

3/1/23

Half Yearly Examination
2016-2017
Class XI
Chemistry

Time - 3 hrs

M.M 70

General Instructions :

All the questions are compulsory .

Q1 to 5 are of one mark .

Q6 to 10 are of two marks .

Q11 to 22 are of three marks .

Q23 is of four marks.

Q24 to 26 are of five marks .

Q1 Define standard molar enthalpy of vaporization.

Q2 Critical temperature for carbon dioxide and methane are 31.1°C and -81.9°C respectively. Which of these has stronger intermolecular forces and why?

Q3 Mention any two conditions for the combination of atomic orbitals .

Q4 What are the signs of ΔH and ΔS when a reaction would always be spontaneous ?

Q5 Write empirical formula of the compounds having following molecular formula :

a N_2O_4

b $\text{C}_6\text{H}_{12}\text{O}_6$

Q6 What will be the minimum pressure required to compress 500 dm^3 of air at 1 bar to 200 dm^3 at 30°C ?

Q7 Which out of NH_3 and NF_3 has higher dipole moment and why ?

Q8 Explain why cations are smaller and anions are larger in radii than their parent atoms .

Q9 The density of 3M solution of NaCl is 1.25 g/ml . Calculate molality of the solution .

Q10 Calculate (a) wave number and (b) frequency of yellow radiation having wavelength 5800 \AA .

Q11 What is Aufbau principle? Write electronic configuration of the elements with atomic numbers 17 and 24.

Q12 Calculate the volume occupied by 8.8 g of CO_2 at 31.1°C and 1 bar pressure. ($R = 0.083\text{ bar L K}^{-1}\text{ mol}^{-1}$)

Q13 Naphthalene ball contains 93.71 % carbon and 6.29 % hydrogen . If its molar mass is 128 g/mol . Calculate its molecular formula.

Q14 a Why Oxygen has higher ionization enthalpy than nitrogen and fluorine ?

b State modern periodic law.

Q15 Write the IUPAC name and symbol for the element with atomic number 119.

Q15 A 100 W bulb emits monochromatic light of wavelength 400 nm .Calculate the number of photons emitted per second by the bulb .

Q16 a) What are d block elements ?

b) Write any two properties of f block elements .

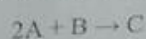
Q17 Explain the geometry of the following molecules using VSEPR theory .

a NH₃

b O₃

c ClF₃

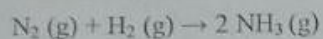
Q18 For a reaction at 298 K



$\Delta H = 400 \text{ KJ/mol}$ and $\Delta S = 0.2 \text{ KJ / Kmol}$. At what temperature will the reaction becomes spontaneous.

Considering ΔH and ΔS to be constant over the temperature range .

Q19 Dinitrogen and dihydrogen react with each other to produce ammonia according to the following chemical equation .



a Calculate the mass of ammonia produced if 2 Kg N₂ react with 1 Kg of H₂.

b Will any of the two reactants remain unreacted ?

c If yes ,which one and what would be its mass ?

Q20 What are the frequency and wavelength of a photon emitted during a transition from $n=5$ to the $n=2$ state in the hydrogen atom ?

Q21 The first and second ionization enthalpies (KJ/mol) of the three elements A,B,C are given below :

	A	B	C
$\Delta_i H_1$	403	549	1142
$\Delta_i H_2$	2640	1060	2080

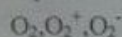
Identify the element which is likely to be :

a. A non metal

b an alkali metal

c alkaline earth metal

Q22 Compare the relative stability of the following species and indicate their magnetic properties.



Q23 Rohan went on a drycleaning shop while talking to the owner he came to know for drycleaning now a days in place of tetrachloroethene, liquefied carbon dioxide with suitable detergent is an alternative solvent .

a. What type of harm to the environment will be prevented by stopping the use of tetrachloroethene?

b. Will the use of the liquefied carbon dioxide with detergent be completely safe from the point of view of pollution ?

c. Name a reagent which is used in place of bleaching powder in order to prevent environment. (2+1+1)

Q24a What is meant by sigma and pi bonds? Give two points of difference .

b Explain the hybridization in ethane molecule .

(3 +2)

Q25 a Describe Rutherford scattering experiment .What conclusion can be drawn from this experiment .

b Write any two points of difference b/w orbit and orbital .

(3 +2)

Q26 a What are degenerate orbitals ? Give example.

b What is the shape of 1) s orbital 2) p orbital 3)d orbital (any two)

c If an electron is moving with a velocity of 600 m/s which is accurate upto 0.005 % then calculate the

uncertainty in its position ($h = 6.626 \times 10^{-34}$ Js and mass of electron = 9.11×10^{-31} kg) (1+2+2)