Name:..... Index No:.....

233/3
CHEMISTRY
Paper 3
PRACTICAL
JULY 2014
2 ¼ HOURS

Candidate's Signature:.....

Date:.....

ALLIANCE GIRLS' HIGH SCHOOL
Kenya Certificate of Secondary Education
CHEMISTRY - MOCK EXAMINATION
Paper 3
PRACTICAL
2 ¼ hours

Instructions to candidates

(a) Write your name and index number in the spaces provided above.
(b) Sign and write the date of examination in the spaces provided above.
(c) Answer ALL the questions in the spaces provided in the question paper.
(d) You are NOT allowed to start working with the apparatus for the first 15 minutes of the 2 ¼ 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.
(e) All working must be clearly shown where necessary.
(f) Mathematical tables and silent electronic calculators may be used.
(g) This paper consists of 7 printed pages.
(h) Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.
(i) Candidates should answer all the questions in English.

For Examiner's use only

Question	Maximum Score	Candidate's Score
1	19	
2	12	
3	09	
Total Score		

1. You are provided with:
   - 1.5g of solid **A**, Potassium dichromate (VI) ($K_2CR_2O_7$)
   - Acidified iron(II) sulphate, solution **B**
   - An indicator, sodium diphenylamine sulphonate
   - Aqueous phosphoric acid.

   You are required to determine the concentration of solution B in moles per litre.

   Procedure:

   Transfer all the 1.5g of solid **A** into a 250ml volumetric flask. Add about $100cm^3$ of distilled water. Shake until all the solid dissolves. Add more distilled water to make up to the mark. Label this as solution **A**. Place solution **A** in a burette. Using a pipette filler, pipette $25cm^3$ of acidified iron(II) sulphate, solution **B** into a conical flask. Add $20cm^3$ of phosphoric acid followed by 10 drops of the indicator provided. Titrate solution **A** against solution **B** until the green colour changes to purple. Repeat the titration and complete table I below. Retain the remainder of solution A for use in question 3(b) (IV).

   (a) Table 1.

	I	II	III
Final burette reading			
Initial burette reading			
Titre (cm^3)			

(4 mks)

(b) (i) Calculate the average volume of solution A used. (1 mk)

(ii) Calculate the concentration of solution A in moles per litre.

(K = 39.0, Cr = 52.0; O = 16.0) (3 mks)

(iii) Calculate the number of moles of potassium dichromate(VI) that reacted with $25cm^3$ of iron(II) sulphate solution. (2 mks)

(iv) Dichromate(VI) ions react with iron(II) ions as shown in the equation below.

$$Cr_2O_7^{2-}{}_{(aq)} + 6Fe^{2+}{}_{(aq)} + 14H^+{}_{(aq)} \longrightarrow 2Cr^{3+}{}_{(aq)} + 6Fe^{3+}{}_{(aq)} + 7H_2O_{(l)}$$

Calculate the number of moles of iron(II) ions in the $25cm^3$ of solution **B**. (1 mk)

(v) Calculate the concentration in moles per litre of iron(II) ions in solution **B**. (1 mk)

2. You are provided with:
0.21M aqueous glucose, solution **C**
0.02M potassium manganate(VII), solution **D**
1.0M aqueous sulphuric acid.

You are required to determine the rate of reaction between acidified potassium manganate (VII) and aqueous glucose at different temperatures.

PROCEDURE:
Place $2cm^3$ of solution **D** into a 250ml. beaker. Using a 100ml. measuring cylinder, add $50cm^3$ of 1.0M sulphuric acid to the beaker containing solution D. Warm the mixture to about 65°C. Stop warming and allow the mixture to cool. When the temperature is **exactly** 60°C, add $15cm^3$ of solution **C** and start a stop watch immediately. Stir the mixture and measure the time taken for the colour of the mixture to change from purple to colourless. Record the time in table 2 below. (also record the temperature at which the mixture becomes colourless). Clean the beaker and repeat the procedure at temperatures, 55°C, 50° and 45°C instead of 60°C. Calculate $\frac{1}{time}$ and complete table 2.

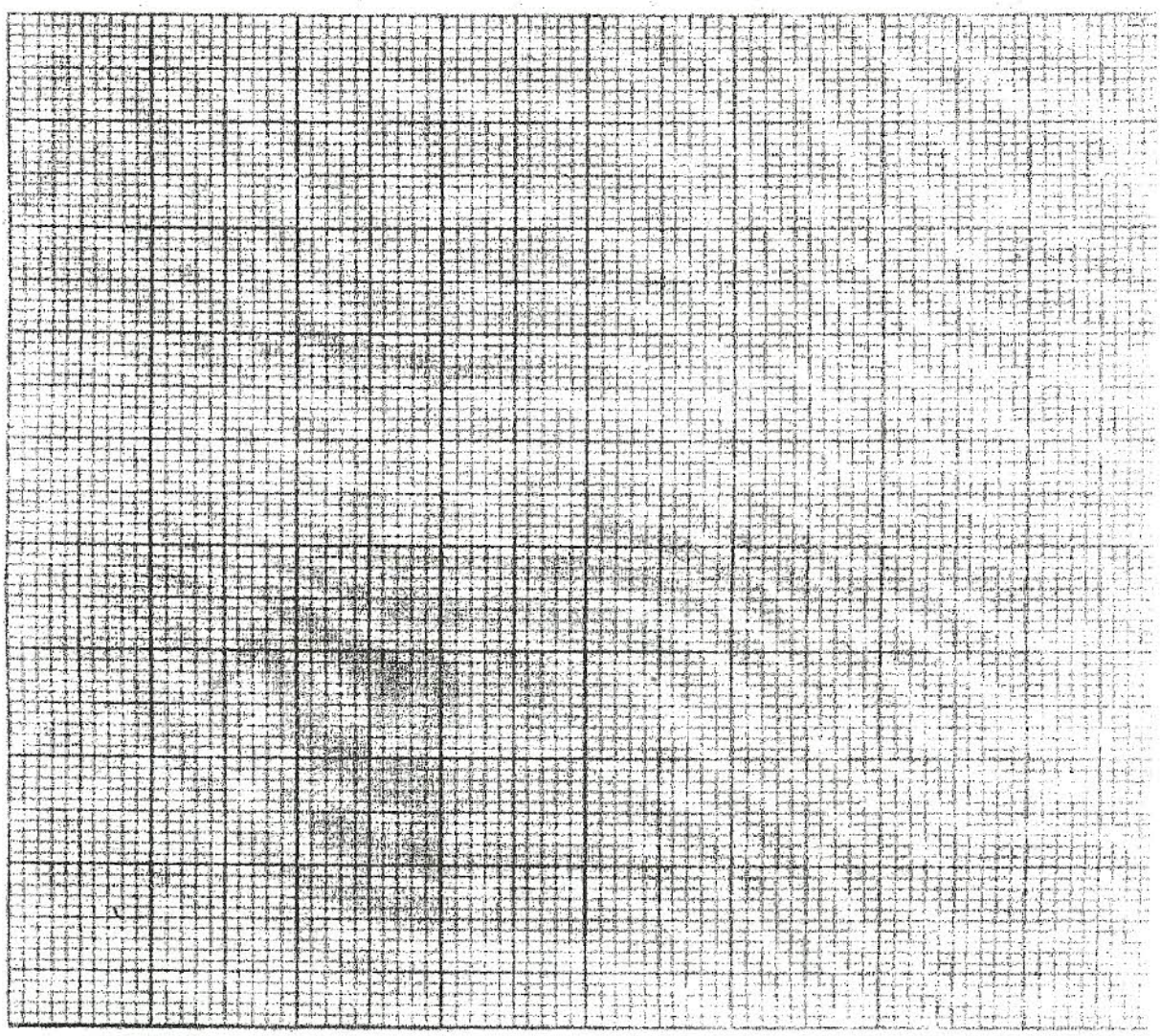
Time

(a) Table 2

Temperature before mixing (°C)	60	55	50	45
Temperature when solution becomes colourless (°C)				
Time (seconds)				
$\frac{1}{time}$ (S^{-1})				

(6 mks)

Plot a graph of $\frac{1}{time}$ (Y axis) against the temperature at the point when the solution becomes colourless. (3 mks)



(b) From your graph, determine the time that the reaction would take if the temperature at which the solution becomes colourless is 42.5°C. (2 mks)

(c) Explain the shape of your graph. (1 mk)

3. (a) You are provided with solid **E**. Carry out the tests below. Record your observations and inferences in the spaces provided.

(i) Heat about one half of solid **E** in a dry test-tube. Test the gas produced using litmus paper.

Observations	**Inferences**
(1 mk)	(1 mk)

(ii) Dissolve the rest of solid E in about $10cm^3$ of distilled water in a boiling tube. Use the solution for the tests below.

I To one portion of the solution, add aqueous sodium hydroxide dropwise until in excess.

Observations	**Inferences**
(1 mk)	(2 mks)

II To a second portion, add aqueous ammonia dropwise until in excess.

Observations	Inferences
(1 mk)	(1 mk)

III To a third portion, add a few drops of aqueous potassium iodide.

Observations	Inferences
(1 mk)	(1 mk)

3(b) You are provided with liquid F. Carry out the tests below. Write your observation and inferences in the spaces provided.

(i) To 2 cm^3 of liquid F, add 2 cm^3 of water shake and allow the mixture to stand for about one minute.

Observations	Inferences
(½ mk)	(½ mk)