Name _____ Index No. _____

Candidate's Signature _____

Date _____

SERIES 9 EXAMS

233/3

CHEMISTRY

PAPER 3

PRACTICAAL

2 ¼ HOURS

INSTRUCTIONS TO CANDIDATES

(a) Write your name and index number in the spaces provided above.
(b) Answer all the questions in the spaces provided.
(c) Mathematical tables and silent electronic calculators many be used.
(d) All working must be clearly shown where necessary.
(e) Candidates should answer the questions in English.

FOR EXAMINER'SUSE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
1	19	
2	11	
3	10	
TOTAL SCORE	**40**	

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1. You are provided with:-

- Solution A containing 4.0g sodium hydroxide per litre solution.
- Aqueous hydrochloric acid solution.
- Calcium hydroxide – Solid C.

You are required to standardize hydrochloric acid solution B using solution A and hence determine the solubility of solid C in 100g of water at room temperature.

Procedure I

- Place all the solid C into a clean conical flask.
- Measure accurately 100cm^3 of distilled water using a measuring cylinder and add it to solid C.
- Shake thoroughly and leave it to stand for 12 minutes.
- Fill the burette with solution B.
- Pipette 25cm^3 of solution A into a clean conical flask.
- Add 3 drops of phenolpthalein indicator and titrate with solution B.
- Record the results in the table I below.
- Repeat the experiment to obtain three consistent readings

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

(4 marks)

(a) Determine the average volume of solution B used. (1 mark)

(b) Determine the molarity of solution A. (1 mark)

(c) Determine the molarity of solution B. (2 marks)

PROCEDURE II

Filter the saturated solution of the mixture C and water into a clean conical flask and label this solution C.

Using pipette and filler, transfer 25cm^3 of the filtrate into a conical flask and titrate with hydrochloric acid solution B using methyl orange indicator.

Record the results in the table 2 below.

Repeat the titration to obtain consistent readings

Table 2

Experiment number	I	II	III
Final burette reading (cm^3)			

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Initial burette reading (cm^3)			
Volume of solution B used (cm^3)			

(4 marks)

(a) Determine the average volume of solution B used. (1 mark)

(b) Determine the number of moles of solution B used. (1mark)

(c) Calculate the number of moles of C in $25cm^3$ of the filtrate. (2 marks)

(d) Calculate the number of moles of solid C in $100cm^3$ of solution . (1 mark)

(e) Calculate the solubility of solid C per 100g of water

(Ca = 40.0, O = 16.0, H = 1.0) Density of water = 1 g/cm^3 (2 marks)

2. You are provided with solid Q. Carry out the test below. Write your observations and inferences in the spaces provided.

(a) Using a spatula place about one third of solid Q in a clean dry test-tube and heat it strongly.

Observation	Inferences

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(1 mark)	(1 mark)

(b) Place the remaining solid Q in a boiling tube. Add about 10cm3 of distilled water. Shake the mixture thoroughly for about one minute. Filter and divide the filtrate into four portions.

Observation	Inferences
(1 mark)	(1 mark)

(c) To the first portion, add 2 drops of phenolphthalein indicator.

Observation	Inferences
(½ mark)	(1 mark)

(d) To the second portion, add $2cm^3$ of dilute hydrochloric acid.

Observation	Inferences

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(½ mark)	(1 mark)

(e) To the third portion, add 5cm^3 of aqueous sodium sulphate.

Observation	Inferences
(1 mark)	(1 mark)

(f) To the fourth portion, add dilute sodium hydroxide dropwise until in excess.

Observation	Inferences
(1 mark)	(1 mark)

3. You are provided with solid P. Carry out the tests below. Identify any gas (es) produced.

Record your observations and inferences in the spaces provided.

(a) Place about half of the solid P in a dry test tube. Heat the solid gently.

Observation	Inferences

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(1 mark)	(1 mark)

(b) Dissolve the remaining portion of solid P in 10cm^3 of distilled water in a boiling tube.

Divide the solution into four portions

To the first portion, add sodium hydroxide dropwise till in excess.

Observation	Inferences

(1 mark)	(1 mark)

(c) To the second portion, add 3 drops of ammonia solution followed by 1cm^3 of hydrogen peroxide.

Observation	Inferences
(1 mark)	(1 mark)

(d) To the third portion, add about 1cm^3 of nitric acid solution.

Observation	Inferences

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(1 mark)	(1 mark)

(e) To the fourth portion, add 3 drops of barium nitrate solution.

Observation	Inferences
(1 mark)	(1 mark)

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