GULF SAHODAYA EXAMINATION – (Saudi Chapter)
CLASS—XI   CHEMISTRY– (February-2013)
SET – C

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 nos. 9 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. Calculators are not allowed.

1	In three moles of butane (C_4H_{10}), calculate the following : (i) Number of moles of carbon atoms. (ii) Number of moles of hydrogen atoms.	1
2	What would be the IUPAC name and symbol for the element with atomic number 120?	1
3	How many types of d orbitals are there? How many electrons does it accommodate?	1
4	Predict the shape of PCl_5 using VSEPR theory.	1
5	State third law of thermodynamics.	1
6	Give one example for a basic buffer.	1
7	Write the IUPAC name of the following compound. · $CH_3\ CO\ CH_2\ CH_2\ CH_2\ COOH$.	1
8	Draw the resonance structures of $CH_2 = CH - CHO$	1
9	Describe the hybridization in the case of ethene.	2
10	(a) With the help of molecular orbital theory show that Ne_2 cannot exist as stable species. (b) Explain why BeH_2 molecule has a zero dipole moment although Be- H bonds are polar.	2
11	a)Critical temperature for carbon dioxide and methane are 31.1^{0C} and -81.9^{0C} respectively. Which of these has stronger intermolecular forces and why? (b) Why do gases deviate from ideal behavior?	2
12	Calculate the total pressure in a mixture of 8 g of oxygen and 4 g of hydrogen confined in a vessel of 1 dm^3 at 27^0C. (R=0.083 bar $dm^3K^{-1}mol^{-1}$) OR Calculate the root mean square and most probable speed of oxygen molecules at 27^0C. (atomic mass of oxygen =16 u)	2
13	The mass of an electron is 9.1×10^{-31} Kg. If its kinetic energy is	2

3 .0 X 10^{-25} J. Calculate its wavelength.(h=6.626 X10 $^{-34}$J s)

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

(b)How is molarity different from molality?

15 Di nitrogen and di hydrogen react with each other to produce ammonia   2
according to the reaction

$$N_{2(g)} + 3H_{2(g)} \rightarrow 2NH_{3(g)}$$

(a) Calculate the mass of ammonia produced if 2 X 10^3 g of di nitrogen reacts with 1 X 10^3 g di hydrogen.

(b)Will any of the two reactants remain unreacted?

(c)If yes, which one and what would be its mass?

16 Write balanced equations for reactions between   2

(a)Na_2O_2 and water.

(b)KO_2 and water.

17 In carius method of estimation of halogen,0.15 g of an organic   2
compound gave 0.12 g of AgBr. Find out the percentage of bromine in
the compound.

(Molar mass of AgBr =188 g/mol, Atomic mass of Br =80 u).

18 (a)Explain the term residual entropy.   2

(b)Derive the mathematical expression for the first law of
thermodynamics.

19 (a)Balance the following redox reaction by ion- electron method.   3

$$Cr_2O_7^{2-} + Fe^{2+} \rightarrow Cr^{3+} + Fe^{3+}$$ (in acidic medium)

(b) What is a redox couple ?

20 (a)It was found that a good piece of lead painting faded due to   3
atmospheric gases. As a Chemistry student, what suggestion would you
give to restore the colour of oil painting? What is the value associated
with such a suggestion ?
(b)What do you understand by 'Hydrogen Economy" ?

21 (a)Give the chemistry of Lassaigne's test for nitrogen.   3

(b) Explain why an organic liquid vaporizes at a temperature below its
boiling point in its steam distillation.

22 Write a brief note on the following environmental terms: 3

(a) Acid rain

(b)Greenhouse effect

(c)Ozone layer depletion.

23 i) Explain the following.   3

(a) Aufbau Principle.

(b) Hunds rule of maximum multiplicity.

(ii)Using s,p,d,f notations, describe the orbital with the following
quantum numbers.

(a) n=1,l=0   (b) n=4,l=3

24 (i)Account for the following.   3

(a) Electron gain enthalpy of Sulphur is more negative than that of Oxygen.

(b) Mg $^{2+}$ ion is smaller in size than O $^{2-}$ ion although both have the same electronic structure.

(ii) How would you justify the presence of 32 elements in sixth period of the periodic table?
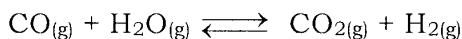
25 For the reaction :   3

$$2A_{(g)} + B_{(g)} \rightarrow 2D_{(g)}$$

$\triangle U = -10.5KJ$ and $\triangle S = -44.1\ JK^{-1}mol^{-1}$.

Calculate $\triangle G^0$ for the reaction and predict whether the reaction may occur spontaneously.(R=8.314 J K^{-1} mol $^{-1}$)

26 (a)Write down any four properties illustrating diagonal relationship   3
between Lithium and Magnesium.

(b)Why does the solubility of alkaline earth metal hydroxides in water increase down the group?

<div align="center">OR</div>

(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)Potassium carbonate cannot be prepared by solvay process why?

27 (a) Addition of HBr to propene yields 2 –Bromo propane. Explain the   3
rule and give the mechanism of the reaction.

(b) Which of the following exhibits geometrical isomerism ?

(i) 2 –methyl propene (ii) but – 2-ene.

28   (a)State Le Chateliers principle.   5

(b)   Write the expression for equilibrium constant K_p for the reaction.

$3Fe_{(s)} + 4H_2O_{(g)} \rightleftharpoons Fe_3O_{4(s)} + 4H_{2(g)}$

(c)What will be conjugate acids for Bronsted bases $NH_2^- \, and \, HCOO^-$?

(d)One mole of water and one mole of CO are taken in a10 L vessel and heated to 725 K. At equilibrium 40 % of water (by mass) reacts with CO according to the equation.

$CO_{(g)} + H_2O_{(g)} \rightleftharpoons CO_{2(g)} + H_{2(g)}$

Calculate the equilibrium constant for the reaction.

<div align="center">OR</div>

(a)Define solubility product.

(b)The pH of blood is close to7.35. What are H^+ and OH^- ions concentrations? What is pOH of blood?

(c)Derive the relationship between dissociation constant of a weak

acid and its degree of dissociation.

29   (i)Write chemical equations for the following reactions.   5

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

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

(ii) An alkene 'A' on ozonolysis gives a mixture of ethanal and pentan-3-one.Write structure and IUPAC name of A.

(iii) How are the following conversions done?

(a)Ethyne to Benzene.   (b)Benzene to toluene.

<div align="center">OR</div>

(a) Write notes on the following.

(i)Kolbe's electrolysis reaction (ii) Friedel – Crafts Acylation reaction.

(b)Account for the order of acidity: Acetylene > Benzene > Hexane.

(c)Arrange the three isomers of Pentane in increasing order of their boiling point.

(d)What are the necessary conditions for any compound to show aromaticity?

30   (a)How is diborane prepared industrially?   5

(b)Draw the structure of diborane molecule.

(c)What happens when

(i) Silicon dioxide is treated with hydrogen fluoride.

(ii)   Borax is heated strongly.

(iii)   Boric acid is added to water.

<div align="center">OR</div>

(a)Account for the following.

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

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

(b)What are silicones? How are they prepared and what are its uses?

(c)What is the state of hybridization of carbon in (i) CO_3^{2-}

(ii) graphite?

<div align="center">************************************</div>