will exhibit blue color.

12. The number of voids in 0.02 moles of a solid which forms HCP lattice is given as : (Given $N_A = 6 \times 10^{23}$)

- A. 3.6×10^{22}
- B. 3.6×10^{24}
- C. 7.2×10^{20}
- D. 5.4×10^{26}

Answer (A)

Solution:

$$\text{Total number of voids} = \frac{18}{6} \times 6 \times 10^{23} \times 0.02 = 3.6 \times 10^{22}$$

13. Which of the following complex has zero spin only magnetic moment?

- A. $[FeF_6]^{3-}$
- B. $[CoF_6]^{3-}$
- C. $[Co(C_2O_4)_3]^{3-}$
- D. $[Fe(H_2O)_6]^{3+}$

Answer (C)**Solution:**

$[Co(C_2O_4)_3]^{3-}$ has d^2sp^3 hybridisation and $3d^6$ electronic configuration and it has zero unpaired electrons.

14. Which of the following diseases can be cured by equanil drug.

- A. Pain
- B. Stomach ulcer
- C. Depression
- D. Hyperacidity

Answer (C)**Solution:**

Depression can be cured by equanil drug.

15. Compare the bond order of the following molecules.

O_2^{2-} , NO , CO

- A. $O_2^{2-} > NO > CO$
- B. $O_2^{2-} > CO > NO$
- C. $CO > NO > O_2^{2-}$
- D. $NO > CO > O_2^{2-}$

Answer (C)**Solution:**

The correct bond order:

$$O_2^{2-} \rightarrow 1$$

$$NO \rightarrow 2.5$$

$$CO \rightarrow 3$$

\therefore The correct order is $CO > NO > O_2^{2-}$

16. Statement – I: Ionization enthalpy difference from B to Al is more than that of Al to Ga

Statement – II: Ga has completely filled d-orbital

Choose the correct option from the following.

- A. Both statement – I and statement – II are correct
- B. Statement – I is incorrect and statement – II is correct
- C. Statement – I is correct and statement – II is incorrect
- D. Both statement – I and II are incorrect

Answer (A)**Solution:**

Ga has similar ionisation enthalpy as Al because of poor shielding effect of completely filled d-orbital in Ga.

17. Which of the following relation is correct.

- A. $\Delta G = \Delta H - T\Delta S$ at constant T & P
- B. $\Delta U = \Delta H + nR\Delta T$ (For n moles of an ideal gas)

- C. $P\Delta V = (\Delta n)RT$
- D. None of these

Answer (A)

Solution:

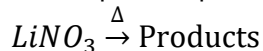
$\Delta G = \Delta H - T\Delta S \rightarrow$ correct relation at constant T & P

$\Delta H = \Delta U + nR\Delta T$ (For n moles of an ideal gas)

$P\Delta V = (\Delta n)RT$ is only true for a chemical reaction at constant T & P.

So, correct answer is option (A).

18. Thermal decomposition products of $LiNO_3$ are

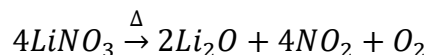


- A. $LiNO_2$ and O_2
- B. $LiNO_2$, NO_2 and O_2
- C. Li_2O , NO_2 and O_2
- D. Li , NO and O_2

Answer (C)

Solution:

Thermal decomposition of $LiNO_3$ gives the following products



19. BOD value of drinking water ranges between:

- A. 3 - 5
- B. 10 -13
- C. 14 - 17
- D. 20 - 22

Answer (A)

Solution:

BOD value of drinking water ranges between 3 and 5.

20. The ratio of de Broglie wavelength of proton to that of α -particle, if they are accelerated through same potential is given as:

- A. $2\sqrt{2} : 1$
- B. $2 : 1$
- C. $1 : 2\sqrt{2}$
- D. $\sqrt{2} : 1$

Answer (A)

Solution:

$$\frac{\lambda_p}{\lambda_\alpha} = \sqrt{\frac{m_\alpha KE_\alpha}{m_p KE_p}} = \sqrt{\frac{4m_p \times 2v}{m_p \times v}} = \sqrt{8} = 2\sqrt{2} : 1$$

21. Which of the following is produced when propanamide is treated with Br_2 in presence of KOH .

- A. Ethyl nitrile
- B. Propanamine
- C. Ethyl amine
- D. Propane nitrile

Answer (C)

Solution:

