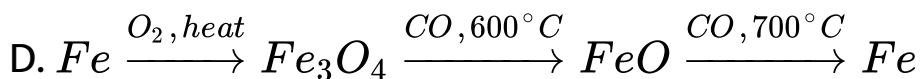# CHEMISTRY
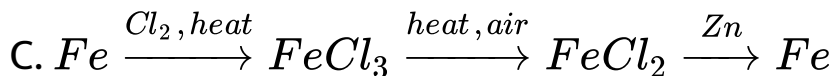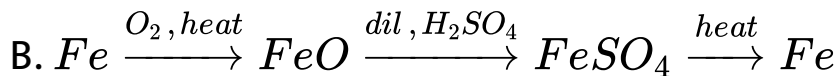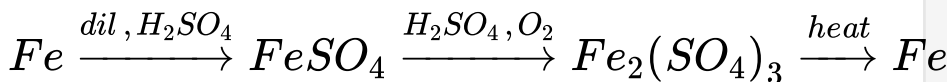
BOOKS - KVPY PREVIOUS YEAR

MOCK TEST 10

Exercise

1. Which series of reactions correctly represents chemical rections related to iron and its compounds ?

A.

$$Fe \xrightarrow{dil,\ H_2SO_4} FeSO_4 \xrightarrow{H_2SO_4,\ O_2} Fe_2(SO_4)_3 \xrightarrow{heat} Fe$$

B. $$Fe \xrightarrow{O_2,\ heat} FeO \xrightarrow{dil,\ H_2SO_4} FeSO_4 \xrightarrow{heat} Fe$$

C. $$Fe \xrightarrow{Cl_2,\ heat} FeCl_3 \xrightarrow{heat,\ air} FeCl_2 \xrightarrow{Zn} Fe$$

D. $$Fe \xrightarrow{O_2,\ heat} Fe_3O_4 \xrightarrow{CO,\ 600^\circ C} FeO \xrightarrow{CO,\ 700^\circ C} Fe$$

Answer:

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2. The coordination number, EAN of the central

metal atom and geometry of the complex ion

obtained by adding $CuSO_4$ to excess of aqueous KCN respectively, are

A. 4,35,sp^2 d

B. 6, 36, sp^3d^2

C. 4, 36, sp^2d

D. 4, 35, sp^3

Answer:

3. A lead storage battery containing 5.0 L of 1N H_2SO_4 solution is operated for 9.65×10^5 s with a steady current of 100 mA. Assuming volume of the solution remaining constant, normality of H_2SO_4 will

A. remain unchanged

B. increases by 0.20

C. increase by unity

D. decrease by 0.40

Answer:

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4. Chloroethene is treated with sodium amide in liquid ammonia. The major product is

    A. o-Nitroaniline

    B. p-Nitroaniline

    C. m - Nitroaniline

    D. All of these

Answer:

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5. A solution contains Fe^{2+}, Fe^{3+} and T^- ions. This solution was treated with iodine at $35°C$. $E°$ for Fe^{3+}, Fe^{2+} is $0.77V$ and $E°$ for $I_2/2I^- = 0.536$ V. The favourable redox reaction is:

A. I_2 will be reduced to I^-

B. There will be no redox reaction

C. I^- will be oxidised to I_2

D. Fe^{2+} will be oxidised to Fe^{3+}

Answer:

6. A metal has an fcc latticed.The edge length of the unit cell is 404 pm .The density of the metal is $2.72g/cm^{-3}$ .The molar mass of the metal is $(N_A$ Avogadro's constant $= 6.2 \times 10^{23} mol^{-1})$

A. 30 g mol^{-1}

B. 27g mol^{-1}

C. 20 g mol^{-1}

D. 40g mol^{-1}

Answer:

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7. The volume of a colloidal particle V_C as compared to the volume of a solute particle in a true solution V_S could be

A. $\dfrac{V_C}{V_S} \simeq 10^3$

B. $\dfrac{V_C}{V_S} \simeq 10^{-3}$

C. $\dfrac{V_C}{V_S} \simeq 10^{23}$
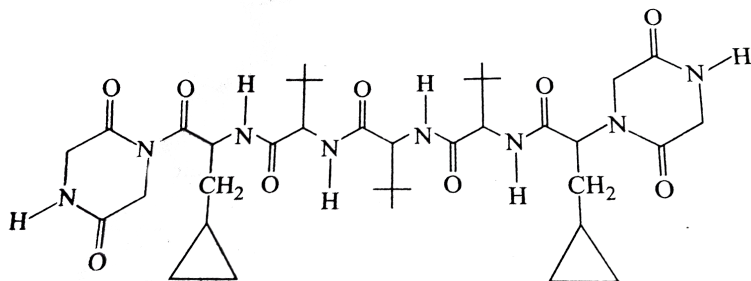
D. $\dfrac{V_C}{V_S} \simeq 1$

Answer:

8. The total number of distinct naturally occuring amino acids obtained by complete acidic hydrolysis of the peptide shown below is

A. Two

B. Three

C. One

D. Four

Answer:

9. At temperature $327°C$ and concentration C, the osmotic pressure of a solution is P. The same solution at concentration C/2 and a temperature $427°C$ of shows osmotic pressure of 2 atm. The value of P will be :

A. $\dfrac{12}{7}$

B. $\dfrac{24}{7}$

C. $\dfrac{6}{5}$

D. $\dfrac{5}{6}$

Answer:

10. If Cl_2 gas is passed into aqueous solution of KI containing some CCl_4 and the mixture is shaken:

    A. upper layer becomes violet

    B. lower layer becomes violet

    C. homogenous violet layer is formed

    D. None of these

Answer:

11. Which of the following is not correct

A. P_4S_{10} exist like P_4O_{10} and P_4S_6 exist like P_4O_6.

B. In P_4S_3, there exist 3P-S-P bond whereas in P_4S_5, there exist four P-S-P bonds.
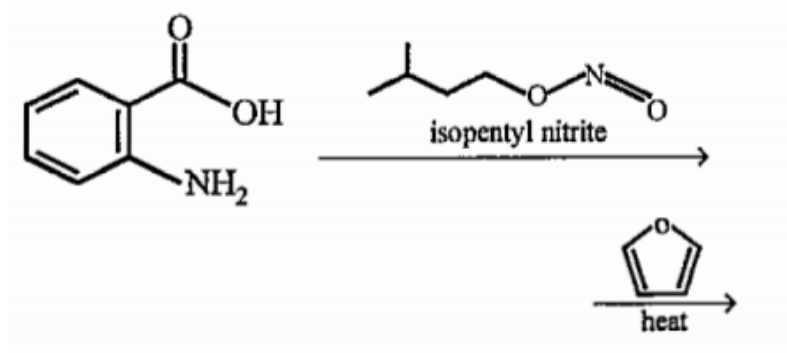
C. Both P_4S_{10} and P_4O_{10} have same structure

D. P_4S_3 is most stable sulphide of phosphorus.

Answer:

12. The compound isopentylnitrite is a source of NO^+ ions and will react with an amine to generate a diazonium cation. Predict the product of the following reaction sequence.
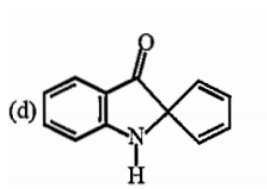

isopentyl nitrite

heat

A.

B.

C.

D.

Answer:

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13. On complete hydrogenation, natural rubber produces

    A. ethylene-propylene copolymer

    B. vulcanised rubber

    C. polypropylene

    D. polybutylene

Answer:

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14. The solublity of hydroides, fluorides of oxalates of the metals of Group IIA

    A. increases down the group

    B. decreases down the group

    C. varies randomly

    D. is constant

Answer:

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15. When nitrobenzene is treated with Br_2 in presence of $FeBr_3$, the major product formed is m − bromo − nitrobenzene. Statement which is related to obtain the m − isomer is

A. the electron density on meta carbon is increased than that on ortho and para positions.

B. the intermediatecarbonium ion formed after initial attack of Br^+ at the meta position is least destabilised.

C. loss of aromaticity when Br^+ attacks at the ortho and para positions and not at meta position.

D. easier loss of H^+ to regain aromaticity from the meta position than from ortho and para positions.

Answer:

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16. The straight chain polymer (silicones) is formed by

A. hydrolysis of CH_3SiCl_3 followed by condensation polymerisation

B. hydrolysis of $(CH_3)_4Si$ by addition polymerisation

C. hydrolysis of $(CH_3)_2SiCl_2$ followed by condensation polymerisation

D. hydrolysis of $(CH_3)_3SiCl$ followed by condensation polymerisation

Answer:

17. 1.30 cm^3 of N_2 gas at STP is adsorbed per gram of silica gel. The area occupied by nitrogen molecule is 0.16 nm^2. What is the surface area per gram of silica gel ?

$\left(N_A = 6.023 \times 10^{23}\right)$
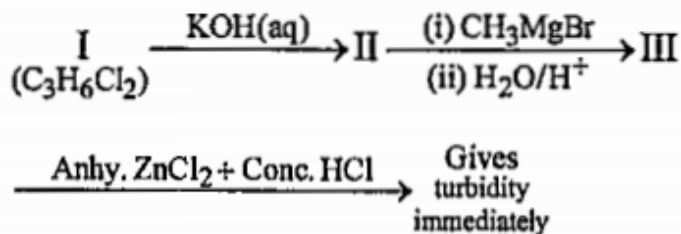
A. $1.6 m^2 g^{-1}$

B. $5.568 m^2 g^{-1}$

C. $3.48 m^2 g^{-1}$

D. $4.42m^2g^{-1}$

Answer:

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18. In the following reaction sequence:
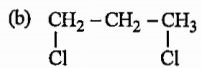
$$\underset{(C_3H_6Cl_2)}{I} \xrightarrow{KOH(aq)} II \xrightarrow[\text{(ii) } H_2O/H^+]{\text{(i) } CH_3MgBr} III$$

$$\xrightarrow{\text{Anhy. } ZnCl_2 + \text{Conc. HCl}} \underset{\text{immediately}}{\overset{\text{Gives}}{\text{turbidity}}}$$

The compound I is:

A.

(a) $\underset{Cl \quad\quad Cl}{CH_2 - CH - CH_3}$

B.

(b) $CH_2 - CH_2 - CH_3$
  $\quad\quad |$ $\quad\quad\quad\quad |$
  $\quad\quad Cl$ $\quad\quad\quad\; Cl$

C.

(c) $Cl - CH - CH_2 - CH_3$
  $\quad\quad\quad |$
  $\quad\quad\; Cl$

D.

$\quad\quad\quad\quad Cl$
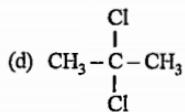$\quad\quad\quad\quad |$
(d) $CH_3 - C - CH_3$
$\quad\quad\quad\quad |$
$\quad\quad\quad\quad Cl$
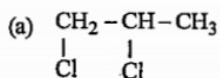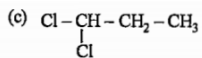
Answer:

19. There are two radioactive substance A and B. Decay consant of B is two times that of A. Initially, both have equal number of nuceli. After n half-lives of A,rates of disintegaration of both are equal. The value of n is .

A. 4

B. 2

C. 1

D. 5

Answer:

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20. You are given an electron with a de-Broglie wavelength of $\lambda = 76.3nm$. What is the Kelvin temperature of this electron?

A. 1.50

B. 2.00

C. 2.50

D. 3.00
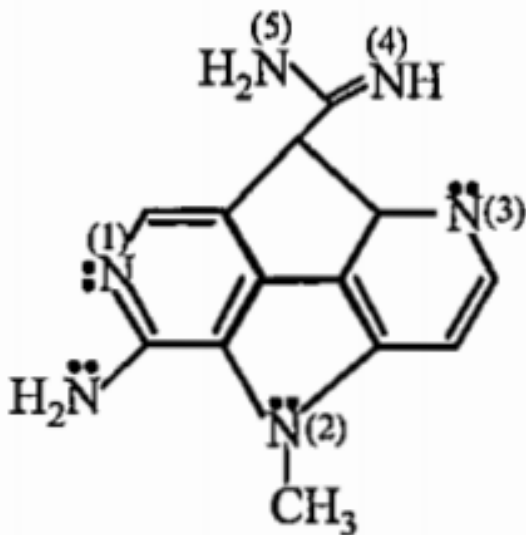
Answer:

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21. The decreasing order of basic strength is

A. igt vgtiiigtivgtii

B. ivgtigtvgtiiigtii

C. vgt ivgtigt iigtiii

D. ivgtvgtiiigtigtii

Answer:

22. A tetrapeptide has $-COOH$ group on alanine. This produces glycine (Gly), valine (Val), phenyl alanine (Phe) and alanine (Ala), on complete hydrolyses. For this tetrapeptide, the number of possible sequences (primary structures) with $-NH_2$ group attached to a chiral centre is
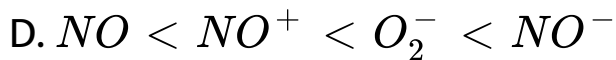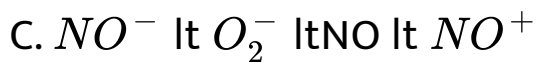
  A. 8

  B. 4

C. 5

D. 6

Answer:

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23. Which one of the following arrangements represents the correct order of electron gain enthalpy of the given atomic species?

A. NO^+ lt NO lt NO lt O_2^-

B. O_2^- lt NO^- lt NO lt NO^+

C. NO^- lt O_2^- ltNO lt NO^+

D. $NO < NO^+ < O_2^- < NO^-$

Answer:

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24. The standard heat of formation values of $SF_6(g), S(g),$ and $F(g)$ are $-1100, 275,$ and $80 kJmol^{-1}$, respectively. Then the average $S - F$ bond enegry in SF_6

A. 309kJ

B. 315kJ

C. 320kJ

D. 300kJ

Answer:

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