



# CHEMISTRY

## BOOKS - GURUKUL BOOKS & PACKAGING CHEMISTRY (HINGLISH)

FEBRUARY 2018

### 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 carbon rods are immersed in hot aqueous solution of :

A. KCl

B. KOH

C.  $H_2SO_4$

D.  $NH_4Cl$

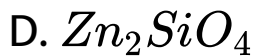
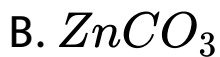
**Answer: B**



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**4. The chemical formula of willemite is :**

A. ZnS

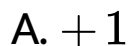


**Answer: D**



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



B. + 2

C. + 3

D. + 4

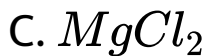
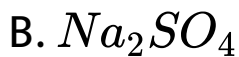
**Answer: C**



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

A.  $Al_2(SO_4)_3$



**Answer: A**



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7. The half-life period of zero order reaction A

→ 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.



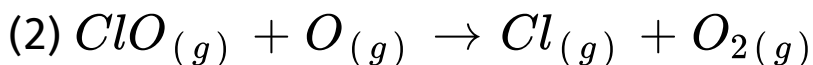
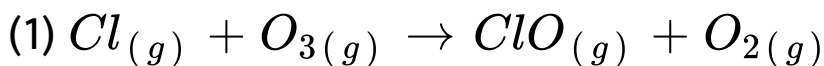
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**11.** Ionic solids are hard and brittle. Explain.



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12. A certain reaction occurs in the following steps :



(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  $8.54 \text{ gram cm}^{-3}$ . If the edge length of unit cell is  $2.8 \text{ \AA}$  and atomic mass is  $56 \text{ gram mol}^{-1}$ , find the number of atoms in the unit cell.

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



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**18.** How many ffaradays 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

$$-42.0 \text{ kJ mol}^{-1}.$$

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



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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 geometry 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

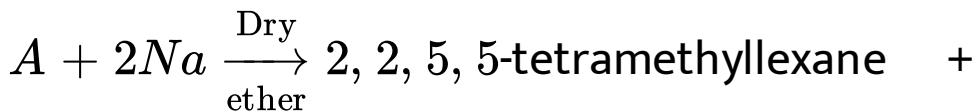
D. acidified potassium permanganate

**Answer: C**



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**6. Identify 'A' in the following reaction :**



$2NaBr.$

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  $[Co(NH_3)_6]^{3+}$  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



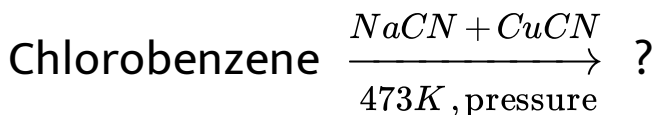
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**15. Explain only reaction mechanism for alkaline hydrolysis of tert-butylbutyromide.**



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16. Complete and rewrite the balanced chemical equations :



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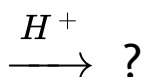
17. Complete the chemical equations :



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**18.** Complete and rewrite the balanced chemical equations :

Butanone + 2, 4 dinitro-phenyl hydrazine



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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)  $LiAlH_4 / H_3O^+$

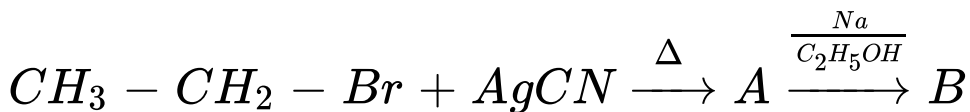
(b)  $PCl_3$ , heat

(c)  $P_2O_5$ , heat



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



Explain Hoffmann bromamide degradation reaction.



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