**[CLASS - XI]**

**CHEMISTRY (THEORY)**

**[SAMPLE PAPER-V]**

**Time Allowed: 3 hrs M.M.: 70**

1. Write the structure of the product formed when propylene reacts with hydrogen bromide in the presence of organic peroxide. (1)
2. What is the effect of increasing temperature on the position of the following equilibrium: N2(g) + 3H2(g) ⇌ 2NH3(g) + 92 kJ. (1)
3. Write an equation relating DH and DU. (1)
4. Define molarity. (1)
5. State Heisenberg’s uncertainty principle. (1)
6. Write the IUPAC name of the following compound:

CH3 CH2 CH(OH) CH2 COOH (1)

1. Why is molecular nitrogen chemically unreactive? (1)
2. Why is Cl⁻ larger in size than Cl? (1)
3. The absolute isotope abundance ratio of chlorine 35Cl/37Cl is 3.1272. Calculate the atomic mass of chlorine. The mass of 35Cland 37Cl are 34.96885 and 36.96590u, respectively. (2)

1. Calculate the wavelength of the photon absorbed when e- in a hydrogen atom jumps from its first excited state to the third excited states. (C = 3 x 108 m/s, h = 6.62 x 10-34 Js)

(2)

1. Write the molecular orbital configuration of F2. Calculate its bond order. (2)
2. Using orbital diagram, show the hybridization in ethene, C2H4. Molecule. (2)
3. 34.05 ml of phosphorous vapours weighs 0.0625 g at 546°C and 1 bar pressure. What is the molecular formula of phosphorous? (R = 0.083 L bar mol-1 K-1) (2)
4. A mixture of hydrogen and oxygen at one bar pressure contains 20% (by weight) of hydrogen. Calculate the partial pressure of hydrogen. (2)
5. A gas absorbs 200 J of heat and expands its volume from 10 L to 20 L at 2 atm pressure. Calculate the change in internal energy. (2)
6. Write the structure of the major organic product formed in the following reactions:
7. CH3 – CH2 – CH2 – CH2 –Cl
8. CH3 – CH2 – CH2 – CH2 – OH (2)
9. How is boric acid prepared? What happens when boric acid is
10. Added to water
11. Strongly heated? (2)
12. What are carbides? How are they classified? Give two examples of each? (2)
13. (a) State Pauli exclusion principle.

(b) How man electrons in 17Cl⁻ have *n + l* value equals to 3?

(c) Draw the shape of 2s orbital. (3)

1. (a) Write the symbol and IUPAC name of an element with atomic number 129.

(b) Why is Li smaller in size than Na?

(c) Cl has higher e- gain enthalpy than F while F has higher Electronegativity than Cl Explain. (3)

1. Calculate the DG° for the following reaction at 27°C:

3 C2H2 (g) 🠖 C6H6(g)

Given:

∆G°*f* C6H6 = - 7.5 x 105 J mol-1

∆G°*f* C2H2 = - 1.5 x 105 J mol-1

Also, predict whether we recommend this process on the commercial scale or not? (3)

1. (a) Balance the following redox reaction in basic medium:

MnO4⁻ + I⁻ 🠖 MnO2 + IO3⁻

(b) Can we store AgNO3 solution in a nickel container or not?

Given:

= - 0.25 V;

= + 0.80 V (3)

1. (a) Name the two nuclear isomers of hydrogen. Which is more stable?

(b) Draw the structure of H2O2 in the gas phase.

(c) Why do we store H2O2 in black wax coated bottles? (3)

1. (a) Why can’t we store sodium hydroxide in aluminium containers?

(b) SiCl4 hydrolyse very readily whereas CCl4 is inert towards water. Explain.

(c)State two anomalous behaviours of boron. (3)

1. (a) What do you understand by hyperconjugation? Using this explain why (CH3)3C+ is more stable than (CH3)2CH+.
2. Which of the following structures is more stable and why?

[[ O O⁻

CH2 = CH – CH or CH2 – CH = CH (3)

1. (a) Draw al possible alcohols with a molecular formula C4H10O. Also, write their IUPAC names.

(b) Draw the structure of 2-hydroxy but-3-enoic acid. (3)

1. (a) What are the harmful effects of carbon monoxide?

(b) How are sulphur and nitrogen oxides produced in the atmosphere? What measures should we take to minimize their emission into the air? (3)

1. (a) The ph of a 0.05 M monobasic acid (HA) is 4.54. Calculate the concentration of the various species present at equilibrium.

(b) State Le-Chatelier’s principle. Discuss the effect of the following factor on the equilibrium: 2SO2(g) + O2(g) ⇌ 2SO3(g)

∆H° = -182 kJ

1. Increasing pressure
2. Increasing temperature
3. Addition of inert gas
4. Addition of a catalyst (5)
5. (a) account for the following:
6. Solution of sodium in liquid ammonia gives a blue colour.
7. BeCO3 is stored in an atmosphere of CO2.
8. Lithium ion has least mobility in aqueous medium.

(b) How will you prepare sodium hydroxide commercially? Name the process. (5)

1. (a) Explain Friedel-Craft acetylation.

(b) How will you convert benzene into ethyl benzene?

(c) Which of the following compounds are aromatic and why?

- +

, ,

(d) Complete the following equations:

Br CH2 CH – CH2 CH3

Br

(e) Alkane (A) with MW = 72 u gives only one mono chloro product on reaction with Cl2 and sunlight. What is the structure and IUPAC name of (A)? (5)