Paper 01 For 2025 Advanced Level Chemistry

Part 01

- Answer all the questions.
- In each of the questions 1 to 10, pick one of the alternatives from I-V which is **correct** or **most appropriate** and mark your response.

01. British chemist who invented the cathode ray tube,

I. John Dalton

IV. Robert Millikan

II. Sir William Crookes

V. Henri Becquerel

III. J. J. Thomson

02. The equation used to calculate the energy of a photon,

I.
$$E = \frac{c}{\lambda}$$

IV.
$$E = \frac{\lambda}{hc}$$

II.
$$E = \frac{hc}{\lambda}$$

IV.
$$E = \frac{\lambda}{hc}$$

V. $E = \frac{h}{p}$

III.
$$E = \frac{h}{mv}$$

- 03. What is the correct order of line series in the line spectrum of hydrogen as it increases in wavelength?
 - I. Balmer series, Lyman series, Paschen series, Brackett series, Pfund series
 - II. Lyman series, Balmer series, Paschen series, Brackett series, Pfund series
 - III. Pfund series, Brackett series, Paschen series, Balmer series, Lyman series
 - IV. Lyman series, Balmer series, Brackett series, Paschen series, Pfund series
 - V. Lyman series, Balmer series, Paschen series, Pfund series, Brackett series
- 04. How is the **dative covalent bond** formed in a molecule or an ion?
 - I. Complete removal of electrons from an atom to form cations and acceptance of electrons by another atom to form anions.
 - II. Sharing a pair of electrons between two atoms in which each atom contributes one electron.
 - III. Large numbers of metallic cations are stabilized by a cloud of many electrons.
 - IV. Sharing of an electron pair between two atoms in which both electrons are given by one atom.
 - V. Sharing a pair of electrons between two atoms.

I.	28 III. 32
II.	30 IV. 33
06 How 1	many repulsion units are there on the central atom of 'S' in SO ₃ ?
I.	6 IV. 2
II.	4 V. 0
III.	3
	n of the following equations can be used to calculate the formal charge on a
	in a molecule or polyatomic ion?
I.	Number of bonds - Number of valence electrons in the atom + Number of
	electrons in lone pairs
II.	Number of valence electrons in the atom - Number of bonds + Number of electrons in lone pairs
III.	Number of valence electrons in the atom - Number of electrons in lone pairs Number of bonds
IV.	Number of valence electrons in the atom - Number of electrons in lone pairs
	Number of bonds
V.	None of the above equation.
false?	n of the following statements regarding the oxidation number of an atom/ion. The sum of the oxidation numbers of all the atoms in an ion is equal to zero.
II.	The oxidation number is used to determine the number of electrons transferred between atoms/ions in compounds and molecules.
III.	The sum of the oxidation numbers of all the atoms in a compound is equal to zero.
IV.	The oxidation number describes the charge that an atom would have if a bonds are considered to be ionic with no covalent component.
V.	The oxidation number of an atom in a covalent compound is found by assigning the electrons shared by atoms to the particular atom.
09. What	is the oxidation number of the central atom (C) in tetrachloromethane (CCl ₄)?
I.	-4 IV. +1
II.	-1 V. +4
III.	0
10 The o	chemical formulas of sodium hydrogen carbonate, potassium permanganat
	hosphorushexoxide, and sulfurous acid according to IUPAC rules are
	MnO4,NaHCO3, P4O6, H2SO3 IV. NaHCO3,KMnO4,H2SO3,P4O6
	(aHCO ₃ ,KMnO ₄ ,P ₄ O ₆ , H ₂ SO ₃ V. H ₂ SO ₃ ,KMnO ₄ ,P ₄ O ₆ ,NaHCO ₃
	[aHCO ₃ ,P ₄ O ₆ ,KMnO ₄ ,H ₂ SO ₃
	\$44.4 \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \

Part 02 **Structured Essay**

Answer all questions on this paper itself.

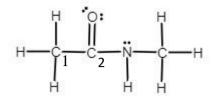
i.

A.	You are provided with the following list of second row element element more than once.						nts. Yo	u may use on		
		Li	Ве	В	С	N	O	F	Ne	
i.	Identify (he eler	nent tha	ıt has tl	ne small	est ator	nic radi	us.		
ii.	Identify t	he eler	nent tha	ıt exhib	its amp	hoteric	propert	ies.		
iii.	Identify t	he eler	nent tha	ıt has tl	ne highe	est melti	ing poin	ıt.		
iv.	Identify t	Identify the element that has the highest 3 rd ionization energy.								
v.	Identify t	ntify the elements that have a half-filled subshell.								
	Identify t	he eler	nents th	at have	e positiv	e electr	on gain	energy.		

Draw the **most acceptable** Lewis dot-dash structure for HCO₃-ion.

Draw the **three** resonance structures for the above ion. Indicate the relative stability of ii. the structures you have drawn by writing stable or unstable under these structures.

iii. Complete the given table based on the Lewis dot-dash structure given below.



	C ₁	C ₂	N
VSEPR pairs around the atom			
Electron pair geometry around the atom			
Shape around the atom			
Hybridization of the atom			
Oxidation number of the atom			

iv. Identify the atomic/hybrid orbitals involved in the formation of σ bonds between the two atoms given below.

C_1 -H	C_1	Н
C_1 - C_2	C_1	C_2
C_2 -O	C_2	0
C_2 - N	C_2	N
N-H	N	Н

Identify the atomic orbitals involved in the formation of Π bonds between the two v. atoms given below.

C_2 - O	C_2	\circ
C2-O	<u>C</u> 2	O

C. State whether the following statements are **true** or **false**.

i.	The boiling point of HCHO is higher than that of HCOOH.	
ii.	Shape of the SOCl ₂ is trigonal pyramid.	
iii.	The covalent character of KBr is lower than that of KCl.	
iv.	Mg^{2+} has 6 electrons that have quantum number $l=0$.	