



D.A.V. PUBLIC SCHOOL
SAMPLE PAPER FOR UNIT TEST
2025-2026
Std:-XI

Sub:- Chemistry

Date :-

Time:- 2 Hours

Max. Marks:- 50

General Instructions:**Read the following instructions carefully**

- a) There are **23** questions in this question paper with internal choice.
- b) Section A consists of 10 multiple choice questions carrying 1 mark each.
- c) Section B consists of 4 very short answer questions carrying 2 marks each.
- d) Section C consists of 6 short answer questions carrying 3 marks each.
- e) Section D consists of 1 case-based question carrying 4 marks.
- f) Section E consists of 2 long answer questions carrying 5 marks each.
- g) **All questions are compulsory.**
- h) **Use of log tables and calculators is not permitted.**

SECTION – A

	The following questions are multiple-choice questions with one correct answer. Each question carries one mark. There is no internal choice in this section.
1.	How many unpaired electrons are present in Ni^{2+} cation? (Atomic no. 28) a) 0 b) 2 c) 4 d) 6
2.	The maximum value of m for an electron in fourth energy level is a) +4 b) +2 c) +3 d) +5
3.	Which of the following pairs of gases contains the same number of molecules? a) 16g of O_2 and 14 g of N_2 b) 6 g of O_2 and 22 g of CO_2 c) 28 g of N_2 and 22 g of CO_2 d) 32 g of CO_2 and 32 g of N_2
4.	Calculate molality of solution containing 3 g glucose dissolved in 30 g water. a) 0.5 m b) 0.56 m c) 0.091 m d) 0.05 m
5.	The principal quantum number represents a) orientation of orbitals in space b) shape of the orbital c) distance of an electron from the nucleus d) number of electrons in an orbital
6.	Which among the following has maximum number of molecules? a) 8 g H_2 b) 64 g SO_2 c) 44 g CO_2 d) 48 g O_3
7.	The number of g-atom of oxygen in 6.02×10^{24} CO molecules is a) 1 b) 0.5 c) 5 d) 10
8.	The ground state electronic configuration of Fe^{3+} is a) $[\text{Ar}] 3d^4 4s^1$ b) $[\text{Ar}] 3d^3 4s^2$ c) $[\text{Ar}] 3d^5 4s^0$ d) $[\text{Ar}] 3d^6 4s^2$

9.	<p>Given below are two statements labelled as Assertion (A) and Reason (R). Assertion (A): The radius of second orbit of He^+ is equal to that of first orbit of hydrogen.</p> <p>Reason (R): The radius of an orbit in hydrogen like species is directly proportional to square of Z and inversely proportional to square of n.</p> <p>Select the most appropriate answer from the options given below:</p> <p>a) Both assertion and reason are correct statements, and reason is the correct explanation of the assertion. b) Both assertion and reason are correct statements, but reason is not the correct explanation of the assertion. c) Assertion is correct, but reason is wrong statement. Assertion is wrong, but reason is correct statement.</p>															
10.	<p>Given below are two statements labelled as Assertion (A) and Reason (R). Assertion (A): In third energy level there is no f-subshell.</p> <p>Reason (R): For $n = 3$, the possible values of l are 0, 1, 2 and for f-subshell, $l = 3$.</p> <p>Select the most appropriate answer from the options given below:</p> <p>a) Both assertion and reason are correct statements, and reason is the correct explanation of the assertion. b) Both assertion and reason are correct statements, but reason is not the correct explanation of the assertion. c) Assertion is correct, but reason is wrong statement. d) Assertion is wrong, but reason is correct statement.</p>															
	<p style="text-align: center;"><u>SECTION – B</u></p>															
	<p>This section contains 4 questions. The following questions are very short answer type and carry 2 marks each.</p>															
11.	Calculate uncertainty in the velocity of an electron of mass $9.1 \times 10^{-31} \text{ kg}$, if the uncertainty in position is of the order of 10^{-8} m .															
12.	Calculate the frequency and wavelength of the radiation emitted when an electron in the hydrogen atom jumps from third orbit to the ground state.															
13.	<p>The following data are obtained when N_2 and O_2 react together to form different compounds:</p> <table><tr><td></td><td>Mass of N_2</td><td>Mass of H_2</td></tr><tr><td>i)</td><td>14 g</td><td>16 g</td></tr><tr><td>ii)</td><td>14 g</td><td>32 g</td></tr><tr><td>iii)</td><td>28 g</td><td>32 g</td></tr><tr><td>iv)</td><td>28 g</td><td>80 g</td></tr></table> <p>Which chemical law of combination is obeyed by the experiment? Write its statement.</p>		Mass of N_2	Mass of H_2	i)	14 g	16 g	ii)	14 g	32 g	iii)	28 g	32 g	iv)	28 g	80 g
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i)	14 g	16 g														
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14.	A golf ball has a mass of 40g and a speed of 45 m/s. If the speed can be measured within accuracy of 2%, calculate the uncertainty in the position.															
	<p style="text-align: center;"><u>SECTION – C</u></p>															
	<p>This section contains 6 questions. The following questions are short answer type and carry 3 marks each.</p>															
15.	<p>a) What is the lowest value of n that allows g orbitals to exist? b) What is the maximum number of emission lines when the excited electron of a hydrogen atom in $n = 5$ drops to the ground state? c) Name the hydrogen spectrum series which appears in the visible region.</p>															

16.	<p>a) State Gay Lussac's law of constant volume.</p> <p>b) 0.6 mol of Cu_2S is roasted in excess of oxygen to yield Cu and SO_2, according to reaction</p> $\text{Cu}_2\text{S} + \text{O}_2 \rightarrow 2 \text{Cu} + \text{SO}_2$ <p>Calculate the mass of Cu formed. (Atomic mass of Cu = 63.5u)</p>
17.	<p>a) Calculate the number of photons emitted in 10 hours by a 60 W sodium lamp emitting radiations of wavelength 6000 \AA.</p> <p>b) Give the values of quantum numbers n and l for the electron in the last orbital of Ag. (Atomic number 47)</p>
18.	<p>A) Consider the reaction:</p> $2 \text{A} + 4 \text{B} \longrightarrow 3 \text{C} + 4 \text{D}$ <p>When 5 moles of A and 6 moles of B are mixed</p> <p>a) Which one is limiting reagent?</p> <p>b) Calculate the number of moles of 'C' formed.</p> <p>B) Out of 1 molar and 1 molal aqueous solution of a solute at a given temperature, which one is more concentrated and why?</p>
19.	A pure sample of compound is found to contain 2.04 g of sodium, 2.65×10^{22} atoms of carbon and 0.132 moles of oxygen atoms. Determine the empirical formula of the compound. (Na = 23, C = 12, O = 16)
20.	<p>a) What is the shape of 3s orbital? How many nodes are there in it?</p> <p>b) State Heisenberg's Uncertainty principle. What is its significance?</p>
	<p style="text-align: center;"><u>SECTION – D</u></p> <p>The following question is case-based question. The question carries 4 (1+1+2) marks. Read the passage carefully and answer the questions that follow.</p>
21.	<p>After the Bohr model of atom was put forward postulating the electrons are revolving around the nucleus, the next studies were focused on finding the energies of electrons in different orbits, the radii of different orbits and the velocities with which the electrons are revolving in different orbits. Bohr himself had given a formula to calculate energies of different orbits. As total energy is the sum of potential and kinetic energy and knowing that potential energy of an electron in the n^{th} shell is $-Ze^2 / r$, expression for kinetic energy can be found out.</p> <p>a) Why are Bohr's orbits called stationary states?</p> <p>b) What do you mean by nodal area?</p> <p>c) Calculate the energy and radius of second orbit of He^+ ion.</p>
	<p style="text-align: center;"><u>SECTION – E</u></p> <p>The following questions are long answer type and carry 5 marks each.</p>
22.	<p>a) Chlorine is prepared in the laboratory by treating manganese dioxide (MnO_2) with aqueous hydrochloric acid according to the reaction :</p> $4 \text{HCl (aq)} + \text{MnO}_2(\text{s}) \rightarrow 2\text{H}_2\text{O (l)} + \text{MnCl}_2(\text{aq}) + \text{Cl}_2 (\text{g})$ <p>How many grams of HCl react with 5.0 g of manganese dioxide?</p> <p>{ At.wt of Mn = 55 , H = 1 , Cl = 35.5 , O = 16 }</p> <p>b) How many grams of concentrated nitric acid solution should be used to prepare 250 mL of 2M HNO_3? The concentrated acid is 70% HNO_3.</p> <p>c) If 500 mL of 5M solution is diluted to 1500 mL, what will be the molarity of the solution obtained?</p>

23.	<p>a) Name the series and spectral region to which transition of electron in hydrogen atom from $n_1 = 3$ to $n_2 = 2$ takes place.</p> <p>b) The unpaired electrons in Al and Si are present in 3p orbital. Which electron will experience more effective charge from the nucleus? Give reason for your answer.</p> <p>c) A tennis ball of mass 6×10^{-2} Kg is moving with the speed of 62 m/s. Calculate the wavelength associated with it. Will the movement of this ball exhibit wave character? Explain.</p> <p style="text-align: center;">OR</p> <p>a) What does the principal quantum number of an atom represent?</p> <p>b) State Zeeman effect.</p> <p>c) Which of the following orbitals are not possible? 2d, 4f, 4g and 6d.</p> <p>d) Calculate the uncertainty in the position of an electron if the uncertainty in its velocity is $5.7 \times 10^5 \text{ ms}^{-1}$. ($h = 6.626 \times 10^{-34} \text{ kg m}^2 \text{ s}^{-1}$, Mass of electron = $9.1 \times 10^{-31} \text{ kg}$)</p>
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