Answer Sheet No._____

Sign. of Candidate _____

Sign. of Invigilator _____

CHEMISTRY SSC–I
SECTION – A (Marks 12)
Time allowed: 20 Minutes

Section – A is compulsory. All parts of this section are to be answered on this page and handed over to the Centre Superintendent. Deleting/overwriting is not allowed. **Do not use lead pencil.**

Q.1   Fill the relevant bubble for each part. Each part carries one mark.

(1)   Which one of the following charged ions will be formed by an element of group IIA having electronic configuration $1s^2\ 2s^2\ 2p^6\ 3s^2$?
A. A^{+3} B. A^{+2}
C. A^{+1} D. A^{-2}

(2)   Which one of the following pairs of subshell has the lowest energy as compared to other pairs of subshells?
A.   1s,2s   B.   2s,2p
C.   3s, 3p   D.   3s, 4s

(3)   Which one of the following Isotopes is used in nuclear reactors?
A.   U-234   B.   U-238
C.   U-235   D.   U-233

(4)   How many molecules of oxygen gas contains one mole of oxygen gas?
A. $8 \times 6.022 \times 10^{23}$ B. 6.022×10^{23}
C. $32 \times 6.022 \times 10^{23}$ D. $16 \times 6.022 \times 10^{23}$

(5)   The variable that is kept constant in Charles' Law is:
A.   Temperature   B.   Volume
C.   Pressure   D.   Volume & Temperature

(6)   The most dilute solution amongst the following is:
A.   1M   B.   0.5 M
C.   0.02M   D.   0.0005M

(7) Pressure Cooker works on the principle of relationship of boiling point with:
A. External Pressure
B. Evaporation
C. Boyle's law
D. Volume

(8) 17g of NH_3 is dissolved in 1 dm^3 of solution, its molarity will be:
A. 1
B. 2
C. 3
D. 4

(9) In H_2S, the oxidation state of Sulphur is:
A. +1
B. +2
C. -1
D. -2

(10) The compound having Hydrogen bonding among its molecule is:
A. C_6H_6
B. MgO
C. CH_4
D. H_2O

(11) Metallic Character increases down the group, which one of the following is the most metallic:
A. Rb
B. Cs
C. Na
D. K

(12) The most electronegative element in the group VIIA is:
A. F
B. Cl
C. Br
D. I

_____

Time allowed: 2.40 hours   Total Marks: 53

Note: Answer all parts from Section 'B' and all questions from Section 'C' on the **E-sheet**.
        Write your answers on the allotted/given spaces.

SECTION – B (Marks 33)

Q.2   Attempt all parts from the following. All parts carry equal marks. $(11 \times 3 = 33)$
   i.   Calculate the number of molecules in 4.5 moles of Carbon dioxide.   (1+2)
                                      OR
         Calculate number of moles in 4g of Hydrogen gas?   (1+2)

   ii.   Draw Bohr's Atomic Model for Potassium $_{19}K^{39}$ indicating the location of
         electrons, protons and neutrons.   (1+1+1)
                                      OR
         State the difference between a shell and subshell present in an atom?   (1.5+1.5)

   iii. State Charles's Law. Derive its mathematical expression.   (1+2)
                                      OR
         What is the nature of a covalent bond formed between two similar atoms and two
         unlike atoms. State with examples?   (1.5+1.5)

   iv.   Define ionic bond. Discuss the formation of NaCl on the basis of octet rule.   (1+2)
                                      OR
         Choose the atom you expect to have greater shielding effect justify your choice?
              i.)   C or Si   ii.) Be or Mg   (1.5+1.5)

   v.   Write two similarities and one differences between isotopes.   (2+1)
                                      OR
         Melting point of NaCl is 801°C and that of ice is 0 °C. Give reason?   (1.5+1.5)

   vi.   Elements are unstable in free state except noble gases. Explain how elements attain
         stability?   (1+2)
                                      OR
         An atom is electrically neutral? Give reason.   (1+2)

   vii. Write electronic configuration of Aluminum $_{13}Al^{27}$. Identify its group and period.
                                                                                   (1+1+1)
                                      OR
         How does the change in temperature affect the Vapour Pressure of a liquid? Show
         with the help of graph.   (2+1)

   viii. How will you prepare 250 cm^3 of 0.025M Na$_2$SO$_4$ solution from a stock solution of
         2M Na$_2$SO$_4$?   (1+2)
                                      OR
         Determine the oxidation number of Nitrogen in the given compounds
              i.)   HNO$_3$ ii.) NH$_3$ iii.) NO$_2$ (1+1+1)

   ix.   Identify the oxidizing and reducing agents in the following reaction.   (1.5+1.5)
              a.   H$_2$S + Cl$_2$ $\longrightarrow$ 2HCl + S
              b.   Mg + 2HCl $\longrightarrow$ MgCl$_2$ + H$_2$

Define corrosion. How is corrosion prevented by cathodic protection? (1+2)

x. What are noble metals? Enlist the names of any two. (1+2)

OR

Why boiling point of water at the top of Mount Everest is 70°C. Give reason?

(1+2)

xi. Discuss why sugar is soluble in water but petrol is not? (1.5+1.5)

OR

Why Alkali and Alkaline earth metals called 's' block elements? (1.5+1.5)

SECTION – C (Marks 20)

Note: Attempt all questions. Marks of each question are given within brackets.

Q.3 What are the type of bonds responsible for the formation of F_2, O_2 and N_2? Explain the formation of bond with the help of structures. (2+2+2)

OR

Describe Rutherford's Experiment with diagram and its conclusions. (3+3)

Q.4 State importance of intermolecular forces in our daily life. (2+2+2)

OR

Describe the trend of Ionization Energy in the Period and group. Explain with reasons. (3+3)

Q.5 Explain the working and construction of Daniel Cell with the help of a labelled diagram. (2+2)

OR

Identify the relationship between electronic configuration and the position of an element in the periodic table. $_{35}Br^{70}$ and $_{8}O^{16}$ (2+2)

Q.6 By using following reactions. Discuss the reactivity of halogens. (2+2)
i) $2KI + Br_2 \longrightarrow 2KBr + I_2$
ii) $KBr + Cl_2 \longrightarrow 2KCl + Br_2$

OR
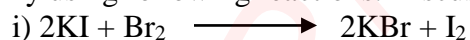
Differentiate between Amorphous and crystalline solids by giving appropriate examples? (2+2)

* * * * *

SUPLEMENTARY TABLE													
Atomic No	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Symbol	H	He	Li	Be	B	C	N	O	F	Ne	Na	Mg	Al	Si
Mass no	1	4	7	9	11	12	14	16	19	20	23	24	27	28
Atomic No	15	2	16	17	18	19	20	31	32	33	34	35	36	37
Symbol	P	He	S	Cl	Ar	K	Ca	Ga	Ge	As	Se	Br	Kr	Rb
Mass no	31	4	32	35	40	39	40	70	73	74	79	80	84	85
Atomic No	38	49	50	51	52	53	54	55	56	81	82	83	84	85
Symbol	Sr	In	Sn	Sb	Te	I	Xe	Cs	Ba	Tl	Pb	Bi	Po	At
Mass no	88	115	119	122	128	127	131	133	137	204	207	208	209	210

SLOs

SECTION – A

1) Identify the relationship between electron configuration and the position of an elementon the periodic table
2) Describe the presence of sub shells in a shell.
3) Compare isotopes of an atom.
4) Describe how Avogadro's number is related to a mole of any substance.
5) Account for temperature-volume changes in a gas using Charles's Law.
6) Describe how to prepare a solution of given Molarity.
7) Explain the effect of temperature and external pressure on vapor pressure and boiling point.
8) Solve problems involving the Molarity of a solution.
9) Determine the oxidation number of an atom of any element in a compound.
10) Intermolecular Forces
11) Explain why alkali metals are not found in the Free State in nature.
12) Compile some important reactions of halogens.

SECTION – B

Q2:

i.   Describe how Avogadro's number is related to a mole of any substance.

OR

Change molecular mass formula mass atomic mass.

ii. Explain how Bohr's atomic theory differed from its.

OR

Describe the presence of subshells in shell.

iii. Account for temperature-volume changes in a gas using Charles's Law.

OR

Describe the formation of covalent bonds between two nonmetallic elements

iv. Describe the characteristics of an ionic bond.

OR

Explain how shielding effect influence periodic trends.

v.   Compare isotopes of an atom.

OR

Describe physical properties of solids.

vi. State the importance of noble gas electronic configurations in the formation of ion.

OR

Describe the presence of sub shells in a shell.

1

vii. Write the electronic configurations of the first 18 elements in the Periodic Table.

OR

Summarize the properties of liquids like evaporation, vapor pressure, boiling point.

viii. Describe how to prepare dilute solutions from concentrated solutions of known Molarity.

OR

Determine the oxidation number of an atom of any element in a compound.

ix. Identify the oxidizing and reducing agents in a redox reaction.

OR

Corrosion and its prevention.

x. Aqua regia

OR

Explain the effect of temperature and external pressure on vapor pressure and boiling point.

xi. Use the rule that "like dissolves like" to predict the solubility of one substance in another.

OR

Determine the demarcation of the periodic table into s and p block.

SECTION – C

Q.3 Describe with examples single, double and triple covalent bonds.

OR

Describe the contributions that Rutherford made to the development of the atomic theory

Q.4 Intermolecular Forces.

OR

Recognize the similarity in the chemical and physical properties of elements in thesame family of elements.

Q.5 Sketch a Danniell cell, labeling the cathode, the anode, and the direction of flow of theelectrons.

OR

Write the electronic configurations of the first 18 elements in the Periodic Table.

Q.6 Compile some important reactions of halogens.

OR

Differentiate between amorphous and crystalline solids.

2

Subject: Chemistry		Paper: Model set-1		Class\Level SSC-I SET 1		Year 2023-24		Code		
Topics/Subtopics	**Fundamentals of chemistry**	**Structure of atoms**	**Periodic table**	Structure of Molecules	Physical states of matter	Solutions	Electrochemistry	Chemical Reactivity	Total marks for each Assessment Objective	%age
Assessment Objective	**Analysis of Questions of syllabus(contents) and assessment objectives**									
(Knowledge based)		1iii(01) 2v(03) 3OR(06)		1x(01) 2iv(03) 3(06)	2iii(03)		1ix(01)	1xii(01)	25	21.18%
(Understanding based)	1iv(01)	2ii(03) OR 2ii (3) 2viOR(03) 2vii(03)	1ii(01) 4OR(04) 2 xi OR (03)	2vi(03) 2iii OR (03)	1v(01) 1vii(01) 2 v OR (03)	1vi(01) 1viii(01) 2xi(03) 2viiOR(03	2ix(03) 2xOR(03)	2x(03) 2ixOR(03) 6(04)	44 +12=56	47.45%
(Application based)	2i(03) 2iOR(03)	5OR(06)	1i(01) 2 iv OR (03)	4(06)	6 OR (04)	2viii(03)	5(04)	1xi(01) 2 viii OR (03)	27+10=37	31.35%
Total marks for each Topic/Subtopic	07	28	12	22	12	11	11	15	118	99.98