Model Paper 2021-22
Subject – Chemistry
Class-12

Time:- 3 hours 15 min **Max. Marks: 70**

Note- First 15 minutes are allotted for the candidates to read the question paper.

Instruction-

i. All questions are compulsory. Marks allotted to each question are given in the margin.
ii. In numerical questions, give all the steps of calculation.
iii. Give relevant answers to the questions.
iv. Give chemical equations wherever necessary.

1- a) Number of atoms present in Face Centred Cubic unit cell is -

(i) 1 (ii)2
(ii) 4 (iv) 6 (1)

b) Which is not a colligative property of solution (1)

(i)Osmotic pressure (ii)Surface tention.
(iii) Elevation in vapour pressure (iv) Depression in freezing point.

c) Unit of rate constant of zero order reaction is -

(i)litre sec^{-1} (ii)litre $mole^{-1}$ sec
(iii) mole $litre^{-1}$ sec^{-1} (iv) mole sec^{-1} (1)

d) Which of the following given compound which doesn't give canizaro reaction-

(i) acetaldehyde (ii)Benzaldehyde
(iii) Tri methyl acetaldehyde (iv) Formaldehyde. (1)

e) Ethyl amine on reaction with HNO_3 gives-

(i) C_2H_4 (ii)NH_3

(iii) $C_2H_5NO_2$ (iv) C_2H_5OH (1)

f) Glucose show reducing property because it has-

(i) aldehyde group (ii)Ketone group

(iii) hydroxyl group (iv) NH_2 group (1)

2- a) If an element A (atomic mass 100) has bcc structure with a cell edge of cube is 400 pm then,

(i) Determine the density of A and

(ii) Calculate the number of unit cell in 100 grams of A (N_A= 6.023×10^{23} mole $^{-1}$) (1+1=2)

b) What is mole fraction? Write the equation for relation between mole fraction and relative Lowering of vapour pressure of solute. (1+1=2)

c) Calculate the equivalent conductivity of 1M H_2SO_4 solution if the specific conductance is 26×10^{-2} ohm $^{-1}$ cm $^{-1}$ (atomic mass of S=32) (2)

d) What is Hardy Schulze law of coagulation? Explain it. (2)

3- a) Calculate the packing efficiency of primitive cubic unit cell. (2)

b) Write the properties and two uses of inert gases. (1+1=2)

c) Write the I.U.P.A.C Name of following coordination compound-
i) $[Pt(NH_3)_2Cl(NO_2)]$ ii) $K_3[Cr(C_2H_4)_3]$ (1+1=2)

d) Write the structural and functional difference between DNA and RNA. (2)

4- a) The electrical resistance of a column of 0.05 mole/litre of NaOH Solution of diameter 1 cm and length of 50 cm is 5.55×10^3 ohm. calculate the resistivity, conductivity and molar conductivity. (1+1+1=3)

b) Write short notes on- (1.5+1.5=3)

(i) peptization

(ii) dialysis

c) Give one method with chemical equation for the identification of primary, secondary and tertiary amines. (3)

d) Write the structural formula of glucose . How do you obtain glucosaccaric acid and glucooxime from glucose? Write chemical equations also. (1+1+1=3)

5- a) The Boiling point of S is 0.6 K increased if 4 gram of a substance 'X' is added in 100 gram of solvent. Then calculate- (1+1+1+1=4)

i) depression of freezing point of S.
ii) Lowering of vapour pressure with respect to S.
iii) osmotic pressure of solution at 300K
iv) atomic mass of X.

if K_b = 5, Ks= 32.0, atomic mass of S = 150, density of solution = 1.6×10^3 Kg/mole^3 is given.

b) Derive equation for rate constant of first order reaction and also show that the half life time of first order reaction doesnot depend upon the concentration of reactants.
(3+1=4)

c) What is Transition element? Explain the following with respect to transition element-
i) they form coloured ion.
ii)they form interstitial compounds. (1+1.5+1.5=4)

d) What is a ligand? How they effect crystal field splitting energy? (1+3=4)

6- a) Explain the following with reason- (2+2+1=5)

i) Sulphur is solid while oxygen is gas at normal temperature.
ii) Halogens are strong oxidizing agent.
iii) Boiling point of inert gases are very low.

OR

Describe the Haber's process for manufacture of Ammonia giving labelled diagram. Write it's properties and uses also . (3+1+1=5)

b) Write short notes on- (2+2+1=5)

i)Reimer-Tiemann reaction

ii)Kolbe's reaction

iii)Williamson synthesis.

OR

What happens when- (Write only chemical equation)- (1+1+1+1+1=5)

i)Phenol is heated with Zn dust.

ii)ethyl alcohol is heated with conc. sulphuric acid at 160 ^{0}C

iii)reaction of diethyl ether with hydroiodic acid.

iv)Bromine water is add in phenol.

iv) Reaction of formaldehyde with Grignard reagent and then its hydrolysis.

7-a) What are the reasons for low reactivity of aryl halide with nucleophilic substitution reaction? (5)

OR

Explain the following (3+2=5)

i) Although chlorine is an electron withdrawing group. Yet it is ortho-para- directing in electrophilic aromatic substitution reaction. Why?

ii) Alkyl halides though polar are immiscible in water.

b) Write chemical test to distinguish between the following compounds-

i) propanal and propanone.

ii) phenol and benzoic acid.

iii)acetophenone and Benzophenone. (2+2+1=5)

OR

How do you obtained following (write chemical equation only) – (1+1+1+1+1=5)

i)1- Phenyl ethanol from Bromobenzene

ii)Benzaldehyde from Benzoic acid.

iii)3-hydroxybutanal from ethanol.

iv)Propene from propanone

v)m nitrobenzyl alcohol from Benzoic acid.