GULF SAHODAYA EXAMINATION – (Saudi Chapter)
CLASS—XI CHEMISTRY – (February-2011)
SET – B

MAX.MARKS:70
TIME: 3 HOURS

General Instructions:

1. All questions are compulsory.
2. Question nos.1 to 8 are very short answer questions and carry 1 mark each.
3. Question nos9 to 18 are short answer questions and carry 2 marks each.
4. Question nos.19 to 27 are short answer questions and carry 3 marks each.
5. Question nos.28, 29& 30 are long answer questions and carry 5 marks each.
6. Use log tables if necessary.

1 Depict the galvanic cell in which the following reaction takes place. 1

$Zn_{(s)} + 2\ Cu^{+}_{(aq)} \longrightarrow Zn^{2+}_{(aq)} + Cu_{(s)}$

2 Write the IUPAC name of the following compound. 1

$CH_3\ CO\ CH_2\ CH_2\ CH_2\ COOH$.

3 Draw the Sawhorse projections of ethane. 1

4 Predict in which of the following entropy increases or decreases. 1

(a) Temperature of a crystalline solid is raised from 0K to 115K.

(b) $2NaHCO_{3\,(s)} \longrightarrow Na_2CO_{3(s)} + CO_{2(g)} + H_2O_{(g)}$.

5 Write van der Waals equation for n moles of a gas. 1

6 Using s,p,d,f notations, describe the orbital with the following quantum numbers. 1

(a) n=3,l=1 (b) n=4,l=2

7 Write the expression for equilibrium constant $\mathbf{K_c}$ for the reaction.

$CH_3COOC_2H_{5\,(aq)} + H_2O_{(l)} \rightleftharpoons CH_3COOH_{(aq)} + C_2H_5OH_{(aq)}$ 1

8 Name any four gases responsible for green house effect. 1

9 What is smog? How is classical smog different from photochemical fog? 2

10 Consider the following species: 2

N^{3-}, O^{2-}, F^{-}, Na^{+}, Mg^{2+} and Al^{3+}.

(a) What is common in them?

(b) Arrange them in the order of increasing ionic radii .

OR

(a) What would be the IUPAC name and symbol for the element with atomic number 120?

(b) How would you justify the presence of 18 elements in the fifth period of the periodic table?

11 Account for the following. 2

(a) Electron gain enthalpy of Chlorine is more than that of Fluorine.

(b) Ionisation enthalpy of Berylium is more than that of Boron

12 (a) State the law of multiple proportion. 2

(b) What is limiting reagent?

13 Write chemical equations for the following reaction. 2

(a)Propyne treated with mercuric sulphate and dilute sulphuric acid at 333K.

(b)Sodium salt of ethanoic acid on heating with Sodalime.

14 Balance the following redox reaction by ion- electron method. 2

$MnO_4^- + I^- \rightarrow MnO_2 + I_2$.(in basic medium)

15 (a) Write the Lewis dot structure of CO . 2

(b) Using VSEPR theory deduce the structure of SF_4.

16 Starting with the thermodynamic relationship G = H – TS, derive the following relationship $\Delta G_{system} = -T\Delta S_{total}$. 2

17 Write the chemical equation for the preparation of $BeCl_2$ and explain its structure in thesolid state. 2

18 Explain the following. 2

(a) Pauli Exclusion Principle.

(b) Hunds rule of maximum multiplicity.

19 (a)Explain the reason for the fusion of an organic compound with metallic sodium for testing Nitrogen, Sulphur and phosphorus. 3

(b)What are electrophiles and nucleophiles? Explain with Example..

20 (a)In terms of Charles law explain why -273^0C is the lowest possible temperature. 3

(b)What will be the pressure exerted by a mixture of 3.2 gram of methane and 4.4 gram of carbon dioxide contained in a 9 dm^3 flask at 27^0C?.

21 What are the frequency and wave length of a photon emitted during a transition from n =5 state to the n =2 state in the hydrogen atom? 3

22 (a)Explain, why an organic liquid vaporizes at a temperature below its boiling point in its steam distillation? 3

(b) Explain hyper conjugation effect with an example.

(c) Draw the resonance structures of CH_3 CH = CH CHO.

23 How is Sodium carbonate (Na_2CO_3. $10H_2O$) prepared by Solvay process? Write the chemical equations of the reactions involved. 3

OR

(a)What happens when alkali metals are dissolved in ammonia?

(b)Why is LiF almost insoluble in water whereas LiCl soluble not only in water but also in acetone?

(c)What is dead burnt plaster? How is it obtained from gypsum?

24 Compare the relative stabilities of the following species and indicate the magnetic properties of $O_2, O_2^+, O_2^-, O_2^{2-}$. 3

25 The combustion of one mole of benzene takes place at 298 K and 1 atm. After combustion, $CO_{2\,(g)}$ and $H_2O_{\,(l)}$ are produced and 3267.0 kJ of heat is liberated. Calculate the standard enthalpy of formation $\Delta_f H^0$ of benzene .standard enthalpies of formation of $CO_{2\,(g)}$ and $H_2O_{\,(l)}$ are -393.5 kJ mol^{-1} and -285.83kJ mol^{-1} respectively. 3

26 (a)H_2O_2 is used to restore the color of old paintings containing PbS .Write a balanced equation for the reaction that takes place in this process. 3

(b)What do you understand by the following

(i)Hydrogen economy (ii) Water gas shift reaction.

27 (a) Define morality. 3

(b) Concentrated H_2SO_4 is 98 % weight and has density 1.84 g / cm ^{3}. What volume of concentrated acid is required to make 5L of 0.50 M H_2SO_4?(molar mass of sulphuric acid = 98 u).

28 (a)How is diborane prepared in the laboratory? 5

(b)How would you explain the lower atomic radius of Gallium as compared to aluminum?

(c)Explain the following reactions.

(i) Silicon dioxide is treated with hydrogen fluoride.

(ii) Silicon is heated with methyl chloride at high temperature in the presence of copper.

(iii) CO isheated with ZnO.

OR

(a) Account for the following.

(i) $[SiF_6]^{2-}$ is known whereas $[SiCl_6]^{2-}$ not.

(ii) Boric acid is considered as a weak acid.

(iii)Diamond is covalent, yet it has high melting point.

(b)How are fullerenes prepared?

(c)What is dry ice? Why is it called so?

29 (a) State Le Chateliers principle. 5

(b)For the reaction $H_{2(g)} + I_{2(g)} \rightleftharpoons 2HI_{(g)}$

What is the relationship between Kp and Kc?

(c)What will be conjugate bases for Bronstedacids HCO_3^- and NH_4^+ ?

(d)A sample of pure PCl_5 was introduced into an evacuated vessel at 473K. After equilibrium was attained ,the concentration of PCl_5 was found to be 0.05 moles/litre. If value of Kc is 8.3 X10 $^{-3}$,what are the concentrations of PCl_3 and Cl_2 at equilibrium ?

$PCl_{5(g)} \rightleftharpoons PCl_{3(g)} + Cl_{2(g)}$.

OR

(a)What are buffer solutions?

(b)Calculate the pH of a solution obtained by dissolving 0.3 g of $Ca(OH)_2$dissolved in water to give 500 ml of solution. (atomic mass of Ca=40, O=16,H=1)

(c)Derive the relationship between dissociation constant of a weak acid and its degree of dissociation.

30 (a)Addition of HBr to propene yields 2 -Bromopropane.Explain the rule and give the mechanism of the reaction. 5

(b) How are the following conversions done?

(i) Ethyne to Benzene. (ii)Benzene to p –nitro bromo benzene.

© An alkene on ozonolysis gives a mixture of ethanal and pentan – 3 – one.Write structure and IUPAC name of A.

OR

(a) Write notes on the following.

(i) Wurtz reaction (ii) Friedel – Crafts Acylation reaction.

(b)Arrange the following compounds in the decreasing order of the property indicated.

(i)Benzene, n –Hexane, Ethyne. (acidic behavior)

(ii) Benzene , m – dinitrobenzene ,toluene .(reactivity with an electrophile)

(c)What effect does branching of an alkane chain has on its boiling point?
