SECONF PRE-BOARD EXAMINATION (2017–18)
CLASS: XII

Subject: CHEMISTRY **Date: 14.01.2018**
Time allowed: 3 Hours. Maximum Marks: 70

General instructions:

(1) **All** questions are **compulsory**.
(2) Question nos. 1-5 are very short answer questions and carry 1 mark each.
(3) Question nos. 6-10 are short answer questions and carry 2 marks each.
(4) Question nos.11-22 are also short answer questions and carry 3 marks each
(5) Question nos.23 is a value based questions and carry 4 marks
(6) Question nos.24-26 are also long answer questions and carry 5 marks each
(7) Use log tables if necessary, use of calculators is not allowed.
(8) Marks are indicated against each question.
(9) Please check this question paper contains **6** printed pages only.
(10) Please check that this question paper contains **26** questions.

1. What is the formula of a compound in which the element P forms hcp lattice and atoms of Q occupy 2/3rd of octahedral voids ? 1
2. What is the effect of temperature on chemisorption? 1
3. p-Dichlorobenzene has higher melting point and solubility than those of o and m-isomers. Discuss. 1
4. What happens when glucose reacts with conc. HNO_3? Write chemical equation involved. 1
5. Alcohols are comparatively more soluble in water than hydrocarbons of comparable molecular masses. Explain this fact. 1

6. Consider the following reaction of $NO_2(g)$ with CO(g):

(a) $NO_2(g) + NO_2(g) \longrightarrow NO + NO_3$ (slow)

(b) $NO_3 + CO \longrightarrow NO_2 + CO_2$ (fast)

(i) Derive rate law on the basis of mechanism.

(ii) What is molecularity of each elementary reaction? 2

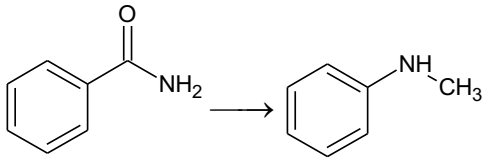
7. $Zn(s)/Zn^{2+}(aq)\|Cu^{2+}(aq)/Cu(s)$. Calculate E°_{cell} and equilibrium constant 'K'. [Given: $E^{\circ}_{Zn^{2+}/Zn} = -0.76\ V, E^{\circ}_{Cu^{2+}/Cu} = +0.34\ V$]

OR

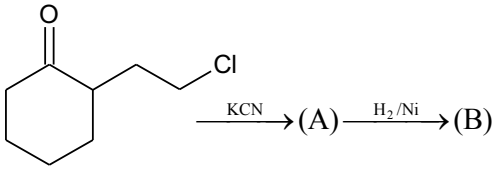
i) Four metals A, B, C, D have their standard reduction potential values are equal to –0.14V, +0.34V, –1.66V and +0.80V respectively. Arrange these metals in decreasing order of reactivity. Give reason.

ii)Predict the products of electrolysis in the following: An aqueous solution of $CuCl_2$ with platinum electrodes 2

8. (i) Suggest a route by which the following conversion can be accomplished.



(ii) Identify (A) and (B) in the following reaction.



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9. Describe the following giving the chemical equation:

(i) Carbylamine Reaction

(ii) Gabriel Phthalimide synthesis 2

10. How would you account for the following?

(i) Mn^{2+} compounds are more stable than Fe^{2+} towards oxidation to their +3 state.

(ii) In a transition series of metals, the metal which exhibits the

greatest number of oxidation states occur in the middle of the series. 2

11. (i) Complete the following reactions:

(a) $Ca_3P_{2\,(s)} + H_2O \longrightarrow$

(b) $XeF_4 + O_2F_2 \longrightarrow$

(ii) Why is H_3PO_2 better reducing agent than H_3PO_3? 3

12. (i) Explain the role of each of the following:

(a) KCN in the extraction of silver

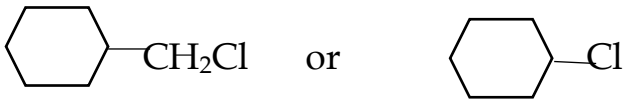
(b) SiO_2 in extraction of copper

(ii) Name one chief ore each of copper and aluminium. 3

13. (i) Convert Phenol to Benzene

(ii) Ethereal solution of an organic compound (A) when heated with magnesium gave (B). (B) on treatment with ethanal followed by acid hydrolysis gave 2-propanol. Identify the compound (A). What is (B) known as? Write all the reactions involved. 3

14. (i) Which one of the following compounds undergo S_N2 reaction faster? Why?



ii) Give a chemical test to distinguish between chlorobenzene and benzyl chloride.

iii) Give the IUPAC name of $CH_3CH=C(CH_3)CH(CH_3)Br$

15. The edge length of a unit cell of a metal having molecular weight 75g/mol is 500pm which crystallises in cubic type of lattice. If the density is $2g/cm^3$, find the radius of metal atom. ($N_A=6.022 \times 10^{23}$).

OR

(i) What happens when zinc oxide is heated?

(ii) What are ferromagnetic substance? Give one example.

(iii) Distinguish between hexagonal and monoclinic unit cells 3

16. In the Arrhenius equation for the certain reaction, the value of 'A' and 'E_a' (activation energy) are 4×10^{13} s^{-1} and 98.6 kJ mol^{-1} respectively. If the reaction is of first order, at what temperature will its half-life period be 10 minutes? 3

17. The electrical resistance of a column of diameter 2 cm and length 25 cm containing 0.01M NaOH solution is 6×10^3 ohms. Calculate its resistivity, conductivity and molar conductivity. 3

18. Explain what is observed:

(i) When a beam of light is passed through a colloidal solution.
(ii) When an electrolyte is added to hydrated ferric oxide sol.
(iii) When electric current is passed through colloidal solution 3

19. (i) Name the following coordination compound and draw the structure of its stereoisomer.
$[Co(NH_3)_3Cl_3]$
(ii) Arrange the following in the increasing order of conductivity in solution. $[Ni(NH_3)_6]Cl_2$; $[Co(NH_3)_6]Cl_3$ and $[CoCl_2(en)_2]$ Cl 3

20. (i) Name the base which is present in DNA but not in RNA.
(ii) What are mono saccharides? Give one example.
(iii) Give one structural difference between amylose and amylopectin. 3

21. (i) Write the monomers of Bakelite. What type of polymer is it?

(ii) Is natural rubber homopolymer or copolymer?

(iii) Arrange the following in increasing order of forces of attraction:
Nylon 6, Neoprene, PVC. 3

22. (i) Complete the following reactions?

(a) $C_2O_4^{2-} + Cr_2O_7^{2-} + H^+ \longrightarrow$

(b) $S_2O_3^{2-} + MnO_4^- + H_2O \longrightarrow$

(ii) Which element of the first transition series has positive $E^{o}_{M^{2+}/M}$ value and why? 3

23. In our country people used to prepare pickle and even used to store some vegetables, fruits in dried form or in some cases as juice etc. All these need some or other form of preservative. On the basis of the above passage answer the following questions.

(i) What are food preservatives?

(ii) What are antioxidants?

(iii) What should be the additive for sweet pickles for diabetics?

(iv) As a chemistry student what values are associated for your suggestion? 4

24. (i) Draw the structure of:

(a) H_2SO_5 (b) N_2O_5

(ii) Why is F_2 more reactive than ClF_3?

(iii) HCl when reacts with finely powdered iron, forms ferrous chloride and not ferric chloride. Why?

(iv) Does the hydrolysis of XeF_6 lead to a redox reaction?

OR

(a) Give reason for the following

(i) ClF_3 molecule has a T shaped structure and not a trigonal planar one.

(ii) SF_4 is easily hydrolysed whereas SF_6 is not easily hydrolysed.

(b) Why is Cl_2 permanent bleaching agent whereas SO_2 temporary?

(c) Out of H_2O and H_2S which one has higher bond angle and why?

(d) Predict the shape and asked angle (90^o or more or less) in the following case.

SO_3^{2-} and the angle O-S-O 5

25. (i) Why are carboxylic acid stronger acid than phenol?

(ii) Distinguish between methyl acetate and ethyl acetate by suitable chemical test.

(iii) An organic compound A (C_3H_6O) is resistant to oxidation but forms compound B(C_3H_8O) on reduction. B reacts with HBr to form the compound C. C with Mg forms Grignard reagent D which reacts with A to form a product which on hydrolysis gives E. Write all the

reactions and mark A to E compounds in the chemical equations.

OR

(a) State reasons for the following:

i) Monochloro ethanoic acid is a weaker acid than dichloro ethanoic acid.

ii) Electrophilic substitution in benzoic acid takes place at meta postion.

(b) Convert:

(i) Benzene to p-Nitrobenzaldehyde

(ii)Acetic acid to methyl amine.

iii) Acetaldehyde to methane. 5

26.(i) The density of 2.03 M solution of acetic acid (molecular mass: 60) in water is 1.017 g/ml. Calculate the molality of the solution.

(ii)Why do gases always tend to be less soluble in liquids as the temperature is raised?

(iii) Explain Raoult's Law for dilute solutions.

OR

(i) Explain why the molecular mass of NaCl determined with the help of colligative property is half of its actual molecular mass.

(ii) What is the value 'i' for K_2SO_4 if it is 50% ionized?

(iii) A solution containing 2.56 g of sulphur dissolved in 100 g of naphthalene whose melting point is 80.1°C and gave a lowering in freezing point 0.68°C. Calculate the apparent molar mass and formula of sulphur where K_f = 6.8 Kkg/mol. 5

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