Brilliant Public School

Seepat Road Bahatarai, Bilaspur (C.G.)
Pre-Board-I, 2017-18
Class –XII
Subject – Chemistry

Time: 3:00 Hrs. **M.M.: 70**
Date: 12/12/2017 **Tuesday**

General Instructions:

(i) All questions are compulsory.
(ii) Marks for each question are indicated against it.
(iii) Question numbers 1 to 5 are MCQ, carrying 1 mark each.
(iv) Question numbers 6 to 10 are short answer questions, carrying 2 marks each. Answer these in about 30 words each.
(v) Question numbers 11 to 22 are also short answer questions, carrying 3 marks each. Answer these in about 40 words each.
(vi) Question number 23 carries 4 marks.
(vii) Question numbers 24 to 26 are also long answer questions, carrying 5 marks each. Answer these in about 70 words each.
(viii) Use log tables, if necessary. Use of calculator is not permitted.

Q.1 Correct condition for the feasibility of cell reaction: 1
(i) dG = -ve , E^0 = +ve (ii) dG = +ve , E^0 = -ve (iii) E^0 = -ve (iv) none of these

Q.2 The correct edge relation for monoclinic shape; 1
(i) a=b=c (ii) a ≠b≠c (iii) a=b≠c (iv) none of these

Q.3 Which of the following element is stable in +4 oxidation state? 1
(i) S (ii) Se (iii) Te (iv) Po

Q.4 Which of the following oxidation state of P in their oxyacid's disproportionate? 1
(i) -3 (ii) +3 (iii) +5 (iv) none of these

Q.5. The shape of the SF_4 molecule is; 1
(i) T-shape (ii) TBP shape (iii) V-shape (iv) See-saw

Q.6 Draw the structure of 2, 3-dimethyl but-2-ene and 2-bromo-3-methylbutene . 2

Q.7 Outline the principle behind the refining of metals by the following methods: 2
(i) Zone refining method
(ii) Chromatographic method

Q.8 Complete the following reaction: 2
(i) $Ca_3P_2 + H_2O$ ➔
(ii) Zn +(conc.) HNO_3 ➔

Q.9 Write the IUPAC name of the complex $[Cr(NH_3)_4Cl_2]^+$.What type of isomerism does it exhibit? 2

Q.10 How are the following conversions carried out? 2
(i) Nitrobenzene into aniline
(ii) Ethanoic acid into methanamine.

Q.11 Explain why: 3
(i) Glucose is soluble in water but cyclohexane is not.
(ii) Aldehyde group is absent in the pentacetate of D-glucose.
(iii) Vitamin essential for us.

Q.12 What are emulsions? What are their different types? Give one example of each. 3

Q.13 Rate constant for a first order reaction has been found to be 2.54×10^{-3} sec^{-1}. Calculate its $3/4^{th}$ life. (log4=0.602) 3

Q.14 Give reason of the following : 3
(i) $(CH_3)_2P=O$ exist but $(CH_3)_2N=O$ does not.
(ii) Oxygen has less electron gain enthalpy the sulphur.
(iii) H_3PO_2 is a stronger reducing agent then H_3PO_3.

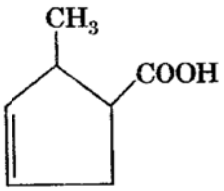
Q.15. What is lanthanoid contraction? Mention its two main consequences. 3

Q.16 Calculate the emf of the cell: 3
$Zn(s) \mid Zn^{2+}(0.01M) \parallel Cu^{2+}(0.0001M) \mid Cu(s)$
Given: $E° Cu^{2+}/Cu = +0.34V$, $E° Zn^{2+}/Zn = -0.76$ V

Q. 17. Draw the structure of : **1 + 1 + 1**
(i) $H_2S_2O_8$
(ii) $H_2S_2O_7$
(iii) SO_3^{2-}

Q. 18. Answer the following :
(i) Halo alkane easily dissolve in organic solvents, why ?
(ii) What is known as a racemic mixture ? Give an example.
(iii) Of the bromo derivatives, $C_6H_5CH(CH_3)Br$ and $C_6H_5CH(C_6H_5)Br$, which one is more reactive in S_N1 substitution reaction and why ? **1+1+1**

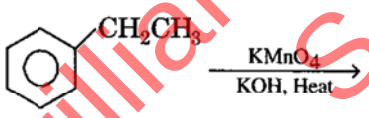
Q. 19. (a)Give IUPAC names of the following compounds : **2 + 1**

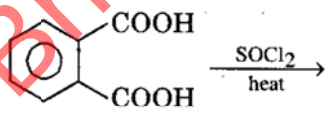
(i) 

(ii) 

(b) Name the reagent you will use convert allyl alcohol into propenal.

Q. 20. Complete the following chemical equations : **1+1+1**

(i) 

(ii) 

(iii) $C_6H_5CONH_2 \xrightarrow[\text{heat}]{H_3O^+}$

Q. 21. Account for the following : **1+1+1**
(i) Primary amines ($R\text{-}NH_2$) have higher boiling point than tertiary amines ($R_3\text{-}N$).
(ii) Aniline does not undergo Friedal-Crafts reaction.
(iii) $(CH_3)_2NH$ is more basic than $(CH_3)_3N$ in an aqueous solution.

Q. 22. Give the structure of A, B and C in the following reaction : **1½ + 1½**

(i) $C_6H_5NO_2 \xrightarrow{Sn+HCl} A \xrightarrow[273\ K]{NaNO_2+HCl} B \xrightarrow{H_2O} C$

(ii) $CH_3CN \xrightarrow{H_2O/H^+} A \xrightarrow[\Delta]{NH_3} B \xrightarrow{Br_2+KOH} C$

Q. 23. Analgesics are the chemical substances which give relief to the body pains and act on our nervous system. These are of two types : narcotics and non-narcotics. Where as the former lead to addiction and are highly toxic, the later are not.

(i) Name a substance which can act both as analgesic and antipyretic as well.

(ii) What is the IUPAC name.

(iii) How does it help heart patients ?

(iv) What precautions must be taken while taking it ? **1+1+1+1**

Q. 24. (a) Define the following terms :

(i) Ideal solution

(ii) Azeotrope

(iii) Osmotic pressure. **3 + 2**

(b) A solution of glucose ($C_6H_{12}O_6$) in water is labelled as 10% by weight. What would be the molality of the solution ?
(Molar mass of glucose = 180 g mol^{-1})

OR

(i) Write the formulation for the galvanic cell in which the reaction.

$Cu(s) + 2Ag^+(aq.) \longrightarrow Cu^{2+}(aq.) + 2Ag(s)$

Takes place identify the cathode and anode reaction in it.

(ii) Write Nernst equation and calculate the emf of the following cell :

$Sn(s)/Sn^{2+}(0{\cdot}04\ m)\ ||\ H^+(0{\cdot}02\ M)\ |H_2(g)$ **(1 bar)**

(given $E^0\ Sn^{2+/Sn} = 0{\cdot}14V$)

Q. 25. (a) Copper crystallizes wit'ı fcc unit cell. If the radius of copper atom is 127·8 pm, calculate the density of copper metal. **4+1**
(Atomic mass of Cu = 63·55 g/mol and Avogadro's number $N_A = 6{\cdot}02 \times 10^{23}\ mol^{-1}$)

(b) Aluminium crystallizes 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 ?

Or

(a) Examine the given defective crystal

A^+	B^-	A^+	B^-	A^+
B^-		B^-	A^+	B^-
A^+	B^-	A^+	O	A^+
B^-	A^+	B^-	A^+	B^-

Answer the following questions :

(i) What type of stoichiometric defect is shown by the crystal ?

(ii) How is the density of the crystal affected by this defect ?

(iii) What type of ionic substances show such defect ?

(b) (i) What type of non-stoichiometric point defect is responsible for the pink colour of LiCl ?

(ii) What type of stoichiometric defect is shown by NaCl ?

Q. 26. (a) Calculate the packing efficiency in *bcc* lattice. **3 + 2**

(b) Calculate the number of particles per unit cell in *fcc*.

OR

(a) Acetone boils at 56·38°C and a solution of 1·41 g of an organic compound in 20 g of acetone boils at 56·88°C. Calculate the molar mass of the organic compound (Give K_b for acetone = 1·67 K kg/mol).

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