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CHEMISTRY

BOOKS - GURUKUL BOOKS & PACKAGING CHEMISTRY (HINGLISH)

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Chemistry Section I

1. The process in which the value of $\Delta U = 0$ is

:

A. Adiabatic

B. Isothermal

C. Isobaric

D. Isochoric

Answer: B

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2. An ionic crystal lattice has $\frac{r^+}{r^-}$ radius ratio of 0.320, its co-ordination number is :

A. 3

B. 4

C. 6

D. 8

Answer: B

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3. In hydrogen-oxygen fuel cell the crbon rods are immersed in hot aqueous solution of :

A. KCl

B. KOH

C. H_2SO_4

D. NH_4Cl

Answer: B

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4. The chemical formula of willemite is :

A. ZnS

B. $ZnCO_3$

C. ZnO

D. Zn_2SiO_4

Answer: D

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5. The oxidation state of nitrogen in dinitrogen trioxide is :

A. $+1$

B. $+2$

C. $+3$

D. $+4$

Answer: C

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6. Which of the following 0.1 M aqueous solutions will exert highest osmotic pressure ?

A. $Al_2(SO_4)_3$

B. Na_2SO_4

C. $MgCl_2$

D. KCl

Answer: A

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7. The half-life period of zero order reaction A $\rightarrow$ product is given by :

A. $\frac{[A]_0}{k}$

B. $\frac{0.693}{k}$

C. $\frac{[A]_0}{2k}$

D. $\frac{2[A]_0}{k}$

Answer: C

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8. Derive the relation between elevation of boiling point and molar mass of the solute .

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9. State third law of thermodynamics. Give 'two' uses.

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10. Draw a neat and labelled diagram of lead storage battery.

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11. Ionic solids are hard and brittle. Explain.

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12. A certain reaction occurs in the following steps :

(1) $Cl_{(g)} + O_{3(g)} \rightarrow ClO_{(g)} + O_{2(g)}$

(2) $ClO_{(g)} + O_{(g)} \rightarrow Cl_{(g)} + O_{2(g)}$

(a) What is the molecularity of each of the elementary steps ?

(b) Identify the reaction intermediate and write the chemical equation for overall reaction.

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13. Define :

(a) Semipermeable membrane

(b) Reference electrode

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14. What is the action of chlorine on :

(a) CS_2

(b) Excess NH_3

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15. Write the chemical equations involved in van Arkel method for refining zirconium metal.

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16. Write balanced chemical equations for the following :

(a) Phosphorus reacts with magnesium.

(b) Flowers of sulphur boiled with calcium hydroxide.

(c) Action of ozone on hydrogen peroxide.

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17. The density of iron crystal is 8.54 gram cm^{-3}. If the edge length of unit cell is 2.8 Å and atomic mass is 56 gram mol^{-1}, find the number of atoms in the unit cell.

(Given : Avogadro's number $= 6.022 \times 10^{23}$, $1\text{Å} = 1 \times 10^{-8}$ cm)

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18. How many ffardays of electricity are required to produce 13 gram of aluminium from aluminium chloride solution ?

(Give : Molar mass of Al = 27.0 gram mol^{-1})

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19. Calculate the internal energy at 298 K for the formation of one mole of ammonia, if the enthalpy change at constant pressure is

$-42.0kJmol^{-1}$.

(Give : $R = 8.314JK^{-1}mol^{-1}$)

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20. Define :

(a) Enthalpy of atomization

(b) Enthalpy of vaporization

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21. Draw the structure of IF_7. Write its geometery and the type of hybridization.

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22. State Henry's law.

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23. 22.22 gram of urea was dissolved in 300 grams of water. Calculate the number of moles

of urea and molality of the urea solution.

(Given : Molar mass of urea = 60 gram mol^{-1})

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24. What is the action of carbon on the following metal oxides :

(a) Fe_2O_3 in blast furnace

(b) ZnO in vertical retort furnace

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25. Write the molecular and structural formulae of :

(a) Thiosulphuric acid

(b) Dithionous acid

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26. The reaction $A + B \rightarrow$ products is first order in each of the reactants.

(a) How does the rate of reaction change if the concentration of A is increased by factor 3 ?

(b) What is the change in the rate of reaction if the concentration of A is halved and concentration of B is doubled ?

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Chemistry Section Ii

1. A polymer used in paints is :

A. Nomex

B. Thiokol

C. Saran

D. Glyptal

Answer: D

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2. The number of primary and secondary hydroxyl groups in ribose are :

A. 1, 3

B. 2, 3

C. 3, 1

D. 3, 2

Answer: A

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3. Diethylene triamine is:

A. monodentate

B. bidentate

C. tridentate

D. tetradentate

Answer: C

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4. Propene on oxidation with diborane in presence of alkaline hydrogen peroxide gives :

A. propan-1-ol

B. propan-2-ol

C. allyl alcohol

D. propan-1, 2-diol

Answer: A

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5. Baeyer's reagent is :

A. acidified potassium dichromate

B. alkaline potassium dichromate

C. alkaline potassium permanganate

D. acidified potassium permanganate

Answer: C

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6. Identify 'A' in the following reaction :

$A + 2Na \xrightarrow[\text{ether}]{\text{Dry}} 2, 2, 5, 5$-tetramethyllexane + 2NaBr. `

A. 2-Bromo-2-methylbutane

B. 1-Bromo-2,2-dimethylpropane

C. 1-Bromo-3-methylbutane

D. 1-Bromo-2-methylpropane

Answer: B

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7. An antifertility drug is :

A. Novestrol

B. Histamine

C. Veranal

D. Equanil

Answer: A

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8. Write balanced chemical equations for the conversion of CrO_4^{2-} to $Cr_2O_7^{2-}$ in acidic medium and $Cr_2O_7^{2-}$ to CrO_4^{2-} in basic medium.

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9. Explain the geometry of $\left[Co(NH_3)_6\right]^{3+}$ on the basis of hybridisation. (Z of Co = 27)

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10. Why ethanol has higher boiling point than ethane ?

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11. Write only reactions for the preparation of benzophenone from benzonitrile.

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12. What is the action of p-toluene sulphonylchloride on ethylamine and diethylamine ?

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13. What are amino acids ? Write the correct reaction for formation of peptide bond between amino acids.

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14. Define :

(a) Antiseptics

(b) Antioxidants

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15. Explain only reaction mechanism for alkaline hydrolysis of tert-butylburomide.

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16. Complete and rewrite the balanced chemical equations :

Chlorobenzene $\xrightarrow[473K\,,\text{pressure}]{NaCN+CuCN}$?

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17. Complete the chemical equations :

Isobutyraldehyde $\xrightarrow{50\,\%\,KOH}$?

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18. Complete and rewrite the balanced chemical equations :

Butanone + 2, 4 dinitro-phenyl hydrazine $\xrightarrow{H^+}$?

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19. Prepare carbolic acid from benzene sulphonic acid.

Write a chemical equation for the action of neutral ferric chloride on phenol.

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20. Explain the preparation and uses of nylon-2-nylon-6.

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21. How glucose is prepared from cane sugar ? Write the formula of the complex copper (II) hexacyano ferrate (II).

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22. What is lanthanide contraction ?

Explain the cause of lanthanide contraction.

Draw the structures of chloroxylenol and adenine.

How are ethylamine and ethyl methyl amine distinguished by using nitrous acid ?

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23. What is the action of the following reagents on ethanoic acid ?

(a) $LiAlH_4 / H_3O^+$

(b) PCl_3, heat

(c) P_2O_5, heat

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24. Identify 'A' and 'B' in the following reaction and rewrite the complete reaction :

$$CH_3 - CH_2 - Br + AgCN \xrightarrow{\Delta} A \xrightarrow[C_2H_5OH]{Na} B$$

Explain Hoffmann bromamide degradation reaction.

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