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SILCHAR REGION

TERM-II (2021-22)

Class: XI

Sub: Chemistry (043)

Time: Two Hours

M.M.: 35

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

1. Define intensive and extensive properties. Write suitable examples.
2. Answer the following-
 - a. Why does boron trifluoride (BF₃) behave as a Lewis acid?
 - b. What is the hybridization of boron in diborane?
3. Answer the following- (1 + 1)
 - a. State the Arrhenius concept of acid-base.
 - b. Write any two examples of Lewis acids and Lewis bases.

Or

- a. Write the relationship between K_p and K_c.
- b. What is the effect of pressure on equilibrium on the following reaction?
 - i. $\text{COCl}_2 \rightleftharpoons \text{CO} + \text{Cl}_2$
 - ii. $\text{H}_2 + \text{I}_2 \rightleftharpoons 2 \text{HI}$

SECTION-B

4. Answer the following- (1 + 2)
 - a. Write a chemical reaction of conversion of ethyne into benzene.
 - b. State markovnikove's rule. Give suitable reaction.

Or

Answer the following- (2 + 1)

- a. What is Kolbe's electrolysis. Write mechanism.
- b. Write IUPAC name of the products obtained by the ozonolysis of the 3,4-Dimethylhept-3-ene

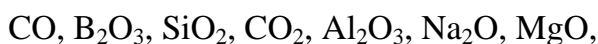
5. Answer the following- (1 + 1 + 1)

- a. Wurtz reaction
- b. $\text{CH}_3\text{-CH=CH}_2 + \text{HBr} \xrightarrow{\text{Peroxide}} ?$
- c. Complete the following reaction. Write the name of this reaction.



6. Answer the following- (2 + 3)

- a. Classify following oxides as neutral, acidic, basic and amphoteric nature.



- b. Arrange the following in increasing order of Lewis acid character.

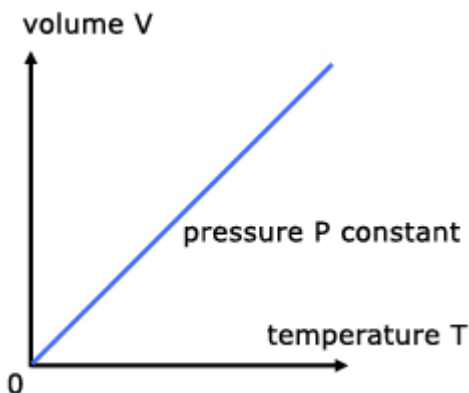


7. Answer the following- (2 + 1)

- a. An unknown alkene 'A' on ozonolysis gives two different carbonyl compounds 'B' and 'C' having molecular formula $\text{C}_3\text{H}_6\text{O}$. Write the structures of A, B and C.
- b. Arrange the benzene, n-hexane and ethyne in increasing order of acidic behavior. Also give the reason for it.

8. Answer the following- (1 + 1 + 1)

- a. Which gas law is shown by the following graph?



- b. Write van-der-waals gas equation for real gases.
- c. Define Avogadro law.

9. Define the following- (2 + 3)

- a. Closed system and isolates system
- b. Hess's law of constant heat summation.

Or

- a. Define state function and path function with suitable example.
- b. State first law of thermodynamics.

10. Answer the following (1 + 1 + 1)

- a. Draw the structures of BeCl_2 (Vapour) and BeCl_2 (Solid)
- b. Why first ionization enthalpy of alkali metals is lower than alkaline earth metals.
- c. Why do alkali metals impart color to the flame?

11. Answer the following (1 + 1 + 1)

- a. Arrange the following in increasing order of ionic characters.

LiCl , KCl , NaCl , CsCl

- b. List any two similarities between Li and Mg .
- c. Why is Cs used in photoelectric cells?

Or

- a. Why is BeCl_2 is more covalent than LiCl ?
- b. All compounds of alkali metals are easily soluble in water but Li compounds are more soluble in organic solvents. Explain.
- c. Arrange the hydrides of Group-I elements in the increasing order of thermal stability.

SECTION-C

12. Read the passage given below and answer the following questions. (1 + 2 + 2)

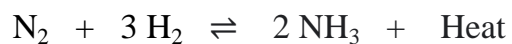
A chemical change in any substance is called as chemical reaction. Chemical reactions are of two types-Reversible and reversible reaction. Reversible reaction proceeds in forward and backward direction. At equilibrium, the rate of forward and backward reaction become equal and the concentration of reactants and products become constant. Chemical equilibrium is dynamic equilibrium. The change in concentration of reactant and product per unit time in a chemical reaction is called as rate of reaction. According to law of mass action, the rate of chemical reaction is directly proportional to the active mass of reactant molecules. The relation between reactant and product at equilibrium is determined by equilibrium constant. The effect of concentration, pressure and temperature on a chemical reaction in equilibrium can be explained with the help of Le-Chatelier's principle.

- a. The equilibrium constant expression of a gas reaction is

$$K_c = \frac{[\text{NH}_3]^4[\text{O}_2]^5}{[\text{NO}]^4[\text{H}_2\text{O}]^6}$$

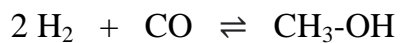
Write the balanced chemical equation corresponding to this expression.

b. The formation of ammonia is represented by following reaction



What is the favorable condition for the formation of ammonia?

c. Consider a reaction



Describe the effect of following on the equilibrium.

- i. Addition of H_2
- ii. Addition of $\text{CH}_3\text{-OH}$
- iii. Removal of CO
- iv. Removal of $\text{CH}_3\text{-OH}$