Set A

SUMMATIVE ASSESSMENT III 2025-26
(MODEL QUESTION PAPER)

CHEMISTRY

Std : X

Time : 1½ Hours Maximum Score : 40

Instructions

- First fifteen minutes are cool off time. Read the questions carefully and plan the answers during this time.
- Write the answers according to the instructions.
- Consider the score while writing the answers.
- Answer only one question for questions having choice A and B.

Answer all the questions from 1 to 4. Each question carries 1 score. (4 × 1 =4)

1. **Assertion (A):** A gas having a volume of 44 L at 1 atm pressure will compress to 11 L at 4 atm pressure.
Reason (R) : According to Boyle's Law, $P_1V_1=P_2V_2$.

Which among the following is correct? (1)

(A) Both A and R are true, and R is the correct explanation of A.
(B) Both A and R are true, but R is not the correct explanation of A.
(C) A is true, but R is false.
(D) A is false, but R is true.

2 Some statements are given below regarding the element with atomic number 24.
Statement 1. The subshell electron configuration of this element is

$1s^2 2s^2 2p^6 3s^2 3p^6 3d^4 4s^2$.

Statement 2. The last electron enters the d subshell.
Statement 3. The *l* value of the subshell where the last electron enters is 1.
Statement 4. The subshell containing the outermost electron has 5 orbitals.

Which of the following is correct regarding these statements? (1)

A. Statements 1, 2, and 3 are correct, but 4 is not correct.
B. Statements 1, 2, 3, and 4 are correct.
C. Statement 1 is not correct, but 2, 3, and 4 are correct.
D. Statements 1 and 3 are not correct, but 2 and 4 are correct.

3. Which of the following is an acidic salt? (1)

A. NaCl B. Na_2CO_3
C. NH_4Cl D. K_2SO_4

4. Match the following.

A Characteristics of ore	B Method of concentration
X) Ore particles are heavier than the impurities	p) Froth floatation
Y) Ore particles are lighter than the impurities	q) Magnetic separation
Z) Magnetic nature of ore	r) Levigation
	s) Leaching

Choose the correct answer from the options given below. (1)

	X	Y	Z
A)	p	q	s
B)	p	r	q
C)	s	p	r
D)	r	p	q

Two questions from 5 to 11 have choice. Each question carries 2 scores. (7×2 =14)

5. A reversible reaction in equilibrium is given.

$2NO_{(g)} + O_{2(g)} \rightleftharpoons 2NO_{2(g)}$ + heat

Write any two changes that should be made in concentration and pressure to increase the amount of nitrogen dioxide in this chemical reaction. (2)

6. (A) A propyne molecule is allowed to react with two hydrogen molecules

(a) Write the chemical equation for this reaction. (1)

(b) Write the IUPAC name of the product. (1)

OR

(B) Ethane reacts with chlorine in the presence of sunlight.

a) What is the name of this chemical reaction? (1)

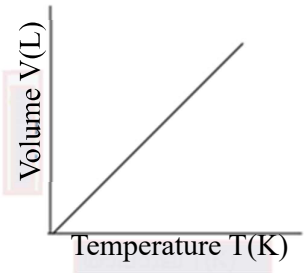
b) Write the IUPAC name of the product obtained. (1)

7. A zinc rod is kept in $CuSO_4$ solution for some time.

a) What change is observed on the surface of the Zn rod? (1)

b) What is the reason for the fading of the blue colour of the $CuSO_4$ solution? (1)

8. (A) The relationship between the volume and temperature of a fixed mass of gas at constant pressure is illustrated in the graph below.



a) Which gas law is this graph related to? (1)

b) If the volume of this gas is 150 L at 300 K, what will be the volume of this gas at 600 K? (1)

OR

(B) 10 L of oxygen at constant temperature and pressure contains X molecules. Answer the questions related to other gas samples at the same temperature and pressure.

a) How many molecules are there in 5 L of hydrogen under the same conditions? (1)

b) What will be the volume of 3X molecules of CO_2? (1)

9. Ionisation enthalpy of s block elements are lower than that of p block elements.

a) What is ionisation enthalpy? (1)

b) Which element in the second period has the highest ionisation enthalpy? (1)

10. Incomplete equations related to the concentration of zinc ores are given.

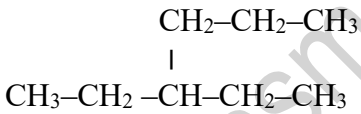
i. $ZnCO_3$ + heat $\longrightarrow$ $\overset{X}{\text{------}}$ + CO_2

ii. ZnS + O_2 + heat $\longrightarrow$ $\overset{Y}{\text{------}}$ + SO_2

(a) Identify X and Y. (1)

(b) How does calcination differ from roasting? (1)

11. Analyze the structure of the given compound.



(a) How many carbon atoms are in the main chain? (1)

(b) What is the name of the branching alkyl group? (1)

Two questions from 12 to 17 have choice. Each question carries 3 scores. (6× 3 =18)

12. Observe the items given in the box.

Zn, Mg, Cu, $CuSO_4$ solution, $MgSO_4$ solution, $ZnSO_4$ solution, Salt bridge

(a) How many galvanic cells can be constructed using these? (1)

(b) Which galvanic cell has the highest value of voltage? (1)

(c) Write the chemical equation for the reaction occurring at the anode of the cell with the highest value of voltage? (1)

13. Sodium hydroxide is manufactured industrially by the Chlor-alkali process.

a) Identify the substance, the aqueous solution of which is electrolysed? (1)

b) Which substance undergoes reduction at the cathode of the membrane cell? (1)

c) What are the products obtained in addition to sodium hydroxide? (1)

14.(A) The gases CO_2 and SO_2 are kept at STP. Their volume is 112L.

a) What is the volume of one mole of gas at STP? (1)

b) What is the mass of 112 L of CO_2? (Molecular mass: $CO_2 = 44$) (1)

c) How many molecules are present in SO_2? (1)

OR

(B) A chemical reaction taking place at STP is given below.

$$CH_4 + 2O_2 \longrightarrow CO_2 + 2H_2O$$

a) How many moles of methane are required to react with 10 moles of oxygen? (1)

b) Calculate the mass and volume of CO_2 obtained if 64 g of methane is completely burnt. (2)

(Molecular mass: $CH_4 = 16$, $O_2 = 32$, $CO_2 = 44$, $H_2O = 18$)

15. Ethanol is produced by fermenting diluted molasses with yeast. The enzyme invertase in yeast converts the sugar solution into glucose and fructose. Then, another enzyme called zymase converts the glucose and fructose into ethanol.

a) Write the chemical equations for these reactions. (2)

b) What is power alcohol? (1)

16.(A)Aluminium is manufactured by the electrolysis of alumina with the addition of cryolite.

a) Why is cryolite added to alumina? (1)

b) Which ions are present in alumina? (1)

c) Write the chemical equation for the reduction reaction that takes place at the negative electrode. (1)

OR

(B) Iron is extracted from haematite using a blast furnace.

a) Which compound acts as reducing agent in the blast furnace? (1)

b) Complete the following chemical equations. (1)

$$CaCO_3 + \text{Heat} \longrightarrow \underline{A} + CO_2$$
$$\underline{A} + SiO_2 \longrightarrow \underline{B}$$

c) What is the function of '**A** ' in this reaction? (1)

17. The atoms of elements A and B each have 3 shells. (Symbols are not real.)
Element A belongs to group 13 and element B belongs to group 16.

a) Write the subshell electronic configuration of A. (1)

b) Which block do these two elements belong to? (1)

c) What is the oxidation state of A in its chloride compound? (1)

(Oxidation state of Cl = −1)

Question 18 has choice. It carries 4 score. **(1 × 4 =4)**

18. One molecule of an organic compound contains 4 carbon atoms, 10 hydrogen atoms, and one oxygen atom. The functional group of this compound is hydroxyl group.

a) Write the structural formula of this compound. (1)

b) Write the structural formula of another organic compound with the same molecular formula but a different functional group. (1)

c) Write the structural formulae of a pair of position isomers with this molecular formula. (1)

d) Write the structural formula of an isomer with the same molecular formula but with different alkyl groups on both sides of the functional group. (1)

OR

The IUPAC name of a compound is Pent-1-yne

a) What is the name of the homologous series to which it belongs? (1)

b) Write the structural formula of this compound. (1)

c) Write the structural formulae of a pair of position isomers with this molecular formula. (1)

d) Write the structural formulae of chain isomers of an alkane containing 5 carbon atoms with one branch and with two branches. (1)

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Answer key

Qn. No	Sub. Qn	Scoring indicators	Score	Total score
1		A	1	1
2		D	1	1
3		C	1	1
4		D	1	1
5		Increase the concentration of reactants / Remove NO_2 from the system / Increase the pressure	1+1	2
6	**(A)**			
	a)	$CH \equiv C - CH_3 + 2H_2 \longrightarrow CH_3 - CH_2 - CH_3$	1	
	b)	Propane	1	2
		OR		
	(B)			
	a)	Substitution reaction		
	b)	Chloroethane	1	
			1	
7	a)	Cu deposited on the surface of Zn rod.	1	
	b)	Decrease in the concentration of Cu^{2+} ions	1	2
8	**(A)**		1	
	a)	Charles's law	1	
	b)	300 L		2
		OR		
	(B)			
	a)	X/2	1	
	b)	30 L	1	
9	a)	The minimum amount of energy required to remove the most loosely bound electron from the outermost shell of an isolated gaseous atom of the element.	1	2
	b)	F	1	
10	a)	X & Y - ZnO	1	
	b)	Definitions of calcination and roasting	1	2
11	a)	6	1	2
	b)	Ethyl	1	
12	a)	3	1	
	b)	Mg - Cu cell	1	3
	c)	$Mg \longrightarrow Mg^{2+} + 2e^-$	1	
13	a)	NaCl	1	
	b)	H_2O	1	3
	c)	H_2, O_2	1	

14	(A)			
	a)	22.4 L	1	
	b)	Number of moles = 112 L / 22.4 L = 5	1	
		Mass of 112 L CO_2 = 5 × 44 =220 g	1	
	c)	$5 \times 6.022 \times 10^{23}$		3
		OR		
	(B)		1	
	a)	5 mol	1+1	
	b)	Mass = 176 g , Volume = 89.6 L		
15	a)	$C_{12}H_{22}O_{11} + H_2O \longrightarrow C_6H_{12}O_6 + C_6H_{12}O_6$		
		$C_6H_{12}O_6 \longrightarrow 2C_2H_5OH + 2CO_2$	1+1	
	b)	Mixture of 20% absolute alcohol and 80% of petrol.	1	3
16	**(A)**			
	a)	To reduce the melting point of alumina and to increase the electrical conductivity.	1	
	b)	Al^{3+} , O^{2-}	1	
	c)	$Al^{3+} + 3e^- \longrightarrow Al$		3
			1	
	(B)	**OR**		
	a)	CO	1	
	b)	A = CaO , B = $CaSiO_3$	1	
	c)	Flux	1	
17	a)	$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^1$	1	
	b)	p block	1	3
	c)	+3	1	
18	**(A)**			
	a)	$CH_3 - CH_2 - \underset{\displaystyle OH}{\underset{\vert}{CH}} - CH_3$ / $CH_3–CH_2–CH_2–CH_2–OH$	1	
	b)	$CH_3 – O – CH_2 – CH_2 – CH_3$ / $CH_3 – CH_2 – O – CH_2 – CH_3$	1	
	c)	$CH_3 – CH_2 – \underset{\displaystyle OH}{\underset{\vert}{CH}} – CH_3$, $CH_3–CH_2–CH_2–CH_2–OH$	1	
	d)	$CH_3 – O – CH_2 – CH_2 – CH_3$ / $CH_3 – CH_2 – O – CH_2 – CH_3$	1	4
		OR		
	(B)			
	a)	Alkyne	1	
	b)	$CH{\equiv}C – CH_2 – CH_2 – CH_3$	1	
	c)	$CH{\equiv}C – CH_2 – CH_2 – CH_3$, $CH_3 – C{\equiv}C – CH_2 – CH_3$	1	
	d)	$CH_3 – \underset{\displaystyle CH_3}{\underset{\vert}{CH}} – CH_2 – CH_3$, $CH_3 – \underset{\displaystyle CH_3}{\underset{\vert}{C}} – CH_3$	1	