GULF SAHODAYA EXAMINATION –2015
(Saudi Chapter)

Class: XI **SET A** **Max.Marks:70**
Sub : Chemistry **Time : 3 hrs**

General instructions:

- **(i) All questions are compulsory.**
- **(ii) Question numbers 1 to 5 are very short answer questions ,carrying 1 mark each.**
- **(iii) Question numbers 6 to10 are short answer questions, carrying 2 marks each.**
- **(iv) Question numbers 11 to 22 are also short answer questions, carrying 3 marks each.**
- **(v) Question number 23 is a value based question, carrying 4 marks.**
- **(vi) Question numbers 24 to 26 are long answer questions, carrying 5 marks each.**
- **(vii) Use log tables, if necessary. Use of Calculator is not permitted.**

1. Arrange the following in the order of increasing ionic radii.
   N^{3-}, O^{2-}, Mg^{2+}, Al^{3+}, F^-, Na^+

2. Which series of hydrogen spectrum lies in visible region?

3. Critical temperature for carbon dioxide and methane are 31.1 ^{o}**C** and – 81.9 ^{o}**C** respectively. Which of these has stronger intermolecular forces and why?

4. Write the conjugate base for the species H_2O and NH_4^+.

5. Write IUPAC name of CH_2=$CHCH_2CH(OH)CH_3$

6. (i)State Avogadro Law.
   (ii)Write the number of significant figures a. 0.0025 b.500.0

7. Calculate the velocity of a particle of mass 0.1mg which is associated with a wavelength of 3.3 x 10^{-29} m. (h = 6.6 x 10^{-34} kgm^2s^{-1})

8. Give reasons
   (i)BF_3 has a zero dipole moment although the B-F bonds are polar.
   (ii)All carbon to oxygen bonds in CO_3^{2-} are equivalent.

9. Write chemical equations
   i) quicklime is heated with silica. ii) calcium nitrate is heated.

   OR

   Write two ways in which Beryllium resembles Aluminium.

10. Draw cis trans isomers of but-2 – ene.
Which isomer has higher dipole moment and why?

11.Con.HCl is 38 % HCl by mass.What is the molarity of this solution if d = 1.19 g cm^{-3}?
What volume of Conc.HCl is required to make 1.00 L of 0.10 M HCl?

12. (i) What is the atomic number of the element whose outer configuration is $3p^5$?
(ii) Give the possible values of n , l for an electron in 3d orbital.
(iii) State physical significance of ψ^2

13 (i)Name a suitable technique for separating a mixture of calcium sulphate and camphor .
(ii) Indicate the number of sigma and pi bonds in $HCONHCH_3$
(iii)$(CH_3)_3C^+$ is more stable than $(CH_3)_2CH^+$.Why?

14.(i)Write two conditions required for the linear combination of atomic orbitals to form molecular orbitals.
(ii)Draw the shapes of the following molecules on the basis of VSEPR theory
XeF_4 and SF_4.
(iii)What is the change in hybridization (if any) of the Al atom in the following reaction?$AlCl_3 + Cl^- \longrightarrow AlCl_4^-$

15 .i) Compressibility factor of a gas is given as, $Z = \frac{PV}{nRT}$
a)What is the value of Z for an ideal gas?
b) For a real gas what will be the effect on value of Z above Boyle temperature?
ii) How is the density of a gas related to its molar mass?

16. Calculate the heat of combustion of glucose from the following data.

$C_{(graphite)} + O_2(g) \longrightarrow CO_2(g)$, $\Delta H = -393.5\ kJmol^{-1}$
$H_2(g) + \frac{1}{2} O_2(g) \longrightarrow H_2O(l)$ $\Delta H = -269.4\ kJmol^{-1}$
$6C_{(graphite)} + 6H_2(g) + 3O_2(g) \longrightarrow C_6H_{12}O_6(s)$, $\Delta H = -1169.8 kJmol^{-1}$

OR

The reaction of cyanamide, $NH_2CN(s)$, with dioxygen was carried out in a bomb calorimeter and ΔU was found to be $-742.7 kJmol^{-1}$ at 298K.Calculate enthalpy change for the reaction at 298K.

$NH_2CN(g) + 3/2\ O_2(g) \longrightarrow N_2(g) + CO_2(g) + H_2O(l)$

17. i)Balance the following reaction by ion-electron method (acidic medium)

MnO_4^- (aq) + Fe^{2+}(aq) ⟶ Fe^{3+}(aq) + Mn^{2+}(aq)

ii)Write formula of Iron (III) sulphate.

18. What causes temporary and permanent hardness of water?
Explain any one method to remove permanent hardness of water?

19 i) State Hess's law of constant heat summation.
ii) Give one point to differentiate the following thermodynamic terms.
Extensive properties and intensive properties.Give one example for each.

20. Comment on each of the following
i) The mobilities of alkali metal ions in aqueous solution are
$Li^+ < Na^+ < K^+ < Rb^+ < Cs^+$
ii) LiI is more soluble than KI in ethanol
iii) Beryllium and Magnesium do not impart colour to the flame while other members of the group do so.

21. i) Explain the following.
a) Mesomeric effect b) Electrophile
ii) Write the formula of the Prussian blue colour compound formed in Lassaigns test for nitrogen.

22. i)Assign the position of element having outer electronic configuration
ns^2 np^6 for n = 3
ii) Fluorine has less negative electron gain enthalpy than chlorine .Give reason.
iii) Write the IUPAC name and symbol of the element with atomic number 110.

23. Super dry cleaning owner Mr.Lalit was using tetra chloroethene earlier as a solvent for drycleaning.As per the advise of his friend he started using liquified CO_2 with a suitable detergent these days and hydrogen peroxide for bleaching purpose.
(i)What is the advantage of using liquid CO_2 for dry cleaning?
(ii) What is the advantage of using H_2O_2 as a bleaching agent?
(iii) In your opinion, how is Green chemistry beneficial to the wellbeing of human race? (iv) What are the values shown by Mr. Lalit?

24. i) At 473K,the equilibrium constant Kc for decomposition of PCl_5 is 8.3×10^{-3}.
If decomposition is depicted as $PCl_5(g) \longrightarrow PCl_3(g) + Cl_2(g)$)
$\Delta_r H^0 = 124.0\ kJmol^{-1}$
a) Write an expression for Kc for the reaction?
b) What would be the effect on Kp if 1.pressure is increased?
2. temperature is increased?

ii)) Kp = 0.04 atm at 899Kfor the equilibrium shown below

$$C_2H_6(g) \rightleftharpoons C_2H_4(g) + H_2(g)$$

What is the equilibrium pressure of C2H6 when it is placed in a flask at 4 atm pressure and allowed to come to equilibrium?

OR

i) What are buffer solutions? Give an example of acidic buffer solution.

ii) The degree of ionization of 0.1M bromoacetic acid solution is 0.132. Calculate the P_H of the solution and dissociation constant of bromoacetic acid.

25 a) Explain structure of diborane b) Explain two differences between diamond and graphite on the basis of structure. Why is the graphite a good conductor of electricity whereas diamond is an insulator?

OR

i) Write balanced equations

a) $H_3BO_3 \xrightarrow{\Delta}$ b) Al + HCl $\longrightarrow$

ii)Give reasons a)Boron is unable to form BF_6^{3-} ion.

b) Con.HNO3 can be transported in aluminium container.

c) Atomic radius of gallium is less than that of aluminium.

26 i) Why is benzene extraordinarily stable though it contains three double bonds?

ii)Write short notes on a)Aromatisation b)Wurtz reaction

iii)Complete the following a) $CH_3\text{-}CH{=}CH_2$ + HBr $\xrightarrow{\text{Peroxide}}$

b) $CH_3\text{-}CHBr\text{-}CH_2\text{-}CH_3$ + KOH (alc) $\longrightarrow$

OR

i) Arrange benzene,hexane and ethyne in the decreasing order of acidity.

ii) Convert: a) ethyne to benzene b) benzene to acetophenone

iii) A hydrocarbon X reacts with O_3 followed by Zn and H_2O gives ethanal and methanal.Identify X and writes the reactions involved.