KITUI RURAL SUB-COUNTY KCSE REVISION MOCK EXAMS 2015

233/3
CHEMISTRY
PRACTICALS
PAPER 3
TIME: 2¼ HOURS

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NAME _____ ADM. NO _____

SCHOOL _____ SIGNATURE _____

DATE _____

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KITUI RURAL CONSTITUENCY FORM FOUR JOINT EXAMINATION, 2015

Kenya Certificate of Secondary Education (K.C.S.E)

233/3
CHEMISTRY
PRACTICALS
PAPER 3
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INSTRUCTIONS TO CANDIDATES:

(a) Write your name and index number in the spaces provided above.

(b) Answer **ALL** questions in the spaces provided.

(c) You are **NOT** allowed to start working with the apparatus for the first 15minutes of the $2\frac{1}{4}$ hours allowed for this paper. This time will enable you read through the question paper and make sure you have all the chemicals and apparatus required.

(d) Mathematical tables and electronic calculators may be used.

(e) All working **must be** clearly shown where necessary.

FOR EXAMINERS' USE ONLY:

QUESTION	MAXIMUM SCORE	CANDIDATES SCORE
1	**22**	
2	**12**	
3	**06**	
TOTAL SCORES	**40**	

This paper consists of 7 printed pages.
Candidates should check carefully to ascertain that all the pages are printed as indicated and no questions are missing.

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

   You are required to determine:-
   - The solubility of solid A at different temperatures.
   - The number of moles of water of crystallization in solid A

Procedure

a) Using a burette, add 4cm^3 of distilled water to solid A in the boiling tube. Heat the mixture while stirring with the thermometer to about 70ºC. When all the solid 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 the burette, add 2.0cm^3 of distilled water to the contents of the boiling tube. Warm the mixture while stirring with the thermometer until all the solid dissolves. Allow the mixture to cool while stirring. Note and record the temperature at which crystals of solid A first appear.

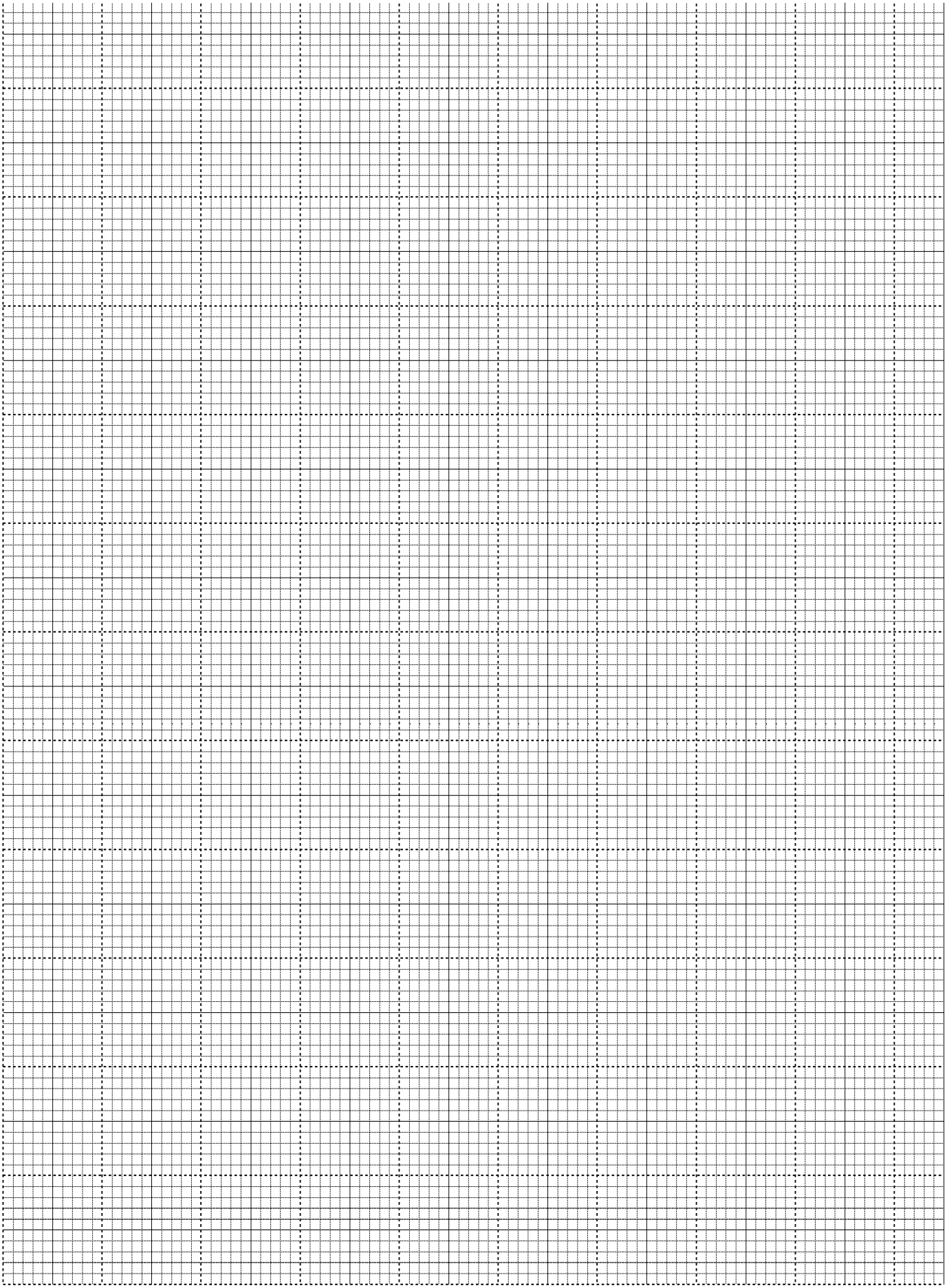
c) Repeat the procedure (b) two more times and record the temperature in the table 1. Retain the contents of the boiling tube for use in procedure (e)

d) i) Complete table 1 by calculating the solubility of solid A at different temperatures. The solubility of a substance is the mass of that substance that dissolves in 100cm^3(100g) or water at a particular temperature.

Table 1

Volume of water in the boiling tube (cm^3)	Temperature at which crystals of solid A first appear.	Solubility of solid A (g/100g H_2O)
4		
6		
8		
10		

ii) On the grid provided plot a graph of solubility of solid A against temperature (3 marks)



iii)Using your graph;

I) Determine the temperature at which 100g of solid A would dissolve in 100cm^3 of water. (1 mark)

_____

_____

_____

_____

II) Calculate the mass of solid A that will crystallize out when a hot solution at 60ºC is cooled to 40ºC (1 mark)

_____

_____

_____

_____

e) i) Transfer the contents of the boiling tube into 250ml volumetric flask, rinse both the boiling tube and the thermometer with distilled water and add 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 25cm^3 of solution A into a conical flask. Warm the mixture to about 60ºC. Titrate the hot solution A with solution B until a permanent pink colour persists. Record your reading in table 2. Repeat the titration two more times and complete table 2.

Table 2

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

(4 marks)

Calculate,

i) Average volume of solution B used (1 mark)

_____

_____

_____

_____

ii) Number of moles of potassium manganate (VII) used. (1 mark)

_____

_____

_____

_____

iii) Number of moles of A in $25cm^3$ of solution A given that 2 moles of potassium manganate (VII) react completely with 5 moles of A (1 mark)

iv) Relative formula mass of A (2 marks)

v) The formula of A has the form $D.xH_2O$. Determine the value of X in the formula given that the relative formula mass of D is 90 and atomic mass of oxygen and hydrogen are 16.0g and 1.0g respectively. (2 marks)

2. a) i) Place a spatula half-full of solid P in a clean dry test tube. Strongly heat the test tube together with its contents. Test for any gases produced.

Observation	Inferences
(1 mark)	(1 mark)

ii) Repeat the procedure in (i) above using solid R.

Observation	Inferences
(1 mark)	(1 mark)

iii) Place a little of solid G in a dry test tube and heat strongly. Record your observations and inferences.

Observation	Inferences
(1 mark)	(1 mark)

b) i) Place all solid M in a boiling tube. Add distilled water shaking until the boiling tube is full.

Observation	Inferences
(1 mark)	(1 mark)

ii) Obtain two portions of about $2cm^3$ of the resulting mixture above b (i)

I) To the first portion add 2-3 drops of barium nitrate solution.

Observation	Inferences
(1 mark)	(1 mark)

II) To the second portion add 2-3 drops of barium nitrate followed by a few drops of 2M hydrochloric acid.

Observation	Inferences
(1 mark)	(1 mark)

3. You are provided with liquid S. Carry out the following tests and record your observations and inferences in the spaces provided.

i) Place four drops of liquid S on a clean dry watch glass and ignite it.

Observation	Inferences
(1 mark)	(1 mark)

ii) Place about 2 cm^3 of liquid S in a clean dry test tube, add all sodium hydrogen carbonate provided

Observation	Inferences
(1 mark)	(1 mark)

iii) Place about $2cm^3$ of liquid S, in a test tube add about $1cm^3$ of acidified potassium dichromate (VI) and warm the mixture.

Observation	Inferences
(1 mark)	(1 mark)