

Candidates must write the code on the title page of the answer book

Roll No.

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- Please check that this question paper contains **5** printed pages.
- Code number given on the right hand side of the question paper should be written on the title page of the answer book by the candidate.
- Please check that this question paper contains **27** questions.
- **Please write down the serial number of the question before attempting it.**
- **15** minutes' time has been allotted to read this question paper. The student will read the question paper only and will not write any answer on the answer script during this period.

Second Pre Board Examination, 2018-2019

CHEMISTRY

Grade: 12

Time: 3 hours

Date: 20.01.2019

Max. Marks: 70

General Instructions:

- All questions are compulsory*
- Marks for each question are indicated against it.*
- The question paper consists of four sections A, B, C and D.*
- Internal choice is given in all the sections. **A student has to attempt only one of the alternatives in such questions.***
- Section-A contains 5 questions of 1 mark each.*
- Section-B has 7 questions of 2 marks each.*
- Section-C is of 12 questions of 3 marks each*
- Section-D has 3 questions of 5 marks each.*
- Question number 1 to 5 are very short-answer questions and carry 1 mark each.*
- Wherever necessary, the diagrams drawn should be neat and properly labelled.*
- Use Log Tables, if necessary. Use of calculators is not allowed.*

1. Explain how vacancies are introduced in an ionic solid when a cation of higher valence is added as an impurity in it ?

(1)

(OR)

Zinc oxide is white but turns yellow on heating and becomes highly conducting. Give reason.

2. Why do gases nearly tend to be less soluble in liquids as the temperature is raised ? (1)
3. Predict the number of unpaired electrons in the square planar $[\text{Pt}(\text{CN})_4]^{2-}$ ion.
(OR)
On the basis of crystal field theory, write the electronic configuration of d^5 in terms of t_{2g} and e_g in an octahedral field when $\Delta_0 < p$. (1)
4. Draw all the isomers of $[\text{CoCl}_2(\text{en})_2]^+$. (1)
5. Discuss the main purpose of vulcanization of rubber. (1)
6. Convert:
a. Propanone to Propene. (2)
b. Ethyl benzene to Benzoic acid. (2)
7. Show that elevation in boiling point is a colligative property.
(OR)
What is the concentration of solution of sucrose (molar mass=342) which is isotonic with a solution containing 6g of urea per litre ? (2)
8. Write the mechanism of the reaction of HI with methoxymethane.
(OR)
How will you bring about the following conversions ? (2)
i. Propene to propan-2-ol.
ii. Methyl magnesium bromide to 2-Methylpropan-2-ol .
9. What are the monomeric repeating units of Nylon-6 and Nylon-6,6 ? (2)
10. How would you prepare :
i. HF from CaF_2 . (2)
ii. Cl_2 gas in laboratory.
11. Show that in case of a first order reaction, the time taken for completion of 99.9% reaction is ten times the time required for $t_{1/2}$ of the reaction. (2)
12. i. Two metals A and B have reduction potential values -0.76V and $+0.34\text{V}$ respectively. Which of these will liberate H_2 from dil H_2SO_4 . (2)
ii. What is the role of ZnCl_2 in a dry cell?
13. An element with molar mass $2.7 \times 10^{-2} \text{ Kg mol}^{-1}$ forms a cubic unit cell with edge length 405pm. If the density is $2.7 \times 10^3 \text{ Kg m}^{-3}$. What is the nature of the cubic unit (3)

cell ?

14. i. Can we separate the components of azeotropic mixture by distillation ?
ii. Equimolar solutions of sodium chloride and glucose are not isotonic. Why?
iii. Which colligative property is preferred for the molar mass determination of macromolecules ? Explain. (3)
15. i. Which of the following is most effective electrolyte in the coagulation of AgI/Ag⁺sol?
K₂SO₄, MgCl₂, K₄[Fe(CN)₆].
ii. Why is ferric chloride preferred over potassium chloride in case of a cut leading to bleeding?
iii. What do you mean by activity and selectivity of catalysts? (3)
16. Explain the following with example:
i. Gabriel phthalimide reaction.
ii. Hoffman bromamide reaction
iii. Cannizzaro's reaction (3)
17. i. Why is glycerol added to shaving soaps ?
ii. How are transparent soaps manufactured ?
iii. What are food preservatives ? Name two such substances. (3)
18. Primary alkyl halide C₄H₉Br (A) reacted with alcoholic KOH to give compound (B). Compound (B) reacted with HBr to give (C) which is an isomer of (A). When (A) is reacted with sodium metal it gives compound (D) C₈H₁₈ which is different from the compound formed from n-butyl bromide. Write the equations for all reactions. (3)
19. Give simple chemical test to distinguish between the following pairs of compounds:
i. Propanal and Propanone
ii. Benzaldehyde and Acetophenone
iii. Ethanal and Propanal (3)
20. i. What is the effect of denaturation on the structure of proteins?
ii. Write the name of two monosaccharides obtained on hydrolysis of lactose sugar.
iii. Why vitamin C cannot be stored in our body? (3)

(OR)

(3)

Give reason for the following:

- i. Amino acids are amphoteric in nature.
ii. Two strands in DNA are not identical but are complementary.

21. The time required for 10% completion of a first order reaction at 298K is equal to that required for its 25% completion at 308K. If the value of A is $4 \times 10^{10} \text{ S}^{-1}$, Calculate K at 318K and Ea.

(OR)

- i. The rate constant for a first order reaction is 60 S^{-1} . How much time will it take to reduce the initial concentration of the reactant to 1/16 th of its initial value.
- ii. In some cases, it is found that a large number of colliding molecules have energy more than threshold value, yet the reaction is slow. Why?

(3)

22. i. How can you separate Al_2O_3 from silica in a bauxite ore associated silica? Give the reactions involved.
ii. Is it true that under certain conditions, Mg can reduce Al_2O_3 and Al can reduce MgO? What are those conditions?

(OR)

- i. Copper can be extracted by hydrometallurgy but not zinc. Explain.
- ii. The choice of reducing agent in a particular case depends on thermodynamic factor. How far do you agree with this statement? Support your opinion with two examples.

(3)

23. Explain the following:

- i. The lower oxidation state of Mn is basic while the higher oxidation state is acidic.
- ii. In titration of FeSO_4 with KMnO_4 in acidic medium why is dil H_2SO_4 used instead of dil HCl?
- iii. Ce^{4+} is used as oxidizing agent in volumetric analysis.

(3)

24. i. Discuss the nature of bonding in metal carbonyls.
ii. How is the stability of coordination compounds determined in aqueous solution? Select a complex formation reaction and write an expression for the stability constant of the complex. Give factors affecting stability of complexes.

(3)

25. An organic compound (A) with molecular formula $\text{C}_8\text{H}_8\text{O}$ gives positive DNP and iodoform tests. It does not reduce Tollens or Fehling's reagent and does not decolourise bromine water also. On oxidation with chromic acid (H_2CrO_4), it gives a carboxylic acid (B) with molecular formula $\text{C}_7\text{H}_6\text{O}_2$. Deduce the structures of A to B. Write the reactions involved.

OR

(5)

- i. An organic compound (A) with molecular formula $\text{C}_5\text{H}_8\text{O}_2$ is reduced to n-Pentane on treatment with Zn-Hg/HCl. (A) forms a dioxime with hydroxylamine and gives a positive Iodoform test and Tollen's reagent test. Identify the compound A and write the reactions involved.
- ii. Write short notes on Coupling reaction.
- iii. Convert Aniline to p-Bromoaniline.

26. i. Resistance of a conductivity cell filled with 0.1M KCl solution is 100 ohm. If the resistance of the same cell when filled with 0.02M KCl solution is 520

(5)

ohm , calculate the conductivity and molar conductivity of 0.02M KCl solution. The conductivity of 0.1M KCl solution is 1.29 S/m.

- ii. How does molar conductance vary with dilution in case of strong and weak electrolyte ? Explain .

(OR)

- i. Silver is electrodeposited on a metallic vessel of total surface area 900cm^2 by passing current of 0.5 amp for two hours. Calculate the thickness of silver deposited. [Given : Density of silver = 10.5 gm cm^{-3} , atomic mass of silver = 108 a.m.u , $F=96,500\text{ C mol}^{-1}$.]
- ii. Give reasons for the following:
- Rusting of iron is quicker in saline water than in ordinary water.
 - Aluminium metal cannot be produced by electrolysis of aqueous solution of aluminium salt.

27. i. What happens when SO_2 is passed through aqueous solution of Fe(III) salt?
- ii. How is ozone estimated quantitatively ?
- iii. What happens when white phosphorus is heated with con NaOH solution in atmosphere of CO_2 ?
- iv. H_3PO_2 and H_3PO_3 act as good reducing agents while H_3PO_4 does not.

(OR)

- i. An element (A) exists as a yellow solid in standard state. It forms a volatile hydride (B) which is foul smelling gas and is extensively used in qualitative analysis of salts. When treated with oxygen (A) forms an oxide (C) which is colourless gas. The gas when passed through KMnO_4 solution ,decolourises it. (C) gets oxidized to another oxide (D) in presence of catalyst V_2O_5 . Identify A,B,C,D. Write the chemical equation for reaction of gas C with acidified KMnO_4 solution.
- ii. Arrange $\text{F}_2, \text{Cl}_2, \text{Br}_2, \text{I}_2$ in increasing order of bond dissociation enthalpy.

(5)