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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.
6. Use of log tables and calculators is not allowed.

SECTION A

Q1 The value of Kc for the reaction $2A \rightleftharpoons B + C$ is 2×10^{-3}. At a given time, the composition of reaction mixture is [A] = [B] = [C] = 3×10^{-4} M. In which direction the reaction will proceed? 2

Q2 Beryllium and magnesium do not give colour to flame whereas other alkaline earth metals do so. Why? 2

Q3 Explain the following 2

i)Solubility Product

ii)Common ion effect

SECTION B

Q4 a)Convert the following 3

i)Phenol to Benzene

ii)Benzene to Benzene hexachloride

b) Draw conformation of ethane by Newmann Projection.

OR

What are the necessary conditions for any system to be aromatic?

Q5 a)PCl_5,PCl_3 and Cl_2 are at equilibrium at 500 K and having concentration 1.59M PCl_3,1.59M Cl_2 and 1.41 M PCl_5.CalculateKc for the reaction, $PCl_5 \rightleftharpoons PCl_3 + Cl_2$ 3

b)Write the conjugate acids for H_2O & NH_3

OR

a)Write the relationship between Kp and Kc for the gaseous reaction : $N_2 + O_2 \rightleftharpoons 2NO$

b)Describe the effect of:

i)addition of H2 ii)removal of CO

on the equilibrium of the reaction : $2H_2\,(g) + CO(g) \rightleftharpoons CH_3OH\,(g)$

Q6 a) Write balanced equations to show the amphoteric character of Aluminium. 2

b) Boron has unusually high melting point. Give reason

Q7 In what ways lithium shows similarities to magnesium in its chemical behaviour? Write any three similarities. 3

Q8 Give reasons: 3

(a) Boron halides form an additional compound with NH_3.

(b) The tendency for catenation decreases down the group in Group 14.

(c) PbO_2 is a stronger oxidizing agent than SnO_2.

Q9 Addition of HBr to propene yields 2-bromopropane. Explain and give mechanism. 3

OR

Explain the following reactions with an example

a.Wurtz reaction

b.Friedel Craft Acylation

c.Beta Elimination

Q10 i)An alkene 'A' on ozonolysis gives a mixture of ethanal and pentan-3-one. Write the structure and IUPAC name of 'A'. 1+2

ii) Draw the cis- and trans-structures for hex-2-ene. Which isomer will have higher boiling point ?

Q11 a) A gas at 300 K exerts a pressure of 720 mm Hg and occupies a volume of 100 ml. Calculate the pressure of the gas which occupies a volume of 84 mL at the same temperature. 3

b) Write the two assumptions of kinetic molecular theory of gases that do not hold good under all conditions.

OR

a) Calculate the temperature of 4.0 moles of a gas occupying 5 dm^3 at 3.32 bar (R = 0.083 bar dm^3 K^{-1} mol^{-1})

b) In terms of Charle's Law explain why -273^0 C is the lowest temperature?

SECTION C

Q12 Chemical energy stored by molecules can be released as heat during chemical reactions when a fuel like methane, cooking gas or coal burns in air. The chemical energy may also be used to do mechanical work when a fuel burns in an engine or to provide electrical energy through a galvanic cell like dry cell. The study of these energy transformations forms the subject matter of thermodynamics. Thermodynamics deals with energy changes in chemical or physical processes and enables us to study these changes quantitatively and to make useful predictions. For these purposes, we divide the universe into the system and the surroundings. Chemical or physical processes lead to evolution or absorption of heat (q), part of which may be converted into work (w). These quantities are related through the first law of thermodynamics. The heat absorbed at constant volume is equal to change in the internal energy i.e., ΔU = q V. But most of chemical reactions are carried out not at constant volume, but in flasks or test tubes under constant atmospheric pressure is equal to change in the enthalpy, ΔH = qp , heat absorbed by the system at constant pressure. There are varieties of enthalpy changes. Changes of phase such as melting, vaporization and sublimation usually occur at constant temperature and can be characterized by enthalpy changes which are always positive. Enthalpy of formation, combustion and other enthalpy changes can be calculated using Hess's law. 5

i) In a process, 701 J of heat is absorbed by a system and 394 J of work is done by the system. What is the change in internal energy for the process?

ii) Define extensive properties. Give one example.

iii) How enthalpy change and internal energy change are related for gaseous reaction?

iv) Calculate the standard enthalpy of formation of $CH_3OH(l)$ from the following data:

$CH_3OH\ (l) + 3/2\ O_2\ (g) \rightarrow CO_2\ (g) + 2H_2O(l)$; $\Delta rH^0 = -726$ kJ mol–1

$C(graphite) + O_2\ (g) \rightarrow CO_2\ (g)$; $\Delta_c H^0 = -393$ kJ mol–1

$H_2\ (g) + 1/2\ O_2\ (g) \rightarrow H_2O(l)$; $\Delta_f H^0 = -286$ kJ mol–1

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