DIRECTORATE OF EDUCATION, GNCT OF DELHI

PRACTICE PAPER: Term-II (2021-22)

CLASS-XI

SUBJECT: CHEMISTRY (043)

TIME: 2 Hrs. **MM: 35**

GENERAL INSTRUCTION:

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]

1. (i) Name the intermolecular forces present between
   a) NH_3
   b) I_2

   (ii) Prove that volume of an ideal gas is zero at absolute zero of temperature.

2. (i) Define standard enthalpy of formation.
   (ii) What will be sign of entropy change in the reaction?
   $2SO_{2\,(g)} + O_{2\,(g)} \longrightarrow 2SO_{3(g)}$
3. (i) Why is KO_2 paramagnetic?
   (ii) Why is Na (Sodium) kept in kerosene?

[Section-B]

4. a) Calculate the pressure exerted by a mixture of 3.2g methane(CH_4) and 4.4g of carbon dioxide (CO_2) contained in a 9 dm^3 flask at 27^0C.
   b) What is the value of compressibility factor (z) for an ideal gas?

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Or

a) Using equation of state PV=nRT; show that at a given temperature density of gas is proportional to molar mass of gas.

b) Name two gases which always show +ve deviation from ideal behavior.

5. (i) how will you convert

a) C_6H_6 to $C_6H_5COCH_3$

b) $CH{\equiv}CH$ to $CH_3\text{-}CH_2\text{-}C{\equiv}CH$

(ii) An alkenes 'A' on reductive ozonolysis gives a mixture of butanone and acetone. Write structure of 'A'.

6 . Give reason:

(i) Tendency to show + 1 oxidation state in group 13 and +2 oxidation state in group 14 increases among heavier elements.

(ii) Conc. HNO_3 can be transported in Aluminium containers.

(iii) Heavier elements in C-family do not form pπ-pπ bond as carbon does.

7. (i) Explain the difference in properties of diamond and graphite on the basis of their structure.

(ii) B is not able to form BF_6^{3-}. Explain.

8. Write balanced chemical equation

(i) $CH_3\text{-}CH{=}CH_2 + HBr \xrightarrow{\text{peroxide}}$

(ii) $CH{\equiv}CH \xrightarrow[873\ K]{\Delta\ \text{Iron tube}}$

(iii) + $\underset{\text{Conc.}}{HNO_3} \xrightarrow[323\text{-}333\ K]{\text{Conc. } H_2SO_4}$

9. (i) Give any four anomalous behavior of Lithium (Li).

(ii) Complete the equation

$Na + NH_3 \rightarrow$

Or

a) Be SO_4 is soluble in water but $BaSO_4$ is insoluble. Give reason.

b) Arrange the following in increasing order of ionization enthalpy.

Rb, Na, K, Li

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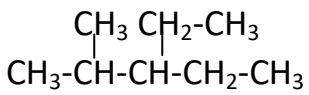
10.a) Write IUPAC name



b) Write chemical reactions.

(i) Wurtz reaction

(ii) Friedel craft alkylation

11. a) Calculate enthalpy of formation for benzene from given data.

i) $C_{(gr)} + O_{2(g)} \rightarrow CO_{2(g)}$ $\Delta H = -393.3$ KJ

ii) $H_{2(g)} + \frac{1}{2} O_{2(g)} \rightarrow H_2O_{(l)}$ $\Delta H = -286.6$ KJ

iii) $C_6H_{6(g)} + \frac{15}{2} O_{2(g)} \rightarrow 6CO_{2\,(g)} + 3H_2O_{(l)}$ $\Delta H = -3267.7$ KJ

b) Define intensive properties.

Or

a) For a reaction $2A+B \rightarrow C$ at 298K

$\Delta H = 400$ KJ mol^{-1} and $\Delta S = 0.2$ KJ K^{-1} mol^{-1}

Calculate the temperature at which the reaction become spontaneous considering ΔH and ΔS to be constant over the temperature range.

b) Give two conditions when ΔH and ΔU become equal.

5. [Section-B]

12. Hydronium ion concentration is more conveniently expressed on a logarithmic scale known as pH scale. The pH of solution is defined as negative logarithm to base 10 of activity of hydrogen ion. In dilute solutions (<0.01M) activity of hydrogen ion is equal to magnitude of molarity represented by $[H^+]$.

Many body fluids eg. blood or urine have definite pH and any deviation in their pH indicate malfunctioning of body. The control of pH is also very important in many chemical and biochemical processes. Many medical and cosmetic formulations require that these be kept and administered at a particular pH. The solutions which resist change in pH on dilution or with the

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addition of small amount of acid or alkali are called Buffer solution. Buffer solutions of known pH can be prepared from knowledge of pk_a of the acid or pk_b of the base and by controlling the ratio of the salt and acid or salt and base. A mixture of acetic acid and sodium acetate acts as buffer solution around pH 4.75 and a mixture of NH_4Cl and NH_4OH acts as a buffer around pH 9.25. To prepare a buffer of acidic pH we use weak acid and its salt formed with strong base.

1. Addition of a drop of HCl to an acidic buffer of acetic acid and sodium acetate does not produce any appreciable change in pH of solution. Why?
2. What is ionic product of water? What is value of ionic product of water at 298K?
3. How will you design (prepare) a buffer solution of pH above 7?
4. Calculate pH of 10^{-3}M NaOH solution

OR

Ionisation constant (Ka) for acetic acid is 2.0×10^{-5} Calculate pH of 0.05M acetic acid solution.

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