TANZANIA HEADS OF ISLAMIC SCHOOLS COUNCIL

FORM TWO INTER ISLAMIC MOCK ASSESSMENT

CHEMISTRY

032 MARKING SCHEME JULY/AUGUST, 2026

SECTION A (15 Marks)

1. **10 Marks @ 01 MARKS**

(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
B	C	B	D	A	B	A	C	A	C

2. **05 Marks 01 mark**

(i)	(ii)	(iii)	(iv)	(v)
E	F	B	A	D

3. (a) (i) Substance A (Sand + water): This is a suspension **00 ½ mark**

Substance B (salt + water); This is a solution **00 ½ mark**

Substance C (kerosene + water); This is an immiscible liquid **00 ½ mark**

(ii) Substance A (Sand and water). The suitable method is filtration/decantation

Rationale: Sand particles are large and insoluble so they are trapped by filter paper as residual while water passes through as filtrate. **01mark**

Substance B (Salt and water) : The suitable method is evaporation (to recover salt) or simple distillation to recover both slat and water)

Rationale: Salt is a soluble solid; heating the mixture removes the solvent (water), leaving the solute behind. **(01mark)**

Substance C (Kerosene and water): The suitable method is using a layer separation.

Rationale: Kerosene and water are immiscible (the have different densities water settle bottom and Kerosene settle above. **01mark**

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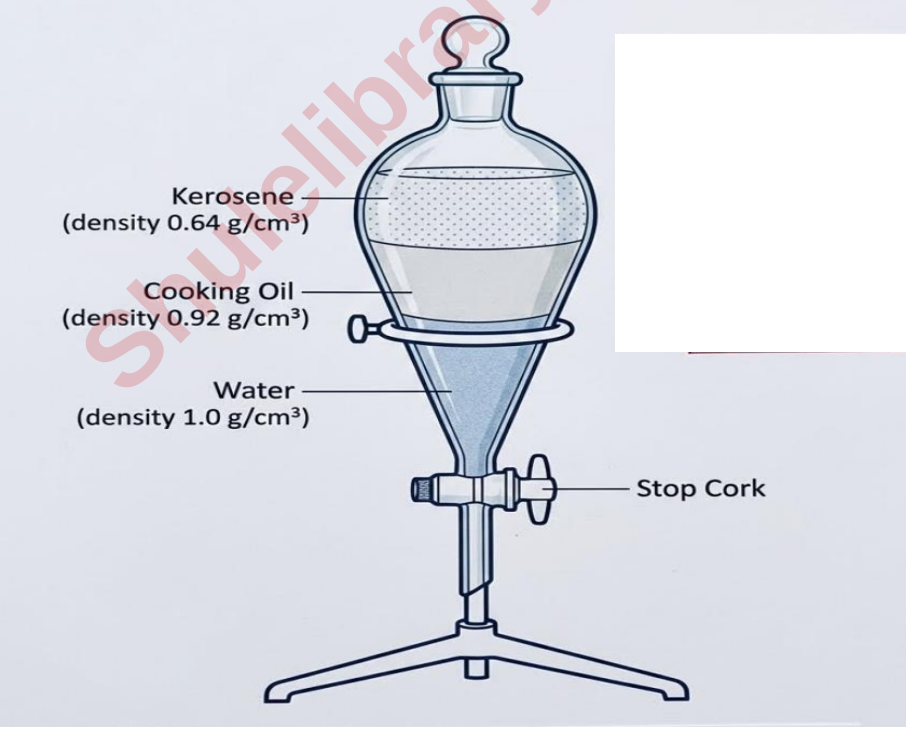
(iii) DIFFERENCE BETWEEN MIXTURE A AND MIXTURE B

Feature	**Mixture A (Sant + water)**	**Mixture B (salt + water)**
Homogeneity/ Composition	Heterogeneous: The components are not uniformly distributed and remain distinct	Homogenous: The components are uniformly distribution, you cannot see the salt
Solubility	The solute (sand) is insoluble in the solvent	The salute (salt) is soluble in the solvent
Sedimentation	If left to stand, the sand will settle at the bottom (sediment)	If left to stand, the salt does not settle the solution remain stable
Transparency	It is usually opaque or cloudy as particles scatter light	It is transparent/clear as the particles are broken down to molecular level
Separation	Can be separated easily by filtration	Can be separated by simple distillation/Evaporation
Particle size	Large particles (visible to the naked eye)	Molecular sized particles (invisible even under a microscope)

Any 3 points (differences), 03 marks @ 01 mark



The diagram of separating funnel

Title 00 ½ marks

Diagram with correct layer of the three liquids = 02 marks

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4. (a)

FLAME WHEN AIR HOLES CLOSED	FLAME WHEN AIR HOLE OPENED
It is yellow in colour	It is blue in colour
It has four zones	It has three zones
It is unstable	It is stable (steady)
It wavy form	It is triangular form
Produce soot	Does not produced soot
Produce less heat	Produce more heat
Burns quietly	Burns with a roaring noise
It gives bright light	It gives Dim light

Any four (04) points, 04marks @ 01 mark

(b) (i) The fire that occur in the library is 9 class A fire **01 mark**

Reason: Class A fires involve burning ordinary combustible solids. In this case, the fund sources were books and magazines, which are made of papers and wood pulp – solid materials that leave behind ash when burned.**01 mark**

(ii) To save the books and magazine, should use Dry chemical, Halons, foam extinguisher and ABC. **Any one 01 mark**

Reason, these extinguishers are suitable for class A fire/Avoid damage of books and magazines **01 mark**

(iii) Water fire extinguisher or APW

Reasons: Can damage the salvageable books and magazines by soaking them.

Electrocution Rist – since the librarian was observing the main electrical switch when the fire started.

Carbondioxide fire extinguisher

Reason: molecules of CO_2 gain heat and lower density resulting expelled by air

The books and magazines can ignite again

Any one extinguish among those 01 mark, reason 01 mark

5. (a) Tea contains a group of organic compounds that act as natural pH indicators that turn a much darker, deep reddish – brown or almost black colour in alkaline solution and pale yellow orange in acidic solution. Therefore, the change of tea from dark brown/red to pale yellow/orange is a visual confirmation that the pH of the tea has dropped (it has become more acidic)

(02 marks)

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(b)

Indicator	Baking powder solution	Yoghurt	Ash extract	Lemon juice
Methyl orange	Yellow	Red/Pink	Yellow	Red/Pink
Phenolphthalein	Pink	Colourless	Pink	Colourless

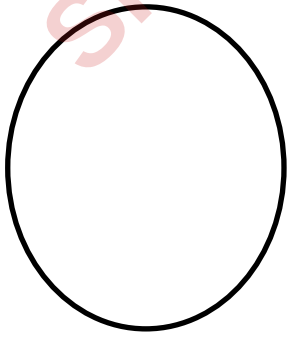
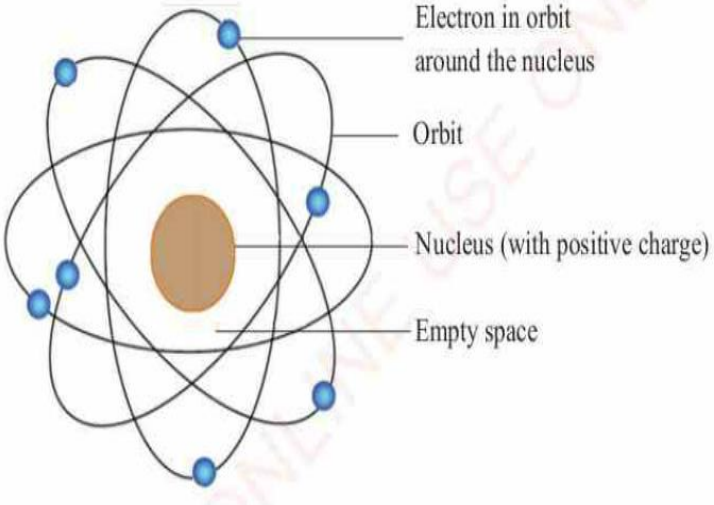
04 marks @ 00 ½ mark

(c) (i) Strong acid – Are those acids that ionize/dissociate completely to give large amount of H^+. Example of strong acid are Hydrochloric acid, nitric acid, and sulphuric acids.

While
Weak acids – Are those acid that ionize/dissociate partially to give small amount of H^+. Example of weak acids are ethanoic acid (CH_3COOH)

(ii) Concentrated acids have large amount of acids molecules dissolved in water
While
Dilute acids have small amount of acid molecules dissolved in water.

6. (a) (i)

DALTON'S ATOMIC THEORY	RUTHERFORD'S ATOMIC MODEL
	

02 marks @ 01 mark

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(ii) 1. Matter is made up of very tiny indivisible particles called Atoms.

2. Atoms can neither created nor destroyed.

3. Atoms of the same elements are alike and have the same mass while atoms of the different elements are different and have different masses

4. Atoms of different elements may combine to form a compound but they do so in simple whole number ratio

Any three (03) points, 03 marks @ 01 mark

(b)

(i) $^{27}_{13}Al$	(ii) $^{235}_{92}U$
Protons = 13 Neutrons = 14 Electrons = 13	Protons = 92 Neutrons = 143 Electrons = 92

03 marks @ 00 ½ mark

(c) (i) Medical applications

Medicine – Is the most common field for isotope use, both for finding (diagnosis and fixing) treatment health issues

Radio therapy: Cobalt – 60 is used to emit high energy gamma rays to kill cancer cells and shrink tumors.

- Sterilization: Gamma rays from isotopes are used to kill bacteria an survival instruments and bandages without using heat
- Medical tracers: Iodine – 131 is used to monitor the function of the thyroid gland.

(ii) Agricultural Application

Isotopes help farmers improve crop yield and manage pests

- Nutrients tracking: Phosphorus – 32 is added to fertilizers.
- Pest control: The sterile insect technique (SIT) involve using radiation to sterilize male pests (Like Tsetse flies)
- Food preservation: Just like surgical tools, food (like potatoes or onions) is exposed to radiation to prevent sprouting and kill food – borne pathogens.

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(iii) Industrial application

- Industries use the "penetrating power" of isotopes to check for quality
- Leak detection – Radioisotopes are added to under ground water or oil pipes to pinpoints exactly what the leak is without digging up the whole line.
- Thickness gauging: In paper or metal foil factories, a radioactive source is placed on one side of the sheet and detect on the other. If the sheet get too thick, less radiation pass through.

(iv) Archaeological application (carbon dating)

- This is perhaps the most famous of isotopes for historical research.
- Carbon 14 Dating: All living organism absorb carbon – 14, when an organism dies, the carbon – 14 begins to decay at a fixed rate. By wearing how much is left in a bone or piece of wood, scientists can calculate its age.

Any two points (2), 02 marks @ 01 mark

7. (a) (i) Q

(ii) M

(iii) K

(iv) P

(v) R **05 marks @ 01 mark**

(b) K = Lithium

M = Neon

N = Oxygen

P = Silcon

Q = Chlorine

R = Magnesium **03 marks @ 00 ½ mark**

(c) (i) Electrovalent/Ionic bond

(ii) Electrovalent/Ionic bond **02 marks @ 01 mark**

8. (a) (i) Given Compound M composed of

0.29g Copper (Cu)

0.14g Sulphur (S)

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0.29 Oxygen (0)

Its halved vapour density is 40

Element symbol	Cu	S	O
Mass	0.29	0.14	0.29
Relative atomic mass	63.5	32	16
Mass / Relative atomic mass	$\frac{0.29}{63.5} = 0.007$	$\frac{0.14}{32} = 0.00438$	$\frac{0.29}{16} = 0.01812$
Divide by smallest value	$\frac{0.00457}{0.00438} = 1.04 \approx 1$	$\frac{0.00438}{0.00438} \approx 1$	$\frac{0.01812}{0.00438} = 4.1 \approx 4$
Ratio	1	1	4

(Table = 02 ½ marks, @ row 00 ½ mark)

The empirical formula = $CuSO_4$ **000 ½ mark**

Molecular formula = n(empirical formula)

Molar mass of a compound = 2XV.D

= 2 X (2 x 40)

= 160

Then,

(CuSO4)n = 160

(63.5 + 32 + (16 x 4)n = 160

$\frac{159.5n}{159.5} = \frac{160}{159.5}$

$n = 1$ **00 ½ mark**

Then

Molecular formula = $(CuSO_4)n$

∴The molecular formula = $CuSO_4$ **01 mark**

(ii) $CuSO_4 = 0$

Cu + -2 = 0

Cu = 0 + 2

Cu = +2

∴ The oxidation number of (upper in compound M is +2 **01mark**

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(b) (i)

S/N	CATION	ANION	FORMULA
(i)	Sodium ion	Thiosulfate ion	$Na_2S_2O_3$
(ii)	Potassium ion	Chlorate ion	$KClO_3$
(iii)	Ammounium ion	Dichromate ion	$(NH_4)_2Cr_2O_7$

01 ½ Marks @ 00 ½ mark

(ii) Required to prove if molar mass of sodium hydrogen carbon is 86g/mol.

From

Total molecular mass of $NaHCO_3$ = Summation of individual molar masses

Total molecular mass of $NaHCO_3$ = Na + H + C + 3O

Total molecular mass of $NaHCO_3$ = 23+ 1 + 12 + 3(16) = 86g/mol

84g/mol = 86g/mol **01mark**

Therefore, her answer is not correct

(c) (i) Calculation of molar mass (the blue print for industry)

The formula tells you exactly which atoms are present and how many of each. This allow chemist to calculate relative molecular mass (Mr).

(ii) Universal identification

Chemical names can vary language or local culture (e.g. Chumvi Vs Salt), but the chemical formula is NaCl is understood globally.

Application: In international trade, a chemical formula ensures that a buyer in Tanzania and a seller in China are talking about the exact some substance preventing dangerous or costly mistakes in industrial orders.

(iii) Stoichiometry (the recipe for reactions

Chemical formular building blocks of balanced chemical equation

Application: Used to the production of medicine pharmacist use formula to ensure that reactants are mixed in the perfect ratio so that to harmful leftover chemical remain in the final tablet

(iv) Determination of percentage composition

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Application

Used by farmer in fertilizer to know percentage composition of nutrients.

(v) Distinguish between similar substances e.g. water (H_2O) and Hydrogen peroxide (H_2O) are both clear liquid. The formula tells us that H_2O_2 has an extra oxygen atom, making it a powerful bleach and disinfectant that is dangerous to drink, whereas H_2O is essential for life.

Any two (02) points 02 marks @ 01 mark

9. (a) (i) From

$3KOH_{(aq)} + FeCl_{3(aq)} \longrightarrow 3KCl_{(aq)} + Fe(OH)_{3(s)}$ - **2marks**

(ii) Therefore, the net ionic equation

$Fe^{3+}_{(aq)} + 3OH^{-}_{(aq)} \longrightarrow Fe(OH)_{3_{(s)}}$ **01 marks**

(iii) Precipitation reaction/Double displacement reaction **02 marks**

(b) Soluble bases: NaOH, K_2O **02marks @ 01 mark**

Insoluble bases; CuO, $MgCO_3$, $Ca(OH)_2$ **03 marks @ 01 mark**

SECTION C (15 Marks)

10. Introduction

Neutralization reaction – Is the reaction between acids and base to form salt and water. Application of neutralization reaction in our daily life.

(a) Reliaring indigestions

Indigestion a discomfort in the stomach that is associated with difficult in digesting food.

It is caused by the presence of excess acid like hydrochloric acid in the stomach.

The excess acid can be neutralized by taking a liquid or tablets that contain magnesium or sodium hydrogen carbon.

(b) Soil treatment

Most plants grow well in soils that have optimal pH value. When soil are too acidic for example due to application of ammonium based fertilizers. Chemicals such as calcium oxide (quicklime) and calcium hydroxide (asked lime) are added to adjust the soil pH. Such chemicals that neutralize the soil acidity are called liming materials.

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(c) Treating factor wastes

Liquid wastes from factories often contain acids and bases. If the wastes get into water bodies such as lakes, ponds and rivers, they can harm aquatic organism like fish.

(d) Manufacture of fertilizers

The production of ammonium fertilizer is done through the neutralization of ammonia with a mineral acid. Ammonium nitrate for example is produced by the reaction of ammonia with nitric acid.

(e) Neutralizing accident spills

If an acid or alkali spills on the floor or work surface in the laboratory it can be neutralized. For examples, sulphuric acid which is very corrosive, can be neutralized by adding sodium hydroxide.

(f) Preventing formation of acid rain

When the pH of rainwater falls below by it is called acid rain. Acid increases the acidity of the soil, rivers and lakes and adversary affects vegetation and aquatic organisms.

To reduce this problem, air pollution devices containing bases are fitted in exhaust pipes and chimney to neutralize the acidic compound before reaching the atmosphere.

Introduction (Neutralization) 02marks

Any 6 points, explanation and example 12 marks @ 02 marks
Good conclusion 01 mark

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