



**INDIAN SCHOOL SOHAR**  
**UNIT TEST (2019 – 20)**  
**CHEMISTRY**

CLASS : XI  
 DATE : 12.05.2019

MAX. MARKS : 50  
 DURATION : 2.00 HRS

**General Instructions:**

- (a) All questions are compulsory.  
 (b) Section A: Question numbers 1 to 15 very short answer questions carrying 1 mark each.  
 (c) Section B: Question numbers 16 to 20 are short answer questions carrying 2 marks each.  
 (d) Section C: Question numbers 21 to 25 are also short answer questions carrying 3 marks each.  
 (e) Section D: Question numbers 26 and 27 are long answer questions carrying 5 marks each.  
 (f) There is no overall choice. However an internal choice has been provided in two questions of one mark, two questions of two marks, four questions of three marks and all the three questions of five marks weightage. You have to attempt only one of the choices in such questions.  
 (g) Use log tables, if necessary, Use of calculator is not allowed.  
 (h) Atomic mass of Na = 23; Cl = 35.5; C = 12; O = 16 u

**SECTION A**

**I. Choose the correct answer:**

- A measured temperature on Fahrenheit scale is 200<sup>o</sup>F. What will this reading be on the Celsius scale?  
 (a) 40<sup>o</sup>C      (b) 94<sup>o</sup>C      (c) 93.3<sup>o</sup>C      (d) 30<sup>o</sup>C
- What will be the molarity of a solution, which contains 5.85 g of NaCl (s) per 500 mL?  
 (a) 4 molL<sup>-1</sup>      (b) 20 molL<sup>-1</sup>      (c) 0.2 molL<sup>-1</sup>      (d) 2 molL<sup>-1</sup>
- What is the mass percent of carbon in carbon dioxide?  
 (a) 0.034%      (b) 27.27%      (c) 3.4%      (d) 28.7%
- Total number of orbital associated with third shell will be \_\_\_\_\_  
 (a) 2      (b) 4      (c) 9      (d) 3
- Number of angular nodes for 4d orbital is  
 (a) 4      (b) 3      (c) 2      (d) 1

**II. In the following questions a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.**

- Assertion and reason both are correct statements and reason is correct explanation for assertion.
  - Assertion and reason both are correct statements but reason is not correct explanation for assertion.
  - Assertion is correct statement but reason is wrong statement.
  - Assertion and reason both are incorrect statements.
  - Assertion is wrong statement but reason is correct statement.
6. **Assertion** : The empirical mass of ethene is half of its molecular mass.  
**Reason** : The empirical formula represents the simplest whole number ratio of

- various atoms present in a compound.
7. **Assertion** : One atomic mass unit is defined as one twelfth of the mass of one carbon-12 atom.  
**Reason** : Carbon-12 isotope is the most abundant isotope of carbon and has been chosen as standard.
8. **Assertion** : All the isotopes of a given element show the same type of chemical behaviour.  
**Reason** : The chemical properties of an atom are controlled by the number of electrons in the atom.
9. **Assertion** : It is impossible to determine the exact position and exact momentum of an electron simultaneously.  
**Reason** : The path of an electron in an atom is clearly defined.
10. **Assertion** : Combustion of 16g of methane gives 18g of water.  
**Reason** : In the combustion of methane, water is one of the products.
11. How many number of atoms are present in 52 u of He?
12. Which quantum number determines (i) energy of electron and (ii) orientation of orbital?  
 OR  
 Why is energy of electron negative?
13. Which orbital is non-directional?
14. State Hund's rule of maximum multiplicity.  
 OR  
 State Pauli's exclusion principle.
15. What is the shape of s-orbital and p-orbital?

### SECTION B

16. Calculate the concentration of nitric acid in moles per litre in a sample which has a density,  $1.41 \text{ g mL}^{-1}$  and the mass percent of nitric acid in it being 69%. (molar mass of nitric acid is  $63 \text{ g mol}^{-1}$ ).
17. 1M solution of  $\text{NaNO}_3$  has density of  $1.25 \text{ g cm}^{-3}$ . Calculate its molality. (Molecular weight of  $\text{NaNO}_3 = 85 \text{ g mol}^{-1}$ )  
 OR  
 Calculate the volume of  $\text{O}_2$  at STP liberated by heating 12.25 g of  $\text{KClO}_3$ . (At. Wt. of K = 39, Cl=35.5, O=16 u)
18. An electron has a speed of  $40 \text{ ms}^{-1}$  accurate upto 99.99%. What is the uncertainty in locating its position? (Given  $m_e = 9.11 \times 10^{-31} \text{ kg}$ ;  $h = 6.626 \times 10^{-34} \text{ kg m}^2 \text{ s}^{-1}$ )  
 OR  
 What is meant by Stark effect and Zeeman effect?
19. What is the maximum number of emission lines when the excited electron of a H atom in  $n=6$ , drops to the ground state?
20. Two particles A and B are in motion. The momentum of particle 'B' is half of 'A'. If the wavelength associated with the particle 'A' is  $5 \times 10^{-8} \text{ m}$ , calculate the wavelength associated with the particle 'B'.

**SECTION C**

21. A compound contains 4.07% hydrogen, 24.27% carbon and 71.65% chlorine. Its molar mass is 98.96 g. What is its empirical and molecular formula? (At. Mass of C = 12; H=1; Cl = 35.5 u)
22. 50.0 kg of N<sub>2</sub>(g) and 10.0 kg of H<sub>2</sub>(g) are mixed to produce NH<sub>3</sub>(g). Calculate the NH<sub>3</sub>(g) formed. Identify the limiting reagent in the production of NH<sub>3</sub> in this situation.

OR

In the reaction  $2A + 4B \rightarrow 3C + 4D$ , when 5 moles of A react with 6 moles of B, then

- (i) which is the limiting reagent?
- (ii) calculate the amount of C formed.
23. The mass of an electron is  $9.1 \times 10^{-31}$ kg. If its kinetic energy is  $3.0 \times 10^{-25}$  J, calculate its wavelength. ( $h = 6.626 \times 10^{-34}$  kgm<sup>2</sup>s<sup>-1</sup>)
24. The energy associated with the first orbit in the hydrogen atom is  $-2.17 \times 10^{-18}$  Jatom<sup>-1</sup>. What is the energy associated with the fifth orbit?  
Calculate the radius of Bohr's fifth orbit for hydrogen atom.

OR

Give three differences between orbit and orbital.

25. Show that the circumference of the Bohr orbit for the hydrogen atom is an integral multiple of the de-Broglie wavelength associated with the electron revolving around the orbit.

**SECTION D**

26. Explain the following:
- |   |                                  |
|---|----------------------------------|
| (i) Gay Lussac law                              | (iv) Law of definite composition |
| (ii) Empirical and molecular formula            | (v) Limiting agent               |
| (iii) Relation between mole and volume of gases |                                  |

OR

Define the following:

- |                     |               |
|---------------------|---------------|
| (i) Avogadro number | (iv) molality |
| (ii) Mole           | (v) ppm       |
| (iii) molarity      |               |
27. Give the essential postulates of Bohr's model of an atom. How did it explain
- (i) the stability of an atom
- (ii) origin of spectral lines in hydrogen atom?

OR

What are quantum numbers? What permitted values can these have? Give the significance of each quantum number.