

KENDRIYA VIDYALAYA, CHOPAN
PRE-BOARD 2016-17

SUBJECT CHEMISTRY

TIME 3 hours

CLASS XII

MAX.MARK 70

INSTRUCTIONS:

1. All questions are compulsory.

2. Q. No. 1 –5 are very short answer question, carrying 1 mark each.

3. Q. No. 6- 10 are short answers questions, carrying 2 marks each.

4. Q. No.11- 22 are short answer questions, carrying 3 marks.

5. Q. No.23 carry 4 marks .

5. Q. No. 24 - 26 are very long answers questions of 5 marks each.

- Q.1 Mention two ways by which lyophilic colloids can be coagulated. 1
- Q.2 In liquid state, hydrogen chloride is a stronger acid than hydrogen fluoride.why 1
- Q.3 Write the IUPAC name of the following compound: 1
(CH₃)₃C –CH(Cl)CH₃
- Q.4 What is the basicity of H₃PO₂ and why? 1
- Q.5 Why do amines behave as nucleophiles? 1
- Q.6 Account for the following: 2
(i) Frenkel defects are not found in alkali metal halides.
(iii) Impurity doped silicon is a semiconductor.
- Q.7 Aluminium crystallises in an fcc structure. Atomic radius of the metal is 125 pm. What is the length of the side of the unit cell of the metal? 2
- Q.8 Draw the structures of the following molecules: 2
(i) XeO₃ (ii) H₂SO₅
- Q.9 State Raoult's law for a solution containing volatile components. 2
How does Raoult's law become a special case of Henry's law?
- Q.10 State Kohlrausch's law of independent migration of ions. Mention one application of Kohlrausch's law. 2

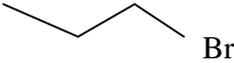
OR

The resistance of a conductivity cell containing 10⁻³ M KCl solution at 25°C is 1500 Ω. What is the cell constant if conductivity of 10⁻³ M KCl solution at 25°C is 1.5 × 10⁻⁴ S cm⁻¹?

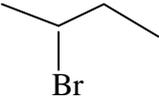
- Q.11 1.00 g of a non-electrolyte solute dissolved in 50 g of benzene lowered the freezing point of benzene by 0.40 K. Find the molar mass of the solute. (K_f for benzene = 5.12 kg mol⁻¹) 3
- Q.12 Calculate the emf of the following cell at 25°C: 3
Ag(s) / Ag⁺ (10⁻³ M) || Cu²⁺ (10⁻¹ M) | Cu (s)
Given E_{cell}⁰ = + 0.46 V and log 10ⁿ = n.
- Q.13 Explain the following with one example of each: 3
(i) Tyndal effect
(ii) Coagulation
(iii) Emulsions
- Q.14 State the principles on which the following operations are based: 3
(i) Zone refining (ii) Vapour phase refining.

OR

- (a) What are the constituents of 'copper matte'?
- (b) What is the role of depressant in froth floatation process?

- Q.15 Explain the following observations: 3
 (i) Sulphur has a greater tendency for catenation than oxygen.
 (ii) Fluorine is a stronger oxidising agent than chlorine.
 (iii) O₃ is a powerful oxidising agent.
- Q.16 Name the following coordination compounds and draw their structures: 3
 (i) [CoCl₂(en)₂]Cl
 (ii) [Pt(NH₃)₂Cl(NO₂)]
 (At. no. Co = 27, Pt = 78)
- Q.17 (i) Which alkyl halide from the following pair is chiral and undergoes faster 3
 S_N² reaction?
- 

Br



Br
- (ii) Out of S_N1 and S_N2, which reaction occurs with
 (a) Inversion of configuration (b) Racemisation
- Q.18 (a) Account for the following: 3
 (i) CH₃CHO is more reactive than CH₃COCH₃ towards reaction with HCN.
 (ii) Carboxylic acid is a stronger acid than phenol.
 (iii) (CH₃)₃C—CHO does not undergo aldol condensation.
- Q.19 Write the chemical equations to illustrate the following name reactions: 3
 (i) Clemanson reduction
 (ii) HVZ reaction
 (iii) Cannizzaro reaction
- Q.20 How will you convert the following: 3
 (i) Aniline to chlorobenzene
 (ii) Ethanoic acid to methanamine
 (iii) Benzene diazonium chloride to phenol
- Q.21 (a) What type of bonding helps in stabilising the α-helix structure of proteins? 3
 (b) What is the structural difference between RNA and DNA ?
- Q.22 Write monomers and draw the structures of 3
 Nylon-6 6, Buna-S, Polythene
- Q.23 Mr. Naresh works in a multi-national company. He is stressed due to his hectic 4
 schedule. Mr. Amit, his friend, comes to know that he has started taking
 sleeping pills without consulting the doctor. Mr. Amit requests Naresh to stop
 this practice and takes him to a Yoga centre. With regular Yoga sessions, Mr.
 Naresh is now a happy and relaxed man.
 After reading the above passage, answer the following questions:
 (i) Write the values shown by Mr. Amit.
 (ii) Which class of drugs is used in sleeping pills?
 (iii) Why is it not advisable to take sleeping pills without consultation with the
 doctor?
- Q.24 a) Write the equations involved in the following reactions: 5
 (i) Reimer-Tiemann reaction
 (ii) Williamson's ether synthesis
 b) How will you convert:
 (i) Propene to Propan-1-ol?
 (ii) Ethanal to Propan-2-ol?

OR

a) Give simple chemical tests to distinguish between the following pairs of compounds:

- (i) Ethanol and Propanol
- (ii) Benzoic acid and Phenol
- (iii) Propan-1-ol and Propan-2-ol

b) Explain the mechanism of dehydration of alcohol

Q.25 Assign reasons for the following: 5

- (i) In the series Sc ($Z = 21$) to Zn ($Z = 30$), the enthalpy of atomisation of Zn is the lowest.
- (ii) Zr and Hf have almost identical radii.
- (iii) Transition metals show variable oxidation states.
- (iv) The $E^\circ_{M^{2+}/M}$ value for copper is positive (+ 0.34 V).
- (v) Cr^{2+} is a very good reducing agent.

OR

Describe the preparation of $KMnO_4$ from pyrolusite ore (MnO_2). How does the acidified

permanganate solution react with the following:

- (i) Fe^{2+} ions
- (ii) Oxalic acid ($C_2O_4H_2$)

Write the ionic equations for the reactions involved.

Q.26 a) The rate of a reaction becomes four times when the temperature changes from 293 K to 313 K. Calculate the energy of activation (E_a) of the reaction assuming that it does not change with temperature. 5

[$R = 8.314 \text{ JK}^{-1} \text{ mol}^{-1}$, $\log 4 = 0.6021$]

b)(i) For a reaction $A + B \longrightarrow P$, the rate law is given by,
 $r = k[A]^{1/2}[B]^2$.

What is the order of this reaction?

OR

(a) A first order reaction is found to have a rate constant $k = 5.5 \times 10^{-14} \text{ s}^{-1}$. Find the half life of the reaction.

b) A reaction is second order in A and first order in B.

(i) Write the differential rate equation.

(ii) How is the rate affected on increasing the concentration of A three times?

(iii) How is the rate affected when the concentrations of both A and B are doubled?
