01). First ionization of some elements are given below.

<table>
<thead>
<tr>
<th>element</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atomic number</td>
<td>Z - 2</td>
<td>Z - 1</td>
<td>Z</td>
<td>Z + 1</td>
<td>Z + 2</td>
<td>Z + 3</td>
<td>Z + 4</td>
</tr>
<tr>
<td>I, KJ mol^-1</td>
<td>1680</td>
<td>2080</td>
<td>494</td>
<td>736</td>
<td>577</td>
<td>786</td>
<td>1060</td>
</tr>
</tbody>
</table>

i). Identify the groups of A,B,C,D,E,F,G.

ii). A, B, and (Z-3) are gases under room temperature. Identify A,B,C,D,E,F, exactly in the periodic table.

iii). Draw the variation of covalent radii of the above element in the given graph,
iv). C,D,E,F,G, Arrange the increasing order of electro negativity of above elements.

v). Plot the consecutive ionization energies with ionization number of element A.

vi). Write the electronic configuration of ‘C’

vii). What is the chemical formula between ‘C’ and ‘A’ Explain its’ bonding type.

02) Two consecutive series of H – spectrum is given below.

| A1 | A2 | A3 | B1 | B2 | B3 | B4 |

i). Draw the electron transitions of the above series in the given energy levels, using arrows and correct symbols.

n = 5

n = 4

n = 3

n = 2
n = 1

ii). Name the given two series of the above spectrum?

iii). What are the transitions for the above two series in the electro – magnetic spectrum,

iv). Mention the direction to where the frequency is increased,

v). What is the relationship among E – energy, frequency and h – plank constant of a photon?

vi). Wave length of a yellow light obtained from a sodium lamp is 589 nm. Calculate the frequency and energy of a photon.

Plank constant = 6.624 x 10^-34 Js
Velocity of the ray = 2.998 x 10^8 ms^-1
03) i). What are the possible resonance structures for N₂O molecule.

ii). Select the most stable and unstable structures of the above.

iii). Write the hybridizations of certain elements in the given circles.
04) i). Fill in the table.

<table>
<thead>
<tr>
<th>Molecule</th>
<th>Electron pairs of valence shell in the mid – atom</th>
<th>No. of bonds around the mid atom</th>
<th>No. of lone pairs around the mid - atom</th>
<th>Shape/ geometry.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF₄</td>
<td></td>
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<tr>
<td>PCl₆</td>
<td></td>
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<tr>
<td>ICl₃</td>
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<tr>
<td>I₃</td>
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<tr>
<td>XeF₄</td>
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<tr>
<td>HOCl</td>
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<tr>
<td>NH₄</td>
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</tbody>
</table>

ii). Draw the electron pair arrangement around the mid – atoms of SF₄, I₃, PCl₆, show a bond by a line and a lone pair by structure.

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05) Calculate the followings.

i). What is number of total atoms in 0.2 mol of C₆H₁₂O₆ molecule?
……………………………………………………………………………………………………………………
……………………………………………………………………………………………………………………
ii). What is the number of moles which consist of $3.011 \times 10^{24}$ amount of Na – atoms?

iii) What is the number of moles in 0.49 g of $\text{H}_2\text{SO}_4$?

$(\text{H} = 1, \text{S} = 32, \text{O} = 16)$

iv). What is the mass of 4.5 mol of $\text{N}_2\text{O}_3$? $(\text{N} = 14)$

v). What is the mass of a $\text{Cl}_2$ molecule? $(\text{Cl} = 35.5)$

vi) What is the mass of a K – atom? $(\text{K} = 39)$

vii). Calculate the concentration of the solution when 2g of Na OH is dissolved in 250 cm$^3$ of water?
viii) What is the required mass of CaCl$_2$·2H$_2$O to prepare 500 cm$^3$ of 0.5 mol dm$^{-3}$ CaCl$_2$ solution (Ca = 40)?

ix) What is the volume of 1.5 mol dm$^{-3}$ CuSO$_4$ solution that consist of 0.03 mol of CuSO$_4$?

x) 200 cm$^3$ of 3 mol dm$^{-3}$ KNO$_3$ solution and 400 cm$^3$ of 2 mol dm$^{-3}$ KNO$_3$ solution were mixed together. What is the concentration of new solution?