

SUMMATIVE ASSESSMENT III 2025-26  
(MODEL QUESTION PAPER)  
**CHEMISTRY**

Time : 1½ Hours

Std : X  
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 x 1 =4)**

1. Find the relation and fill up suitably (1)

-CHO : alkanal

> C=O : .....

- A. alkanol  
B. alkanoic acid  
C. alkanone  
D. ether

2. Three statements are given. (1)

Statement 1: The groups 3 to 12 are included in d block.

Statement 2 : p block elements are placed at the bottom of the periodic table.

Statement 3 : Ionisation enthalpy increases on moving down the group.

Which of the following is correct regarding the given statements?

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

3. Match the following. (1)

A	B
a) $6.022 \times 10^{23}$ NH <sub>3</sub>	i) 2 g
b) 22.4 L H <sub>2</sub> at STP	ii) 44 g
c) 1 mol CO <sub>2</sub>	iii) 17 g
	iv) 1 g

Choose the correct answer from the options given below.

	(a)	(b)	(c)
A.	(ii)	(i)	(iii)
B.	(i)	(iv)	(iii)
C	(iii)	(i)	(ii)
D	(ii)	(iii)	(iv)

4. **Assertion (A)** : Concentrated sulphuric acid reacts with metals and gets reduced.

**Reason (R)** : Concentrated sulphuric acid is a good oxidising agent.

Which of the following is correct? (1)

- A. Both A and R are correct but R is not the correct explanation of A.
- B. A is correct, but R is not correct.
- C. Both A and R are correct and R is the correct explanation of A
- D. Both A and R are not correct

**Two questions from 5 to 12 have choice. Each question carries 2 scores. (8x 2 =16)**

5. The atomic number of an element is 22.

- a) Write the subshell electron configuration of the given element. (1)
- b) Which group does it belong to? (1)

6. The volume of a fixed mass of a gas at 1 atm pressure is 10 L.

- a) What will be its volume if the pressure is increased to 5 atm? (1)
- b) State the gas law applicable here. (1)

7. (A) In a galvanic cell, zinc rod is dipped in zinc sulphate solution and silver rod is dipped in silver nitrate solution.

- a) Identify the electrode at which oxidation takes place. (1)
- b) What is the energy change taking place in a galvanic cell? (1)

**OR**

- (B) a) What is the energy change taking place in an electrolytic cell? (1)
- b) In which electrode, oxidation takes place in an electrolytic cell? (1)

8. A homologous series is given.



- a) Find A and B (1)
- b) What is the general formula of the given homologous series ? (1)

9. (A) a) What is meant by polymerisation? (1)

- b) Write the name of the monomer of polythene. (1)

**OR**

(B) a) What are the two types of polymerisation? (1)

- b) What is the polymer of vinyl chloride? (1)

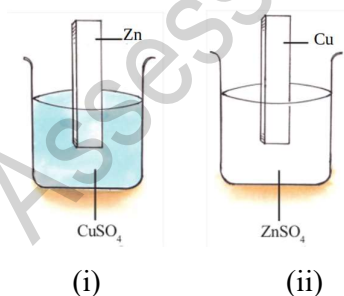
10. Which method of concentration is used in each of the following situations?
- The density of the ore is more than that of the gangue. (1)
  - The density of the ore is less than that of the gangue. (1)
11. X is a basic salt. Analyse the data regarding the acid and base from which X is formed.
- The acid is formed when carbon dioxide is dissolved in water under pressure.
  - The base is formed by Chlor - alkali process.
- Identify the salt X and write its chemical formula. (1)
  - Write the chemical equation of the hydrolysis of the salt X. (1)
12. Starting from carbon monoxide, how are the following compounds prepared industrially? (2)
- Methanol
  - Ethanoic acid

**Two questions from 13 to 16 have choice. Each question carries 3 scores. (4x 3 =12)**

13. (A) There are 6 carbon atoms in a saturated hydrocarbon. There is a methyl group at the second carbon atom.
- Write the structural formula of the given hydrocarbon. (1)
  - Write the structural formula of any possible chain isomer of it and its IUPAC name. (2)

**OR**

- (B) There are 5 carbon atoms in a hydrocarbon. There is a double bond between the first and second carbon atoms.
- Write the structural formula of its position isomer (1)
  - Write the structural formula of another unsaturated hydrocarbon having molecular formula  $C_5H_8$  and its position isomer. (2)
14. Analyse the given figure and answer the following questions.



- Identify the beaker in which chemical change takes place? (1)
  - Give reason. (1)
  - Write the chemical equation of the reaction taking place here. (1)
15. (A) A sample of carbon dioxide contains  $3 \times 6.022 \times 10^{23}$  molecules.
- Find the number of moles of ammonia which contains as many molecules as that of the sample of carbon dioxide? Calculate the mass of ammonia. (2)

- b) Find the volume of ammonia at STP which contains the same number of moles as that of the sample of carbon dioxide. (1)

**OR**

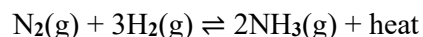
(B) A sample of ammonia has a volume of 2240 L at STP.

- a) Find the number of moles of ammonia in the given sample. (1)  
b) Find the number of molecules of carbon dioxide equal to that of the sample of ammonia. (1)  
c) Find the number of moles of carbon dioxide present in 396 g of carbon dioxide. (1)

16. a) What are alloys? (1)  
b) Write the components of the alloy, Stainless steel. (1)  
c) Which is the alloy steel used in the core of electromagnetic instruments? (1)

**One question from 17 to 18 has choice. Each carries 4 scores. (2 x 4 =8)**

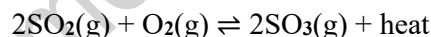
17. (A) Consider the Haber process for the manufacture of ammonia



- a) What will be the effect on the chemical equilibrium if: (2)  
i) Temperature is increased  
ii) Pressure is decreased  
b) Substantiate your answers. (2)

**OR**

(B) Consider the reversible reaction.



- a) How does the decrease in pressure affect the rate of forward reaction? (1)  
b) How does the increase in temperature affect the decomposition of  $\text{SO}_3$ ? (1)  
c) Substantiate your answers. (2)

18. A few subshells are given.

(i) 3d (ii) 4s (iii) 4f (iv) 5d

- a) Find the n and l values of each subshell (2)  
b) Find n+l values and arrange the given subshells in the increasing order of their energies. (2)

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**CHEMISTRY**  
**Answer key**

Qn. No	Sub.Qn	Scoring indicators	Score	Total score
1		C	1	1
2		B	1	1
3		C	1	1
4		C	1	1
5	a	$1s^2 2s^2 2p^6 3s^2 3p^6 3d^2 4s^2$	1	2
	b	Group 4	1	
6	a)	2 L	1	2
	b)	Boyle's law - statement	1	
7	(A) a)	Zn electrode	1	2
	b)	Chemical energy into electrical energy	1	
	(B)			
	a	Electrical energy into chemical energy	1	
	b	Positive electrode / Anode	1	
8	a)	A- $C_4H_{10}$ B- $C_6H_{14}$	1	2
	b)	$C_nH_{2n+2}$ (n= Number of carbon atoms)	1	
9	(A)		1	2
	a)	Definition of polymerisation		
	b)	Ethylene/Ethene/ $CH_2=CH_2$	1	
		OR		
	(B)			
	a)	Addition polymerisation, Condensation polymerisation	1	
	b)	Poly Vinyl Chloride /PVC	1	
10	a)	Levigation / Hydraulic washing	1	2
	b)	Froth floatation	1	
11	a)	X is Sodium carbonate, $Na_2CO_3$	1	2
	b)	$Na_2CO_3 + 2H_2O \rightarrow 2 NaOH + H_2CO_3$	1	

12	a)	Methanol is industrially produced by treating carbon monoxide with hydrogen in the presence of catalyst.	1	
		or		
		$\text{CO} + 2\text{H}_2 \xrightarrow[573\text{ K}]{\text{catalyst}} \text{CH}_3 - \text{OH}$		2
	b)	Ethanoic acid can be prepared industrially by treating methanol with carbon monoxide in the presence of catalyst.	1	
		or		
		$\text{CH}_3\text{OH} + \text{CO} \xrightarrow{\text{catalyst}} \text{CH}_3\text{COOH}$		
13	(A)		1	
	a)	$\begin{array}{c} \text{CH}_3 - \text{CH} - \text{CH}_2 - \text{CH}_2 - \text{CH}_3 \\   \\ \text{CH}_3 \end{array}$		
	b)	$\begin{array}{c} \text{CH}_3 \\   \\ \text{CH}_3 - \text{CH} - \text{CH} - \text{CH}_3 \\   \\ \text{CH}_3 \end{array} \quad \text{2, 3- Dimethylbutane /}$	1+1	
		$\begin{array}{c} \text{CH}_3 \\   \\ \text{CH}_3 - \text{C} - \text{CH}_2 - \text{CH}_3 \\   \\ \text{CH}_3 \end{array} \quad \text{2, 2- Dimethylbutane}$		3
		<b>OR</b>		
	B			
	a)	$\text{CH}_3 - \text{CH} = \text{CH} - \text{CH}_2 - \text{CH}_3$	1	
	b)	$\text{CH} \equiv \text{C} - \text{CH}_2 - \text{CH}_2 - \text{CH}_3$	1	
		$\text{CH}_3 - \text{C} \equiv \text{C} - \text{CH}_2 - \text{CH}_3$	1	
14	a)	In first beaker	1	
	b)	Zinc displaces copper from its salt solution. The more reactive metal displaces the less reactive metal from its salt solution.	1	3
	c)	$\text{Zn} + \text{CuSO}_4 \longrightarrow \text{ZnSO}_4 + \text{Cu}$	1	
15	A) a)	Number of moles in $3 \times 6.022 \times 10^{23}$ molecules = 3 mols	1	
	b)	Mass of 3 mols of $\text{NH}_3 = 3 \times 17 = 51 \text{ g}$	1	
		$3 \times 22.4 \text{ L} = 67.2 \text{ L}$	1	
		<b>OR</b>		3
	B			
	a)	Number of moles = $2240/22.4 = 100 \text{ mols}$	1	
	b)	Number of molecules = $100 \times 6.022 \times 10^{23}$	1	
	c)	No. of mols = $396 \text{ g} / 44 \text{ g} = 9$	1	

16	(A) a) Alloys are mixtures of two or more metals. Nonmetals like carbon, nitrogen and phosphorous are used for the production of alloys. b) Fe, Cr, Ni, C c) Silicon steel	1 1 1	3
17	(A) a) i. Rate of backward reaction increases. ii. Rate of backward reaction increases.  b) In a system at equilibrium, increase in temperature will increase the rate of endothermic reaction.  When the pressure of the system at equilibrium is decreased, the system will try to attain equilibrium by increasing the rate of reaction in the direction where the number of moles of molecules increases. So the rate of backward reaction increases.  <b>OR</b>  (B) a) Rate of forward reaction decreases. b) Rate of decomposition of $\text{SO}_3$ will increase. c) When the pressure of the system at equilibrium is decreased, the system will try to attain equilibrium by increasing the rate of reaction in the direction where the number of moles of molecules increases. So the rate of forward reaction decrease.  In a system at equilibrium, increase in temperature will increase the rate of endothermic reaction. Rate of backward reaction increases. So the decomposition of $\text{SO}_3$ increase.	1 1 2     1 1 2	4
18	a) $3d \quad n=3 \quad l=2$ $4s \quad n=4 \quad l=0$ $4f \quad n=4 \quad l=3$ $5d \quad n=5 \quad l=2$  b) $3d \quad n+l = 3+2=5$ $4s \quad n+l = 4+0=4$ $4f \quad n+l = 4+3=7$ $5d \quad n+l = 5+2=7$  $4s < 3d < 4f < 5d$	2     1   1	4