



## CHEMISTRY

### BOOKS - GURUKUL BOOKS & PACKAGING

### CHEMISTRY (HINGLISH)

MARCH 2014

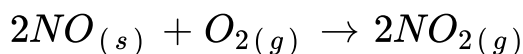
#### Section I

1. What is 'boiling point' ? Drive a relation between  $\Delta H$  and  $\Delta U$  for a chemical reaction Draw neat labelled diagram of calomel electrode. Resistance and conductivity of a cell containing  $0.001 \text{ M KCl}$  solution at  $298 \text{ K}$  are  $1500$

$\Omega$  and  $1 \cdot 46 \times 10^{-4} S. cm^{-1}$  respectively. What is the cell constant ?

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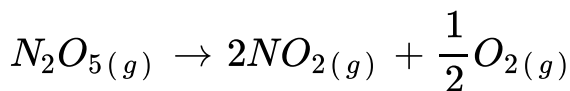
2. Write molecularity of the following reaction :



What is 'calcination' ? How does it differ from 'roasting' ?

Write resonating structures of ozone,

The decomposition of  $N_2O_{5(g)}$  at 320 K according to the following equation follows first order reaction :



The initial concentration of  $N_2O_{5(g)}$  is  $1 \cdot 24 \times 10^{-2} mol. L^{-1}$  and after 60 minutes,  $0 \cdot 20 \times 10^{-2} mol. L^{-1}$ . Calculate the rate constant of the reaction at 320 K.



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3. One mole of a gas expands by 3L against a constant pressure of 3 atmosphere. Calculate the work done in :

(a) L. atmosphere (b) Joules

(c) Calories



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4. Calculate the amount of  $CaCl_2$  (van't Hoff factor  $i = 2.47$ ) dissolved in 2.5 L solution so that its osmotic pressure at 300 K is 0.75 atmosphere.

Given : Molar mass of  $CaCl_2$  is  $111 \text{ g. mol}^{-1}$ ,

$R = 0.082 \text{ L. atm } K^{-1} \text{ mol}^{-1}$ .



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5. Describe anomalous behaviour of fluorine with the other elements of group 17 with reference to :

- (a) Hydrogen bonding
- (b) Oxidation state
- (c) Polyhalide ions.

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6. Face centred cubic crystal lattice of copper has density of  $8.966 \text{ g. cm}^{-3}$ . Calculate the volume of the unit cell.

Given molar mass of copper is  $63.5 \text{ g. mol}^{-1}$  and Avogadro number  $N_A$  is  $6.022 \times 10^{23} \text{ mol}^{-1}$ .

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7. What is the action of the following reagents on ammonia :

(a) Nessler's reagent

(b) Sodium metal

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8. State the first and second law of electrolysis.

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9. Draw neat and labelled diagram of Bessemer converter used in the extraction of copper.

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10. Derive the relationship between half life and rate constant for first order reaction.

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11. Derive the relation between  $\Delta G^\circ$  and equilibrium constant (K) for the reaction :



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12. Explain brown ring with the help of chemical equation.

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13. Explain, why do aquatic animals prefer to stay at lower level of water during summer ?

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14. Crystalline solids and Amorphous solids.

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15. To get  $n$ -type doped semiconductor, impurity to be added to silicon should have the following number of valence electrons

A. 2

B. 3

C. 4

D. 5

**Answer: A**



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**16.** Number of faradays of electricity required to liberate 12 g of hydrogen is :

A. 1

B. 8

C. 12

D. 16

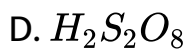
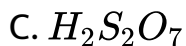
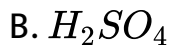
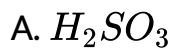


**Answer: C**



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17. What is molecular formula of oleum ?



**Answer: C**



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**18.** Purification of aluminium by electrolytic refining is carried out by :

- A. Hoope process
- B. Hall process
- C. Baeyer process
- D. Serpeck process

**Answer: C**

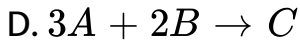
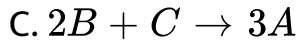
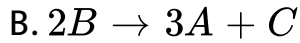
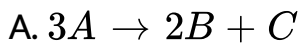


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**19.** The rate of reaction of certain reaction is expressed as :

$$\frac{1}{3} \frac{d[A]}{dt} = - \frac{1}{2} \frac{d[B]}{dt} = - \frac{d[C]}{dt}$$

The reaction is :



**Answer: C**



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**20.** A system absorbs 640 J heat and does work of 260 J, the change in internal energy of the system will be :

A.  $+380J$

B.  $-380J$

C.  $+900J$

D.  $-900J$

**Answer: B**



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**21.** Which of the following is not a colligative property?

A. Vapour pressure

B. Depression in freezing point

C. elevation in boiling point

D. Osmotic pressure

**Answer: A**



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**22.** Write the structural formula and IUPAC names of all possible isomers of the compound with molecular formula  $C_3H_8O$ .

Write 'two' uses of phenol.

What happens when glucose is treated with :

(a) Bromine water (b) dilute nitric acid

(c) Hydrogen cyanide (HCN)



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**23.** Write the molecular formula and structural formula of BHA and BHT.

What are thermoplastic polymers ?

Write a note on aldol condensation.

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**24.** What is the action of the following reagents on aniline ?

(a) Bromine water

(b) Acetic anhydride

(c) Hot and conc. sulphuric acid

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**25.** Discuss the optical activity of lactic acid.

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**26.** write balanced chemical equations for action of potassium permanganate on :

(a) Hydrogen

(b) Warm conc. Sulphuric acid

Explain why  $Mn^{2+}$  ion is more stable than  $Mn^{3+}$  ?

(given :  $Mn \rightarrow Z = 25$  )

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27. What is effective atomic number (EAN) ?

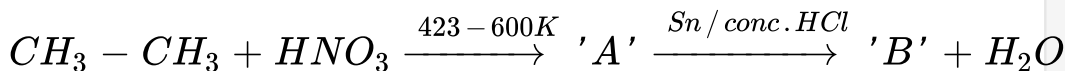
Calculate EAN of cobalt ( $Z=27$ ) in  $[CO(NH_3)_6]^{+3}$  and of zinc ( $z=30$ ) in  $[Zn(NH_3)_4]SO_4$ .

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28. What is a 'soap' ? How is it prepared ?

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29. Identify the compounds 'A' and 'B' in the following equation :



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30. Write a note on self oxidation-reduction reaction of aldehyde with suitable example.

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31. Write names and chemical formulae of monomers used in preparing Buna-S.

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**32.** Define complex lipids. Mention 'two' functions of lipids.

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**33.** Distinguish between  $S_{N1}$  and  $S_{N2}$  mechanism.

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**34.** What are lanthanoids ? What is the position of actinoids in periodic table ?

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35. How is methoxyethane prepared from :

- (a) Methyl iodide
- (b) Diazomethane

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36. IUPAC name of  $K_4[Fe(CN)_6]$  is

- A. Tetrapotassium ferrocyanide
- B. Potassium ferricyanide
- C. Potassium ferrocyanide
- D. Potassium hexacyanoferrate

**Answer: D**

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**37.** Carbon atom in methyl carbocation contains how many pairs of electrons ?

A. 8

B. 4

C. 3

D. 5

**Answer: B**



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**38.** How many moles of acetic anhydride will be required to form glucose pentaacetate from 2 M of glucose ?

A. 2

B. 5

C. 10

D. 2 · 5

**Answer: B**



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**39.** Identify the weakest base amongst the following :

A. p-methoxyaniline

B. o-toluidine

C. Benzene-1, 4-diamine

D. 4-aminobenzoic acid

**Answer: B**

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**40.** Bakelite is a polymer of

A. Benzaldehyde and phenol

B. Acetaldehyde and phenol

C. Formaldehyde and phenol

D. Formaldehyde and benzyl alcohol

**Answer: C**



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**41. Formalin is 40 % aqueous solution of :**

A. Methanal

B. Methanoic acid

C. Methanol

D. Methanamine

**Answer: A**



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42. Which among the following pairs of elements is 'not' an example of chemical twins ?

A. Zr and Hf

B. Nb and Ta

C. Mo and W

D. Ta and Re

**Answer: D**



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