GULF SAHODYA EXAMINATION 2018 (SAUDI CHAPTER)

Set –A

Subject- Chemistry **Marks- 70M**

Std.- XI **Time- 3 Hrs.**

General Instructions:

- All questions are compulsory.
- Questions 1 to 5 are very short answer questions, carrying one mark each.
- Questions 6 to 10 are short answer questions, carrying two marks each.
- Questions 11 to 22 are also short answer questions, carrying three marks each.
- Question 23 is a value based question carrying four marks.
- Questions 24 to 26 are long answer questions carrying five marks each.
- Use of calculators is not permitted.

1. **Write the general electronic configuration of the f-block elements.**
2. **Give the Henderson-Hasselbalch equation for acidic buffer solution.**
3. **Draw the structure of $BeCl_2$ (solid).**
4. **What do you mean by redox couple?**
5. **Write the IUPAC name of CH_3-CO-CH_2-CH(OH)-CH_3.**
6. **a) State the law of Multiple proportion.**
   b) In a reaction, $A + B_2 \rightarrow AB_2$
   Identify the limiting reagent, if 300 atoms of A react with 200 molecules of B.
7. **Calculate the bond order of O_2^+.**
8. **i. State Dalton's Law of Partial Pressures.**
   ii. Give two assumptions of the kinetic theory of gases that do not hold good.

   Or

   i.The tyre of automobiles are inflated to lesser pressure in summers than in winters. Why?
   ii.Write the Vander Waal equation for real gases.
9. **Enthalpies of formation of CO(g), CO_2(g), N_2O(g) and N_2O_4(g) are –110, – 393, 81 and 9.7 kJ mol^{-1} respectively. Find the value of $\Delta_r H$ for the reaction:**
   $N_2O_4(g) + 3CO(g) \rightarrow N_2O(g) + 3CO_2(g)$
10. **Explain the chemistry of lassaigne's test when both N and S are present in the same organic compound.**
11. **a. Explain the hybridization in CH_4.**
    b. Which out of NH_3 and NF_3 has higher dipole moment and why ?

    Or

    i. Draw and name the structure of ClF_3 on the basis of VSEPR theory.

ii. Distinguish between σ and π bond.

iii. Although geometries of NH_3 and H_2O molecules are distorted tetrahedral, bond angle in water is less than that of ammonia. Discuss.

12. A compound contains 4.07 % hydrogen, 24.27 % carbon and 71.65 % chlorine. Its molar mass is 98.96 g. What are its empirical and molecular formulas? (Atomic mass of C = 12, H =1, Cl = 35.5 amu)

13. i) State Pauli exclusion principle.
ii) What is the possible value of n, l and s for the unpaired electron in the atom of an element whose atomic number is 17 ?
iii) Chromium(Z=24) has electronic configuration $3d^5\ 4s^1$ and not $3d^4\ 4s^2$. Give reason.

14. a) Draw the boundary surface diagram of the d orbitals which have similar shape.
b) Give any two postulates of the Bohr's Model for Hydrogen atom.

15. a) Give reason.
i. The electron gain enthalpy of O is less negative than that of S.
ii. Be has higher Δ_i H than B.
b) Assign the position of the element having outer electronic configuration $(n-1)d^2, ns^2$ for n=4.

16. a) A sample of N_2 gas has a volume of 1.00L at a pressure of 0.50 atm at 40°C. Calculate the pressure if the gas is compressed to 0.225 cm^3 at - 6°C.
b) Two different gases 'A' and 'B' are filled in separate containers of equal capacity under the same conditions of temperature and pressure. On increasing the pressure slightly, the gas 'A' liquefies but gas 'B' does not liquefy even on applying high pressure until it is cooled. Explain this behaviour.

17. a. Derive the expression $C_p - C_v = R$.
b. For the reaction, $2\ Cl(g) \rightarrow Cl_2(g)$, what are the signs of ΔH and ΔS ?

18. a)Balance the following redox reaction using ion electron method.
$MnO_4^- + I^- \rightarrow MnO_2 + I_2$ (basic medium)
b)Which among the following elements is the strongest oxidizing agent?
$E°(Zn^{+2}/Zn) = -0.76$ V , $E°(Cr^{+2}/Cr) = -0.74$ V , $E°(H^+/H_2) = 0$, $E°(Fe^{+3}/Fe^{+2}) = 0.77$

19. a. Give the reaction for the formation of syngas.
b. What are ionic hydrides?
c. H_2O_2 is stored in wax –lined glass or plastic vessels in dark. Give reason.

20. a. Give one biological importance of each Na and Ca.
    b. Alkali metals when dissolved in liquid ammonia give blue coloured solutions. Why?
    c. What happens when milk of lime reacts with chlorine?

21. a. In Carius method of estimation of halogen, 0.15g of an organic compound gave 0.12g of AgBr. Find out the percentage of bromine in the compound.
    b. Explain why $(CH_3)_3C^+$ is more stable than $CH_3CH_2^+$ and CH_3^+ is the least stable cation.

22. a. Using a chemical test distinguish between ethane and ethyne.
    b. Explain the mechanism of addition of HBr to but-1-ene in the absence of peroxide.

23. During an educational trip , Neha a student of botany saw a beautiful lake in a village . She collected many plants from that area. She noticed that villagers were washing clothes around the lake and at some places waste materials from houses was destroying its beauty. After a few years , she visited the same lake again. She was surprised to find that the lake was covered with algae, it was stinking and its water had become unusable. She immediately brought the attention of the authorities of the village towards the condition of the lake.
    Answer the following questions on the basis of the paragraph.
    i. Explain the reasons for this condition of the lake.
    ii. As a student, how can you help the villagers in restoring the natural condition of the lake?
    iii. What values are shown by Neha?

24. a. What are silicones? How are they prepared?
    b. What happens when,
    i) Borax is heated strongly.
    ii) Aluminum is treated with dilute NaOH.
    c. Graphite is used as a lubricant. Give reason.

    Or

    a. What is inorganic benzene?
    b. Why is CO highly poisonous?
    c. Complete the following reactions.
    i. $Na_2B_4O_7 + H_2SO_4 + H_2O \rightarrow$
    ii. $BF_3 + NaH \xrightarrow{450K}$
    iii. $SiO_2 + HF \rightarrow$

25. a)Draw the conformational isomers of ethane using Newman's projections.

b)Write a note on Wurtz reaction.

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

d)How will you convert ,

i. Ethyne to nitrobenzene

ii. Sodium acetate to methane

Or

a)Draw the geometrical isomers of But-2-ene.

b)Write a note on Friedel-Crafts alkylation of benzene.

c)Complete the following reactions.

i. $CH_3\text{-}CH_2\text{-}Cl \xrightarrow{alc.KOH}$

ii. $CH_3\text{-}C{\equiv}CH + H_2O \xrightarrow{Hg^{+2}/H^+}$

iii. $CaC_2 + H_2O \rightarrow$

26. a. Calculate the pH of 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)

b. Out of NaCl and KCl ,which should be added in order to precipitate soap (RCOONa) and why?

c. Write the conjugate bases for the Bronsted acids HF and H_2SO_4 .

Or

a. The ionization constant of acetic acid is 1.74×10^{-5}. Calculate the degree of dissociation of acetic acid in its 0.05 M solution. Calculate the concentration of acetate ion in the solution.

b. Describe the effect of :

i) Addition of CH_3OH

ii) Removal of CO

on the equilibrium of the reaction:

$$2H_2(g) + CO\ (g) \rightleftharpoons CH_3OH\ (g)$$