



## CHEMISTRY

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

JULY 2017

#### Section I

1. Which of the following is a basic oxide ?



D.  $Al_2O_3$

**Answer: C**



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2. In the representation of galvanic cell, the ions in the same phase are separated by a :

A. single vertical line

B. comma

C. double vertical line

D. semicolon

**Answer: D**



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3. An ionic crystal lattice has limiting value<sup>3</sup> of radius ratio as  $0.414 \rightarrow 0.732$ , the co-ordination number of its cation

is :

A. 6

B. 4

C. 3

D. 12

**Answer: A**



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4. The unit of rate constant for zero order reaction is :

A.  $t^{-1}$

B.  $\text{mol dm}^{-3}t^{-1}$

C.  $\text{mol}^{-1}\text{dm}^3t^{-1}$

D.  $\text{mol}^{-2}\text{dm}^6t^{-1}$

**Answer: B**



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5. Calcium carbonate used in the extraction of iron acts as :

A. oxidising agent

B. reducing agent

C. gangue

D. flux

**Answer: D**



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6. 10.0 grams of caustic soda when dissolved in  $250 \text{ cm}^3$  of water, the resultant gram molarity of solution is :

A.  $0.25M$

B.  $0.5M$

C.  $1.0M$

D.  $0.1M$

**Answer: C**



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7. 55 L atm of work is obtained when 1.0 mole of an ideal gas is compressed isothermally from a value of  $28.5L \rightarrow 18.5L$  the constant external pressure is :

A.  $5.05atm$

B.  $5.5atm$

C.  $0.05atm$

D.  $0.55atm$

**Answer: B**



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**8.** State Henry's law.

How does solubility of a gas in water varies with temperature ?

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**9.** How is nitric acid prepared by Ostwald's process ?

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**10.** Classify the following solids into different types

(a) Ammonium phosphate

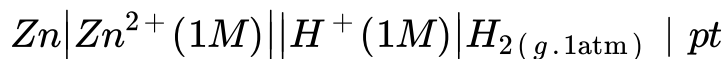
(b) Brass

(c)  $S_8$  molecule

(d) Diamond

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11. Construct a labelled diagram for the following cell-



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12. Explain with chemical reactions, why is zinc oxide amphoteric in nature ?

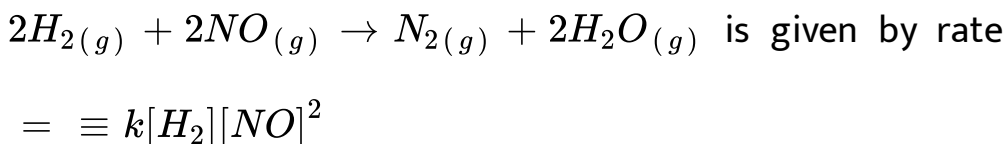
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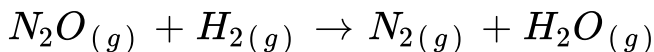
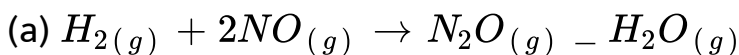
13. Write the names and chemical formulae of any two minerals of aluminium.

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14. The rate law for the reaction



The reaction occurs in the following two steps:



What is the rate of  $N_2O$  in the mechanism ? What is the molecularity of each of the elementary steps ?

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15. Write the mathematical expression of the First Law of Thermodynamics for the following processes : (1) Isothermal  
(2) Adiabatic  
(3) Isochoric      (4) Isobaric

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16. From the following data for the liquid phase reaction  $A \rightarrow B$ , determine the order of reaction and calculate its rate constant :

$t/s$	0	600	1200	1800
$[A]/\text{MolL}^{-1}$	0.624	0.446	0.318	0.226

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17. Calculate the standard enthalpy of combustion of  $CH_3COOH(l)$  from the following data :

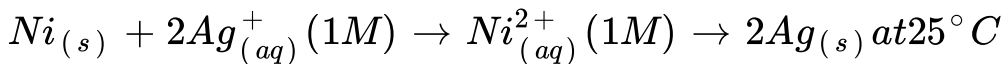
$$\Delta_f H^\circ (CO_2) = -39383 \text{ KJ mol}^{-1}$$

$$\Delta_f H^\circ (H_2O) = -285.8 \text{ KJ mol}^{-1}$$

$$\Delta_f H^\circ (CH_3COOH) = -483 \cdot \text{KJ mol}^{-1}$$

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18. Write the cell representation and calculate equilibrium constant for the following redox reaction :



$$E^\circ_{Ni^{2+}/Ni} = 0.25V \text{ and } E^\circ_{Ag^+/Ag} = 0.799V$$

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**19.** What is the action of concentrated sulphuric acid on the following

(a) phosphorous pentachloride

(b) copper

(c) potassium chlorate



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**20.** Define : (a) Molality

(b) Osmotic pressure

Write any two advantages of face centered cubic (FCC) and body centered cubic (BCC) whose unit cell edge lengths are  $3.5 \text{ \AA}$  and  $3.0 \text{ \AA}$  respectively. Find the ratio of the densities of FCC and BCC.

Arrange the following oxyacids of chlorine -HClO

$HClO_2$ ,  $HClO_3$  and  $HClO_4$  with respect to :

(a) Increases order of thermal stability.

(b) Increasing order of oxidising power.



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**21.** An organic substance ( $M=169 \text{ gram mol}^{-1}$ ) is dissolved in  $2000 \text{ cm}^3$  of water. Its osmotic pressure at  $12^\circ C$  was found to be  $0.54 \text{ atm}$ . If  $R = 0.0821 \text{ Latm. K}^{-1} \text{ mol}^{-1}$ , calculate the mass of the solute.

Calculate the number of atoms in a unit cell of a metal crystallising in face centered cubic structure.

Distinguish between isothermal process and adiabatic process.

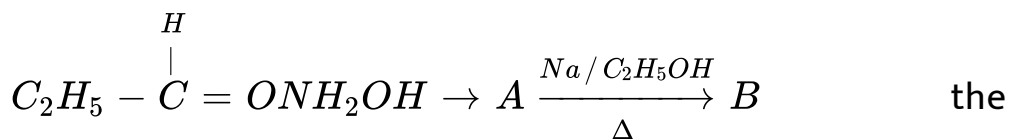
Mention the names of various steps involved in the extraction of pure metals from their ores.



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## Section II

1. In the following



compound 'B' is :

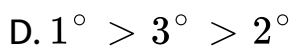
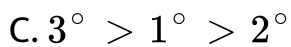
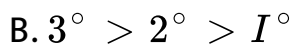
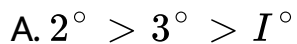
- A. propan-1-amine
- B. Propan-2-amine
- C. Isopropylamine
- D. Dimethylamine

Answer:



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2. The stability order for carbocation is :



Answer:



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3. Effective atomic rule is used to find-

A. geometry of complex

B. stability of complex

C. number of isomers of complex

D. number of possible ligands arounds metal ion in complex

**Answer:**



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4. Which of the following ion is coloured ?

A.  $Sc^{3+}$

B.  $Zn^{3+}$

C.  $Ti^{4+}$



D.  $V^{2+}$

**Answer:**



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5. Phenol when nitrated with conc.  $HNO_3$  in presence of conc.  $H_2SO_4$  forms

A. o-nitrophenol

B. p-nitrophenol

C. 2,4,6-trinitrophenol

D. m-nitrophenol

**Answer:**



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6. The secondary structure of proteins is derived from

A. co-ordinate bond

B. ionic bond

C. hydrogen bond

D. covalent bond

**Answer:**

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7. Ethylidene dichloride when boiled with aqueous solution of NaOH yields-

- A. formaldehyde
- B. acetaldehyde
- C. acetone
- D. ethyl methyl ketone

**Answer:**

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**8.** How is phenol prepared from cumene ?

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**9.** Write a note on self oxidation-reduction reaction of aldehyde with suitable example,



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10. Explain basic nature of amines.



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11. What are antiseptics ? Give any 'two' examples.



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12. What happens when glucose is treated with

(a) hydroxylamine

(b) hydrogen cyanide



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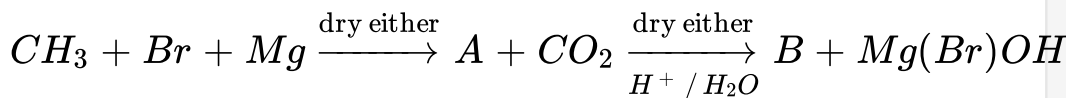
13. Draw the structures of chromate and dichromate ions.

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14. How is terylene prepared ?

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15. Identify A and B in the following reaction :



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**16.** How ligands are classified ? Explain with suitable examples.

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**17.** What is Lanthanoid contraction ?

Explain , why lanthanum ( $Z = 57$ ) forms  $La^{3+}$  ion, while cerium ( $Z = 58$ ) forms  $Ce^{4+}$  ion ?

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**18.** What is the action of the following reagents on propanone ?

(a) Phenyl hydrazine

(b) Zn-Hg/conc. HCl

(c) Sodium bisulphite.



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**19.** Define enzymes.

How is peptide linkage formed ?



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**20.** How is nitroethane converted into-

(a) ethyl amine,            (b) N-ethylhydroxyl amine

(c) acetic acid ?

Write names and chemical formulae of monomers used in

preparing Buna-N.

What are saps ? How are they prepared ?

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**21.** How will you prepare ethanol, propan-2-ol and 2-methyl propane-2-ol from Grignard's reagent ?

Define optical activity. Explain optical activity of lactic acid.

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