B.K. BIRLA CENTRE FOR EDUCATION

SARALA BIRLA GROUP OF SCHOOLS
A CBSE DAY-CUM-BOYS' RESIDENTIAL SCHOOL

TERM-1 EXAMINATION 2025-26
CHEMISTRY(043)

Class: XI | Duration: 3 Hours
Date: 05/09/2025 | Max. Marks:70
Admission no: | Roll no:

General Instructions:

(i) All questions are compulsory.
(ii) The question paper has five sections and 33 questions.
(iii) Section–A has 16 questions of 1 mark each; Section–B has 5 questions of 2 marks each; Section– C has 7 questions of 3 marks each; Section– D has 2 case-based questions of 4 marks each; and Section–E has 3 questions of 5 marks each.
(iv) There is no overall choice. Answer all 33 questions. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.
(v) Wherever necessary, neat and properly labeled diagrams should be drawn.

SECTION-A

Q. No. 1 to 12 are multiple choice questions. Only one of the choices is correct. Select and write the correct choice as well as the answer to these questions.

Q.no	Question	Marks
1.	Which one of the following will have the largest number of atoms? (a) 1 g Au(s) (b) 1 g Na(s) (c) 1 g Li(s) (d) 1 g of Cl_2(g	1
2.	Which of the following is used for the treatment of cancer? (a) Cis-Platin (b) Taxol (c) A ZT (Azidothymidine) (d)Both (a) and (b)	1
3.	The number of significant figures in 0.001620 are (a) 4 (b) 3 (c) 6 (d) 2	1
4.	The total no. of orbitals associated with third shell will be (a) 2 (b) 4 (c) 9 (d) 3	1
5.	Which of the following options represents ground state electronic configuration of a copper atom? (a). $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^8 4s^2$ (b) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^9 4s^2$ (c)$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^{10} 4s^1$ (d) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^5 4s^1$	1
6.	The shape of an orbital is determined by (a) Principal quantum number (b) Azimuthal quantum number (c) Magnetic quantum number (d) Spin quantum number	1
7.	The total possible values for magnetic quantum number for the value of l=3 is (a) 3 (b) 1 (c) 5 (d) 7	1

8.	Which of the following has lowest electron affinity? (a) Kr (b) O (c) N (d) S	1
9.	The correct order of increasing values of second ionisation potential of C6, N7, O8 and F9 is: (a) C > N > F > O (b) C < F < N < O (c) C < F < N < O (d) C < N < F< O	1
10.	Eka Aluminium is _____ (a) Germanium (b) Gallium (c) Silicon (d) Copper	1
11.	The angle corresponds to sp^2 hybridisation is ? (a) 90^0 (b) 120^0 (c) 180^0 (d) 109^0	1
12.	The number of sigma and pi bonds in C_2H_2 are? (a) 2,3 (b) 3,1 (c) 3,2 (d) 4,0	1
	Question No. 13 to 16 consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below: A. Both A and R are true, and R is the correct explanation of A. B. Both A and R are true, and R is not the correct explanation of A. C. A is true but R is false. D. A is false but R is true.	
13.	Assertion (A): 2.000 has four significant figures. Reason (R): All zeros after decimal are significant.	1
14.	Assertion- No two electrons in an atom can have same values of all four Quantum numbers. Reason- An orbital cannot hold more than two electrons which should have opposite spin.	1
15.	Assertion: The dipole moment helps to predict whether a molecule is polar or non polar. Reason: The dipole moment helps to predict the geometry of molecules .	1
16.	Assertion : Atomic size increases along a period. Reason : Effective nuclear charge increases as the atomic number increases resulting in the increased attraction of electrons to the nucleus.	1
	SECTION-B	
17.	1 M solution of $NaNO_3$ has density 1.25 g cm–3. Calculate its molality. (Molecular weight of $NaNO_3$ = 85 g mol^{-1})	2
18.	An organometallic compound on analysis was found to contain, C = 60%, H = 12% and Fe = 28%. Determine its empirical formula. (At. mass of Fe = 56 .C=12 H=1)	2
19.	Write the properties of d block elements. (Four points only)	2
20.	Write the difference between sigma and pi bond. (two points each)	2
21.	Attempt either option A or B. A. An atom of an element has 19 electrons. Find out its atomic number, valency and no. of unpaired electrons. OR B. Write the electronic configurations of the following ions- Na^+, O^{2-}.	2
	SECTION-C	
22.	Calculate the amount of carbon dioxide that could be produced when- (i) 1 mole of carbon is burnt in air. (ii) 1 mole of carbon is burnt in 16 g of dioxygen.	3

	(iii) 2 moles of carbon are burnt in 16 g of dioxygen.	
23.	Explain the terms – (a)-Molarity (b) Molality (c) mole fraction	3
24.	State Heisenberg Uncertainity principle. Write its mathematical expression. Calculate the uncertainity in momentum of an electron, if uncertainity in position is 10^{-10}m.	3
25.	Draw the shapes of s, p, d-orbitals.	3
26.	Attempt A OR B A. Define the ionisation enthalpy. Discuss the factors affecting ionisation enthalpy of elements and their trends in the periodic table. OR B. How would you explain the fact that first ionisation enthalpy of sodium is lower than that of magnesium but its second ionisation enthalpy is higher than that of magnesium?	3
27.	Calculate formal charge (a) Formal charge on each oxygen atom in O_3. (b) What is s-s overlapping?	3
28.	How does molecular orbital theory account for the following (a) Bond order of N_2 is greater than N_2^+ But the bond order of O_2 is less than that of O_2^+ (b) Be_2 does not exist	3
	SECTION-D	
29.	According to quantum mechanical model of the atom, the electron distribution of an atom containing a number of electrons is divided into shells .The shells in turn are thought to consist of one almost subshells and subshells are assumed to be composed of one or more orbitals which the electrons occupy. While for hydrogen and hydrogen like systems all the orbitals within a given shell have same energy and that of energy of the orbitals in a multi electron atom are not same. (1+1+2) 1. Among the following pair of orbitals, which orbital will experience the largest effective nuclear charge : 2s or 3p? 2. Which of the following sets of quantum numbers are not possible (give reason) a. n = 0 ,l = 0, m =0, s =+ 1/2 . b. n=1, l =0,m =0, s =-1/ 2 . 3. State Pauli Exclusion Principle. OR Using s, p d f notation, describe the orbital with the following quantum number. a. n=2,l=1 b. n=4,l=0	4
30.	Modern periodic table arranges the elements in the increasing order of atomic number. It has 18 groups and 7 periods. Atomic numbers are consecutive in a period and increases in group in a pattern. Elements are divided into four blocks, s-block,p-block, d-block and f-block based on their electronic configuration. 78% of elements are metals, about 20 elements are non-metals and few elements like B, Si, Ge, As are metalloids. Metallic character increases down the group but decreases along the period from left to right. The physical and chemical properties vary periodically with their atomic numbers. Periodic trends are observed in atomic size, ionisation enthalpies, electron gain enthalpies, electronegativity and valence. Oxides of metals are basic, some are amphoteric. Non-metals form acidic oxides, some form neutral oxides. s-block elements are soft, highly reactive, do not show variable oxidation states. p-block elements are metals, non-metals as well as metalloids, show variable oxidation states, exist as solids, liquids and gases. d-block elements are metals, form coloured ions, show variable oxidation states, have high melting and boiling points. Lanthanoids and actinoids are f block elements, form coloured ions. All actinoids are radioactive.	4

	(a) Name the two elements which belong to p-block . 2 (b) What is difference between oxidation states of p-block and d-block elements? 2 OR (b) Which group elements are most electropositive and why? 2	
	SECTION-E	
31.	Write the electronic configuration of Cr, Zn and Mn. Account for Stability of half filled and completely filled subshells. **OR** What is the significance of Principal, Azimuthal ,Magnetic quantum numbers and spin quantum number of an atom?	5
32.	(i) What would be the IUPAC name and the symbol of element Z=111? (ii)Arrange the following : (a) K Li Na (Increasing order of metallic character) (b) Cl Br,F (Increasing order of non-metallic character) (iii) In terms of period and group, where will you locate the element with Z=16? (iv) What are pnicogen family members? OR (a) Use the periodic table to answer the following questions. (i) Identify an element with two shells with 4 electrons in the outer subshell. (ii) Identify an element that would tends to lose two electrons. (iii) Identify an element that would tends to gain two electrons. (b) Assign the position of the element having outer electronic configuration: (i) ns^2np^5 for n=2 (ii) $(n-1)d^1ns^2$ for n=4	5
33.	Define the term Hybridisation. Explain the three types of hybridisation with suitable examples. **OR** Complete any five (i) Give one example of tetra atomic polar molecule. (ii) Give one example of tetra atomic non polar molecule. (iii) molecule having six bond pairs . (iv) shape of sp3d hybrid orbitals. (v) shape of $sp3d^2$ hybrid orbitals. (vi) Draw Lewis dot structure of O_2^-	5

**********ALL THE BEST**********