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BENGALURU REGION

SAMPLE QUESTION PAPER - TERM – II: SESSION 2021-22

Class : XI **Max. Marks:35**

Subject : CHEMISTRY **Time: 2hrs**

GENERAL INSTRUCTIONS:

Read the following instructions carefully.

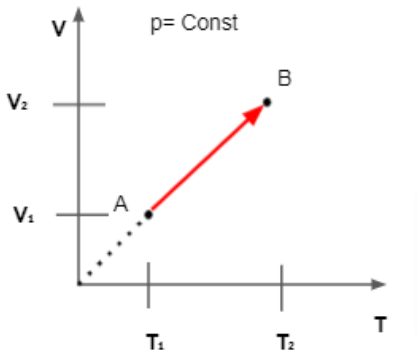
1. There are 12 questions in this question paper with internal choice.
2. **SECTION A - Q. No. 1 to 3** are very short answer questions carrying 2 marks each.
3. **SECTION B - Q. No. 4 to 11** are short answer questions carrying 3 marks each.
4. **SECTION C- Q. No. 12** is case based question carrying 5 marks.
5. All questions are compulsory.

SECTION A

1. Write an expression of K_c for the following reaction: (2)
   $CaCO_3(s) \rightleftharpoons CaO(s) + CO_2(g)$
   What is the effect of increasing concentration of CO_2 on direction of reaction?
2. Name an alkali metal carbonate which is thermally unstable and why? Give its decomposition reaction. (2)
3. The ionization of hydrochloric acid in water is given below:
   $HCl(aq) + H_2O(l) \rightleftharpoons H_3O^+(aq) + Cl^-(aq)$
   Label two conjugate acid-base pairs in this ionization. (2)

SECTION B

4. (a)Which gas law is shown by the following graph



(b) Calculate the temperature of 4.0 mol of gas occupying 5 dm^3 at 3.32 bar. [R= 0.083 bar $dm^3 mol^{-1} K$]. (1+2)

OR

4 (a) A gas that follows Boyle's law, Charle's law and Avogadro's law is called an ideal gas. Under what conditions a real gas would behave ideally?

(b) Name the intermolecular forces that exist in (i) HF (ii) I_2 (1+2)

5. (a) Write the correct order of reducing character of Group I elements.
   (b) Why are alkali metals strong reducing agents?
   (c) Name the alkali metal which shows diagonal relationship with magnesium. (1+1+1)
6. (a) Aluminum forms $[AlF_6]^{3-}$ whereas $[BF_6]^{3-}$ is not formed . Why?
   (b) C and Si are always tetravalent but Ge, Sn & Pb show divalency. Why?
   (c) Why do the heavier elements not form pπ−pπ multiple bonds as carbon does? (1+1+1)

OR

6. (a) Mention any two dissimilarities of boron with other elements of group-13.

(b) Write the structural difference between diamond and graphite . (2+1)

7. (a) The dipole moment of trans 1,2-dichloroethane is less than the cis – isomer. Explain.
   (b) Ethyne is acidic in nature in comparison to ethene and ethane. Why is it so? (1+2)
8. (a) How will you convert benzene into
   (i) acetophenone?
   (ii) m-nitrochlorobenzene?
   (b) Write the structures of products obtained by ozonolysis of pent-2-ene. (2+1)
9. Calculate the pH value of a solution of 0.1 M NH_3 ($K_b = 1.8 \times 10^{-5}$). (3)

OR

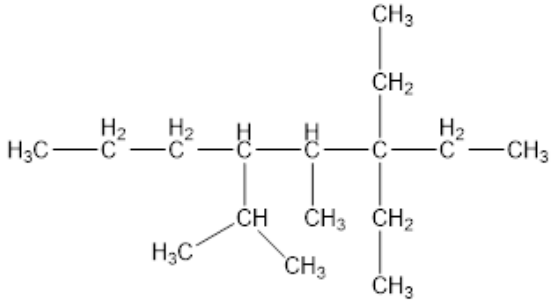
9. At 773 K, the equilibrium constant K_c for the reaction $N_2 (g) + 3H_2 (g) \rightleftharpoons 2NH_3 (g)$ is $6.02 \times 10^{-2}\ L^2\ mol^{-2}$. Calculate the value of K_p at the same temperature. (3)

10. Give reason.
    (a) Gallium has higher ionization enthalpy than Aluminium.

(b) Cone. $HN0_3$ can be transported in an aluminium container.

(c) TlCl is more stable than $TlCl_3$.

11. (a) Write the IUPAC of the following



(b) Give a brief account for the following statements:

(i) n-pentane has greater boiling point that iso-pentane.

(ii) Wurtz reaction is carried out in dry ether. (1+2)

OR

11. Write lUPAC names of the products obtained by addition reactions of HBr to Hex-1-ene (a) In the absence of Peroxide (b) In the presence of Peroxide. Write the reactions for both the cases. (3)

SECTION C

Read the passage given below and answer the questions that follow

12. The change in internal energy of a system is the sum of all the energy inputs and outputs to and from the system similarly to how all the deposits and withdrawals you make determine the changes in your bank balance." This is expressed mathematically as: $\Delta U = q+w$, where ΔU is the change in the internal energy, q is the heat added to the system, and w is the work done on the system.

According to the law of energy conservation, the change in internal energy is equal to the heat transferred to, less the work done by, the system. If the only work done is a change of volume at constant pressure, the enthalpy change is exactly equal to the heat transferred to the system. Entropy is very different from energy.

Entropy is not conserved but increases in all real processes. Reversible processes (such as in Carnot engines) are the processes in which the most heat transfer to work takes place and are also the ones that keep entropy constant. Thus we are led to make a connection between entropy and the availability of energy to do work.

(a) Define state function.

(b) What is the enthalpy of the formation of an element in its standard state?

(c) Neither q nor w is a state function but q+w is a state function. Explain.

(d) Calculate the standard entropy change for the reaction X ⇌ Y if the value of ΔH° = 28.40 kJ and equilibrium constant is 1.8 × 10-7 at 298 K and ΔrG° = 38.484 kJ.

OR

(d)Calculate the enthalpy of formation of carbon disulphide given that the enthalpy of combustion of it is 110.2 kJ mol^{-1} and those of sulphur and carbon are 297.4 kJ mol^{-1} and 394.5 kJ mol^{-1} respectively.

(1+1+1+2)