



INDIAN SCHOOL SOHAR
TERM I EXAMINATION (2018 – 19)
CHEMISTRY

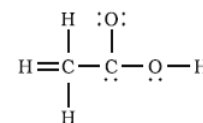
CLASS : XI
DATE : 25.09.2018

MAX.MARKS : 70
DURATION : 3 HRS

General Instructions:

- (i) All questions are compulsory.
- (ii) Question numbers 1 to 5 very short answer questions carrying 1 mark each.
- (iii) Question numbers 6 to 12 are short answer questions carrying 2 marks each.
- (iv) Question numbers 13 to 24 are also short answer questions carrying 3 marks each.
- (v) Question numbers 25 and 27 are long answer questions carrying 5 marks each.
- (vi) Use log tables, if necessary, Use of calculator is not allowed.
- (vii) Constants: Atomic Masses C = 12 gmol⁻¹; Cl = 35.5 gmol⁻¹; Na = 23 gmol⁻¹; O = 16 gmol⁻¹; H = 1 gmol⁻¹
 $N_A = 6.02 \times 10^{23} \text{ mol}^{-1}$

1. State the law of multiple proportions.
2. How does the intensity of the spectral line vary with wavelength?
3. Which properties of the elements depend on the electronic configuration of the atoms and which do not?
4. The skeletal structure of CH₃COOH as shown below is correct, but some of the bonds are shown incorrectly. Write the correct Lewis structure for acetic acid.
5. Name two intermolecular forces that exist between HF molecules in liquid state.
6. If the density of methanol is 0.793 kgL⁻¹, what is its volume needed for making 2.5L of its 0.25M solution?
7. Light of wavelength 4000 Å falls on the surface of caesium. Calculate the energy of the photoelectron emitted. The critical wavelength for photoelectric effect in caesium is 6600 Å.
8. What would be the IUPAC names and symbols for elements with atomic numbers 122, 127, 135, 149 and 150?



OR

- On the basis of quantum numbers, justify that sixth period of the periodic table should have 32 elements.
9. Match the correct atomic radius with the element.

Element	Atomic Radius (pm)
Be	74
C	88
O	111
B	77
N	66

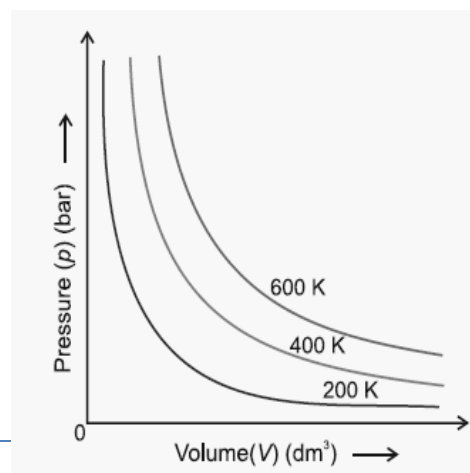
10. Arrange the elements with the following electronic configurations in order of increasing electron gain enthalpy.
- (i) $1s^2 2s^2 2p^5$ (iii) $1s^2 2s^2 2p^3$
 (ii) $1s^2 2s^2 2p^4$ (iv) $1s^2 2s^2 2p^6 3s^2 3p^4$
11. Group the given molecules as linear and non-linear molecules. H_2O , $HOCl$, $BeCl_2$, Cl_2O
12. Calculate the volume occupied by 8.8g of CO_2 at $31.1^\circ C$ and 1 bar pressure. ($R = 0.083 \text{ L bar K}^{-1} \text{ mol}^{-1}$)
13. Define empirical formula.
 Naphthalene (compound of C and H) contain 93.71% carbon. If its molar mass is 128 gmol^{-1} , calculate its molecular formula.
14. (i) 0.5 mole each of H_2S and SO_2 mixed together in a reaction flask, react according to equation
 $2H_2S + SO_2 \rightarrow 2H_2O + 3S$
 Calculate the number of moles of S formed.
 (ii) Calculate the volume of 0.015M HCl solution required to prepare 250 mL of a $8.25 \times 10^{-5} \text{ M}$ HCl solution.
15. State Heisenberg's uncertainty principle. Give its mathematical expression. Also give its significance.
16. What is Hund's rule of maximum multiplicity? Illustrate this by taking the example of carbon.
17. Predict the formulae of the compounds that will be formed by the following pairs of elements.
 (i) Magnesium and oxygen (iii) Element 114 with chlorine
 (ii) Aluminium and chlorine
18. What is the cause of periodicity in the properties of elements? How do the following properties vary in a (a) group, (b) period?
 (i) Atomic size (ii) Electronegativity (iii) Ionisation enthalpy
19. Which one in the following pairs has higher electron gain enthalpy?
 (i) O^- , S (ii) O, S^- (iii) O^- , S^- (iv) N^- , P
20. Give example each of molecules which have the following geometrics
 (i) Linear (ii) Trigangular planar (iii) Tetrehedral (iv) Trigonal bipyramidal
 (v) Octahedral

OR

Arrange the following sets of molecules in the decreasing order of bond angle.

- (i) SF_6 , CCl_4 , H_2O , NH_3 (ii) CH_4 , NH_3 , H_2O , BF_3 (iii) H_2S , $AlCl_3$, BeH_2 , H_2O

21. Distinguish between a σ and π bond.
22. Explain the following on the basis of valence bond theory.
 (i) BF_3 is planar but NH_3 is not.
 (ii) CCl_4 and $SiCl_4$ are tetrahedral
 (iii) The HSH bond angle in H_2S is closer to 90° than HOH bond angle in H_2O
23. The variation pressure with volume of the gas at different temperatures can be graphically represented as shown in figure. On the basis of this graph answer the following questions.
 (i) How will the volume of a gas change if its pressure is increased at constant temperature?



- (ii) At a constant pressure, how will the volume of a gas change if the temperature is increased from 200 K to 400K?
24. A 2.0 L container at 25°C contain 1.25 moles of O₂ and 3.2 moles of C.
- (i) What is the initial pressure in the flask?
- (ii) If the carbon and oxygen react as completely as possible to form CO, what will be the final pressure in the container?
25. (a) An element X forms four oxide having percentages of X equal to 77.4%, 63.2 %, 69.9%, and 72.0%. Verify law of multiple proportions.
- (b) A solution of glucose in water is labelled as 10%(w/w). The density of the solution is 1.20gmL⁻¹. Calculate (a) molarity (b) molality

OR

- (a) A sample of drinking water was found to be severely contaminated with chloroform CHCl₃ which is carcinogenic in nature. The level of contamination was 15 ppm (by mass).
- (i) Express this in per cent by mass
- (ii) Determine the molarity of chloroform in the water sample.
- (b) Calculate the molarity of a solution of ethanol in water in which the mole fraction of ethanol is 0.040.
26. (i) Calculate the wavelength of an electron moving at $3.0 \times 10^{10} \text{ cm s}^{-1}$.
(Mass of the electron = $9.1 \times 10^{-31} \text{ kg}$, $h = 6.626 \times 10^{-34} \text{ kg m}^2 \text{ s}^{-1}$)
- (ii) Calculate the ratio between the wavelength of an electron and a proton if the proton is moving with half the velocity of electron.
(Mass of proton = $1.67 \times 10^{-27} \text{ kg}$ and mass of electron = $9.11 \times 10^{-31} \text{ kg}$)

OR

Give the electronic configuration of the following ions.

- (i) Cu²⁺ (ii) Cr³⁺ (iii) Fe²⁺ (iv) Fe³⁺ (v) S²⁻
27. Use the molecular orbital energy level diagram to show that N₂ would be expected to have a triple bond; F₂ a single bond and Ne₂, no bond.

OR

How is molecular orbital different from atomic orbital? Give electronic configuration of (i) H₂⁺, (ii) Li₂, (iii) B₂, (iv) C₂. Calculate their bond order and predict their paramagnetic behaviour.
