

MANGU HIGH SCHOOL

NAME..... CLASS

INDEX NO..... ADM. NO.....

233/3
CHEMISTRY
PAPER 3
(PRACTICAL)



MOCK 2022
TIME: 2¼ HOURS

INSTRUCTIONS TO CANDIDATES

- i. Write **your name** and **index number** in the spaces provided above.
- ii. **Sign** and **write** the date of examination in the spaces provided.
- iii. Answer **all** questions in the spaces provided in the question paper.
- iv. You are not allowed to start working with the apparatus for the first **15 minutes** of the 2¼ hours allowed for this paper. This time is to enable you to **read** the questions paper and **make sure** you have all the chemicals and apparatus that you may need.
- v. All working **must** be clearly shown where necessary.
- vi. Mathematical tables and electronic calculators may be used.

FOR EXAMINER'S USE ONLY:

Question	Maximum Score	Candidate's Score
1	22	
2	10	
3	08	
TOTAL	40	

This paper consists of 6 printed pages. Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing

Turn Over

1. You are provided with
- (i) 4.5g of solid A in a boiling tube
 - (ii) Solution B, 0.06M acidified potassium manganite (VII)

You are required to determine

- (i) The solubility of solid A at different temperatures
- (ii) The number of moles of water of crystallization of solid A.

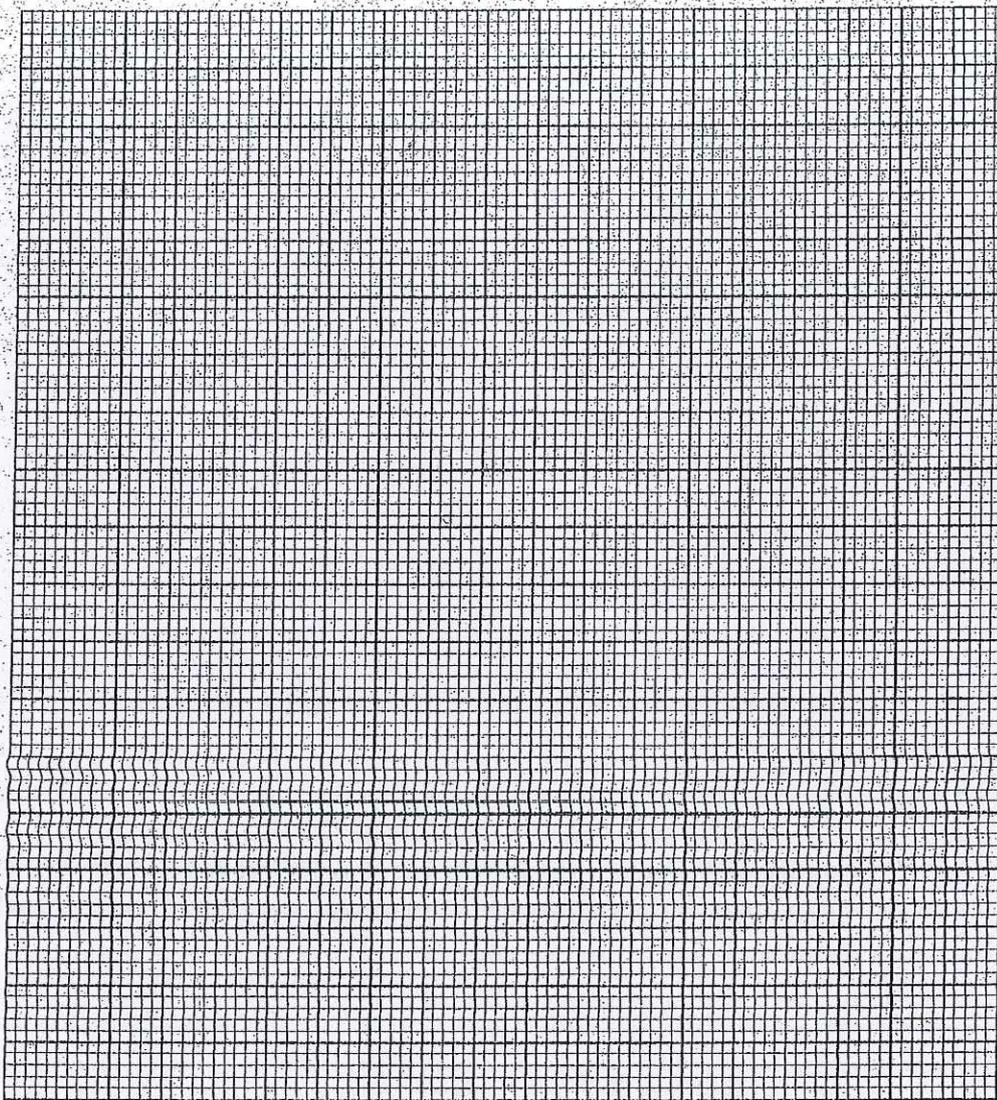
Procedure 1:

- (a) Using a burette, add 4cm³ of distilled water to solid A in a boiling tube. Heat the mixture while stirring with a thermometer to about 70°C. When all the solids has dissolved allow the solution to cool while stirring with the thermometer. Note the temperature at which crystals of solid a first appear. Record this temperature in table 1.
- (b) Using a burette add 2cm³ of distilled water to the content of the boiling tube. Warm the mixture while stirring the thermometer until all the solid dissolve. Allow the mixture to cool while stirring. Note and record the temperature at which crystals of solid A first appears.
- (c) Repeat procedure (b) two more times and record the temperature in table 1. Return the content of boiling tube for use in procedure.
- (d) (i) Complete the table calculating the solubility of solid A at different temperatures. The solubility of a substance is the mass of that substance that dissolves in 100cm³(100g) of water at a particular temperature. (6mks)

Table 1

Volume of water in the boiling tube (cm ³)	Temperature at which crystals of solid A first appear (°C)	Solubility of solid A (g/100g of water)
4		
6		
8		
10		

- (ii) On the grid provided plot a graph of the solubility of solid A (vertical axis) against temperature. (3mks)



- (iii) Using your graph determine the temperature at which 100g of solid A would dissolve in 100cm³ of water. (1mk)
- (iv) Using your graph determine the solubility of solid A at 55°C. (1mk)

Procedure 2

- (e) (i) Transfer the content of the boiling tube into about 250ml volumetric flask. Rinse both the boiling tube and thermometer with distilled water and add it to the volumetric flask. Add more distilled water to make up to the mark. Label this solution A. Fill the burette with solution B using a pipette, place 25.0cm³ of solution A into a conical flask. Warm the mixture to about 60°C. Titrate this hot solution A with solution B, until a permanent pink colour persist. Record your readings in table 2. Repeat the titration more times and complete table 2.

(4mks)

Table 2

	I	II	III
Final burette reading (cm ³)			
Initial burette reading (cm ³)			
Volume of solution B used (cm ³)			

- (ii) Calculate the
- (a) Average volume of solution B used. (1mk)
- (b) Number of moles of potassium amangate (VII) used. (2mks)
- (c) Number of moles of A in 25cm³ of solution A given that 2moles of potassium manganite (VII) reacts completely with 5 moles of A. (1mk)
- (d) (i) Relative formula mass of A. (3mks)
- (ii) The formula of a has the formula of D.XH₂O. Determine the value of x in the formula, given that the relative formula mass of D is 90. (O=16, H=1) (2mks)

2. You are provided with solid FA5, FA6, and FA7. Carry out the following tests and write your observations and inferences in the spaces provided.

(a) Place all solid FA5 in the boiling tube. Add about 10cm^3 of distilled water and shake until all the solid dissolves. Label this as solution FA5.

(i) To about 2cm^3 of solution FA5 in a test tube, add 2M sodium hydroxide solution drop wise until in excess.

Observation	Inferences
(2mks)	(1mk)

(ii) To about 2cm^3 of solution FA5 in a test tube, add 2M ammonium hydroxide solution dropwise until in excess.

Observation	Inferences
(2mks)	(1mk)

(iii) To about 2cm^3 of solution FA5 in the test tube, add 4 drops of 2M sulphuric (VI) acid.

Observation	Inferences
(1mk)	(1mk)

(iv) To about 2cm^3 of solution FA5 in a test tube, add 2 drops of potassium iodide solution.

Observation	Inferences
(1mk)	(1mk)

(b) Place solid FA7 into boiling tube. Add about 10cm^3 of distilled water and shake well. Label this as solution FA7. Use this solution for the following tests.

(i) Place about 2cm^3 of solution FA7 in a test tube and place the universal indicator paper provided into the solution hence determine its pH.

Observation	Inferences
(1mk)	(1mk)

(ii) To about 2cm^3 of solution FA7 made in (i) above, add 3 drops of acidified potassium manganate(VII) solution

Observation	Inferences
(1mk)	(1mk)

(iii) To the remaining solution FA7 in the boiling tube, add the other half of solid FA6.

Observation	Inferences
(1mk)	(1mk)