

0715/ 1/ 2025

Chemistry A/ L

SOUTH WEST REGIONAL MOCK EXAMINATION GENERAL EDUCATION

The Teachers' Resource Unit (TRU) in collaboration with the South West Chemistry Teachers' Association (SOWECTA)	Subject Code 0715	Paper Number 1
CANDIDATE NAME	Subject title Chemistry	
CANDIDATE NUMBER		
CENTRE NUMBER		
Advanced Level	DATE SATURDAY 22/03/2025 MORNING	

Time Allowed: 1hr. 30mins

INSTRUCTIONS TO CANDIDATES:

1. USE A SOFT HB PENCIL THROUGHOUT THIS EXAMINATION.

2. DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO.

Before the Examination begins:

3. Check that this question booklet is headed "Chemistry 0715 Paper 1".

4. Insert the information required in the spaces provided above.

5. Without opening the booklet, pull out the answer sheet carefully from inside the front cover of this booklet. Take care that you do not crease or fold the answer sheet or make any marks on it other than those asked for in these instructions.

6. Insert the information required in the spaces provided on the answer sheet using your HB pencil:

Candidate Name, Centre Number, Candidate Number, Subject Code Number and Paper Number

How to answer questions in this examination:

7. Answer ALL the 50 questions in this examination. All questions carry equal marks.

8. Non-programmable calculators are allowed.

9. For each question there are four suggested answers, A, B, C, and D. Decide which answer is correct. Find the number of the question on the Answer sheet and draw a horizontal line across the letter to join the square brackets for the answer you have chosen. For example, if C is your correct answer, mark C as shown below:

(A) (B) (C) (D)

10. Mark only one answer for each question. If you mark more than one answer, you will score zero for that question. If you change your mind about an answer, erase the first mark carefully, and then mark your new answer.

11. Avoid spending much time on any question. If you find a question difficult, move to the next question. You can come back to this question later.

12. Do all rough work in this booklet using, where necessary, the blank spaces in the question booklet.

13. Mobile phones are **NOT ALLOWED** in the examination room.

14. You must not take this booklet and answer sheet out of the examination room. All question booklets and answer sheets will be collected at the end of the examination.

Question 1 – 37 (thirty-seven questions)

Directions: Each of the questions or incomplete statements in this section is followed by four suggested answers. Select the best answer in each case.

1. Which one of the following is affected when an atom forms an ion

A	The atomic number.
B	The mass number.
C	The number of neutrons.
D	The number of electrons.

2. Identify which of the acid-base property of group IV oxides is correct

A	CO and SiO are acidic
B	GeO ₂ and SnO ₂ are neutral
C	PbO and SnO are amphoteric
D	CO ₂ and SiO ₂ are basic

3. Why do transition metals form complexes?

A	They are coloured
B	The energy difference between 3d and 4s orbitals is very close
C	They have variable oxidation states
D	They have available d-orbitals to accommodate electrons

4. The empirical formula of vitamin C is CH₂O. If its molar mass is 180, what is its molecular formula?

A	C ₆ H ₁₂ O ₂
B	C ₂ H ₆ O ₂
C	CH ₂ O
D	C ₆ H ₁₂ O ₆

5. Which one of the following is a property of Ionic compounds?

A	They are made up of atoms
B	Good conductors of electricity
C	Their solutions conduct electricity
D	They dissolve in CCl ₄

6. The first four successive ionization energies of an element W in KJmol⁻¹ are: 900, 1758, 14905, 21060. From the values it can be predicted that

A	The element has three electrons in its outermost shell
B	The third electron is found in the innermost shell closer to the nucleus
C	The element has one electron in its outermost shell
D	The first and second electrons are not in the same shell

7. Determine the pressure of a gas inside a box, which contains 0.05 mol of the gas in a volume of 8 dm³ at 30°C. R = 0.0821atmdm³mol⁻¹ K⁻¹

A	0.16 atmosphere
B	0,02 atmosphere
C	0.61 atmosphere
D	0,06 atmosphere

8. Identify the products formed when potassium nitrate (KNO₃) is heated strongly

A	KNO ₃ and O ₂
B	K ₂ O, NO ₂ and O ₂
C	KNO ₂ , NO ₂ and O ₂
D	KNO ₂ and O ₂

9. A Chemist needs 200 litres of 0.5 M HCl. What volume of 12 M must be dissolved in water to form this solution?

A	0.83 litres
B	3.8 litres
C	4,800 litres
D	8.3 litres

10. The definition "It is a solution that contains one mole of solute dissolved in one litre of solution" refers to

A	Saturated solution
B	Standard solution
C	Molar solution
D	Dilute solution

11. For the reaction: A + 2B → C, the following data were obtained:

Exp't	[A] mol/dm ³	[B] mol/dm ³	Relative rate
1	0.10	0.10	0.001
2	0.10	0.20	0.004
3	0.20	0.10	0.001

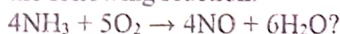
The reaction is:

A	First order with respect to B
B	Second order with respect to B
C	First order with respect to A
D	Overall, third order.

12. Identify the compound that produces nitrogen gas as one of the by-products when it reacts with NaNO₂/HCl(aq) at 5°C?

A	CH ₃ CONH ₂
B	C ₆ H ₅ NH ₂
C	(CH ₃) ₂ NH
D	C ₆ H ₅ CH ₂ NH ₂

13. What is the equilibrium constant expression for the following reaction:



A	$\frac{[\text{NO}][\text{H}_2\text{O}]}{[\text{NH}_3][\text{O}_2]}$
B	$\frac{[\text{C}]^c[\text{D}]^d}{[\text{A}]^a[\text{B}]^b}$
C	$\frac{[\text{NO}_4][\text{H}_2]^6/[\text{NH}_3]^4}{[\text{O}_2]^5}$
D	$\frac{[\text{NO}]^4[\text{H}_2\text{O}]^6}{[\text{NH}_3]^4[\text{O}_2]^5}$

14. The pH of a 0.0001 molar $\text{Ca}(\text{OH})_2$ Solution is?

A	9.3
B	10
C	10.3
D	3.7

15. If the half-life of a substance is 6.7 years, how long will it take for 600 g of the sample to reduce to 75 g?

A	20.1 years
B	2.01 years
C	3.35 years
D	13.4 years

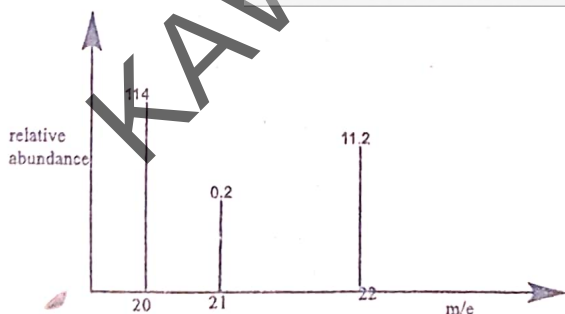
16. An element has the electronic structure: $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$. State the group and the period to which the element belongs in the periodic table

A	Group II Period 4
B	Group IV Period 2
C	Group II Period 2
D	Group VII Period 3

17. Identify a property of group I and II elements which increases down both groups

A	First ionization energy
B	Density
C	Melting point
D	Atomic radius

18. The graph that follows shows a spectrometer trace of a sample of neon (Ne)



On calculation its relative atomic mass is?

A	18.20
B	20.18
C	57.5
D	25.31

19. A sample of a solution turns Prussian blue when treated with freshly prepared FeSO_4 followed by FeCl_3 and concentrated H_2SO_4 . This indicates that the element present in the sample is?

A	Copper
B	Sulphur
C	Nitrogen
D	Chlorine

20. An organic compound with molecular formula $\text{C}_3\text{H}_6\text{O}$ produces an orange precipitate with 2,4 DNPH and gives a silver mirror with Tollen's reagent. Deduce the name of the compound

A	Propanal
B	Propenol
C	Propanone
D	Methoxyethane

21. Identify a pair of isoelectronic anions across the periodic table.

A	$\text{Ca}^{2-}/\text{N}^{3-}$
B	$\text{P}^{3-}/\text{F}^{-}$
C	$\text{S}^{2-}/\text{Cl}^{-}$
D	$\text{Mg}^{2-}/\text{Na}^{+}$

22. Select the correct oxidation state of nitrogen in the compound

A	-3 in Mg_3N_2
B	-1 in NH_3
C	+3 in NaNO_2
D	-5 in NaNO_3

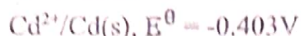
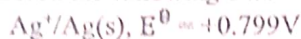
23. Which of following physical properties correspond to the halogen indicated?

A	Fluorine – gas – reddish brown
B	Chlorine-liquid-greenish yellow
C	Bromine – liquid – reddish brown
D	Iodine – solid – pale yellow

24. At 20°C the vapor pressure of heptane (C_7H_{16}) and octane (C_8H_{18}) are 473 KPa and 140 KPa respectively. An ideal solution contains 50.0 g of heptane and 32 g of octane. What will be the partial pressure of heptane?

A	0.64 KPa
B	303.2 KPa
C	50.4 KPa
D	6.40 KPa

25. Given the following data



Determine the emf of the cell when the two half-cells are coupled

A	-1.202 V
B	+1.202 V
C	+0.396 V
D	-0.396 V

26. Select an organic molecule that can exhibit geometrical isomerism

A	$\text{CH}_2 = \text{CH}_2$
B	$\text{HOOCCH} = \text{CHCOOH}$
C	$\text{CH}_3\text{CH}(\text{CH}_3)\text{CH}_3$
D	$\text{CH}_2\text{CH} = \text{CH}_2\text{OH}$

27. Choose a molecule which is NOT correctly matched with its shape

A	NH_3 , Trigonal pyramidal
B	PCl_5 , Trigonal bipyramidal
C	BF_3 , Trigonal planar
D	SF_6 , Hexagonal

28. Select the strongest acid from the list below

A	CH_3COOH
B	ClCH_2COOH
C	Cl_2CHCOOH
D	Cl_3CCOOH

29. CO_2 and SiO_2 are oxides of group IV elements. The correct explanation for the existence of CO_2 as a gas and SiO_2 a solid at room temperature.

A	CO_2 exist as a simple covalently bonded molecule while SiO_2 exist as a giant molecular structure
B	Carbon is a non-metal whereas Silicon is a metal
C	CO_2 is an acidic gas whereas SiO_2 is not
D	Both Carbon and silicon can undergo catenation

30. Which of the following experimental evidences applies to a mixture which deviates positively from Raoult's law?

A	There is a slight increase in the total volume of the mixture
B	The reaction is exothermic
C	There is a slight decrease in the total volume of the mixture.
D	The boiling point of the mixture is higher than expected.

31. An optically active compound X is synthesized when propanoic acid reacts with chlorine gas under UV light and then passed over concentrated NH_3 . The probable formula of X is

A	$\text{CH}_3\text{CH}_2\text{COOH}$
B	$\text{CH}_3\text{CH}(\text{NH}_2)\text{COOH}$
C	$\text{CH}_3\text{CH}_2\text{COCl}$
D	$\text{CH}_3\text{CH}(\text{Cl})\text{CONH}_2$

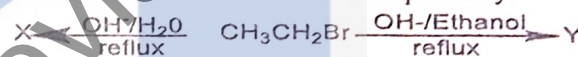
32. "The ability of polydentate ligands to form ring structures with the central ion" is the definition of:

A	Coordination number
B	Chelation
C	Anionic complex
D	Linkage isomerism

33. Choose a halide that can be prepared by action of concentrated H_2SO_4 on its metal halide?

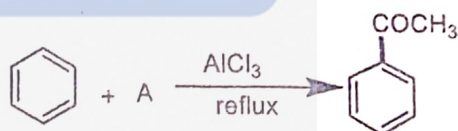
A	HI
B	HBr
C	HCl
D	NaF

34. Study the reaction of haloalkanes with hydroxide ion at different conditions and then identify the molecules indicated as X and Y respectively.



A	$\text{CH}_2 = \text{CH}_2$ and $\text{CH}_3\text{CH}_2\text{OH}$
B	CH_3COOH and $\text{CH}_3\text{CH}_2\text{OH}$
C	$\text{CH}_3\text{CH}_2\text{OH}$ and $\text{CH}_2 = \text{CH}_2$
D	$\text{CH}_3\text{CH}_2\text{COOH}$ and $\text{CH}_3\text{CH}_2\text{OH}$

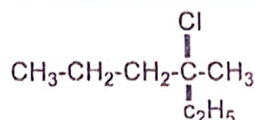
35. Benzene reacts with an acid chloride in the presence of AlCl_3 to produce an aromatic ketone as shown below



The acid chloride (A) could be:

A	CH_3COOH
B	CH_3COCl
C	CH_3Cl
D	$\text{CH}_3\text{CH}_2\text{Cl}$

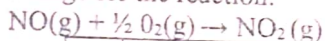
36. The correct IUPAC name of the molecule;



is:

A	3-chloro-3-ethylpentane
B	2-chloro-2-ethylpentane
C	4-chloro-2-ethylpentane
D	3-Chloro-3-methyl hexane

37. The enthalpy of formation of nitrogen oxide (NO) and nitrogen dioxide (NO₂) are +90.2 kJ/mol and +33.2 kJ/mol respectively. What is the enthalpy change for the reaction:



A	+ 57 kJmol ⁻¹
B	- 57 kJmol ⁻¹
C	+ 75 kJmol ⁻¹
D	- 75 kJmol ⁻¹

Questions 38 – 46 (nine questions)

Directions: For each of the questions below, ONE or MORE of the responses is (are) correct. Decide which of the responses is (are) correct. Then choose:

- A if 1, 2 and 3 are all correct
 B if 1 and 2 only are correct
 C if 2 and 3 only are correct
 D if 3 only is correct

Directions summarized			
A	B	C	D
1, 2, 3 all correct	1, 2 only correct	2, 3 only correct	3 only correct

38. Identify the compound(s) below which when warmed with an alkaline solution of iodine (I₂/NaOH) gives a yellow precipitate of iodoform (CHI₃) with an antiseptic smell.

- Propan-2-ol
- Ethanol
- Propan-1-ol

A.
 B.
 C.
 D.

39. Carbon is different from other group IV elements in that:

- It exhibits allotropy
- It can catenate extensively
- Carbon forms gaseous oxides

A.
 B.
 C.
 D.

40. Carbonyl compounds (Aldehydes and Ketones):

- Are oxidized to carboxylic acid by H⁺/KMnO₄
- React with 2,4- DNPH to form yellow precipitates
- Undergo addition reaction with Hydrogen cyanide

A.
 B.
 C.
 D.

41. Correct statements about the Chemistry of halogens include:

- The bond energy of the Cl-Cl bond is greater than the bond energy of the F-F bond
- The oxidizing strength of oxoacids decrease as the oxidation state of the halogen decreases
- Hydrogen halides are prepared by action of concentrated sulphuric acid on the metal halide

A.
 B.
 C.
 D.

42. In the Contact Process for the manufacture of sulphuric acid:

- The yield of SO₃ is increased in practice by reducing the temperature since the reaction is exothermic
- SO₃ is converted to sulphuric acid by dissolving it in conc H₂SO₄ and diluted with calculated amount of water
- Finely divided vanadium pentoxide catalyst at about 450°C and 1 atmosphere is used to form SO₃

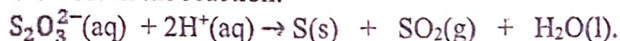
A.
 B.
 C.
 D.

43. In which of the following procedure(s) can a given alkane be prepared in the laboratory?

- Reaction of haloalkanes with benzene in the presence of a Lewis acid
- Reaction of haloalkanes with sodium metal in dry ether
- By decarboxylation of calcium salt of a carboxylic acid.

A.
 B.
 C.
 D.

44. Given the reaction:



What is (are) the technique(s) that can be used to measure the rate of this reaction?

- Gas syringe method
- Colorimeter
- Conductimetry

A.
 B.
 C.
 D.

45. Primary amines can be prepared by:
1. Hofmann Degradation of amides
 2. Reduction of nitriles
 3. Reduction of amides
- A.
B.
C.
D.

46. Sulphates of S-block elements which is (are) soluble include:

1. CaSO_4
2. BaSO_4
3. Na_2SO_4

- A.
B.
C.
D.

Questions 47 – 50 (Four questions)

Directions: Each of the following questions consists of a statement on the left-hand column followed by a second statement on the right-hand column. Decide whether the second statement is true or false. Then choose:

- A If both statements are true and the second statement is a CORRECT explanation of the first statement.
B If both statements are true and the second statement is NOT a CORRECT explanation of the first statement.
C If the first statement is true, but the second statement is false.
D If the first statement is false, but the second statement is true.

Summary of Directions			
	First Statement	Second Statement	
A	True	True	Second statement is a CORRECT explanation of the first.
B	True	True	Second statement is NOT a CORRECT explanation of the first
C	True	False	
D	False	True	

	FIRST STATEMENT	SECOND STATEMENT
47	Atomic radius decreases slightly from Sc to Cu and increases from Cu to Zn	There is slight increase in effective nuclear charge as electrons enter an inner 3d subshell and the increase from Cu to Zn is due to completely filled d-orbital A B C D
48	An alkaline solution of phenol reacts with benzenediazonium chloride to form an orange azo dye	Phenols and alcohols are hydroxyl compounds that react with neutral iron (iii) chloride to produce a violet coloration. A B C D
49	The hydrides of PH_3 and CH_4 are insoluble in water	The hydrides of S and Cl are acidic A B C D
50	The technique employed when identifying the bond types and functional groups in an organic compound is infrared spectroscopy	Spectroscopy is based on the interaction between light and matter A B C D

END.

GO BACK AND CHECK YOUR WORK.