



Technical University of Mombasa

Faculty of Applied and Health Sciences

DEPARTMENT OF **MEDICAL SCIENCES**
DIPLOMA IN PHARMACEUTICAL TECHNOLOGY
(DPT 12J)

APM 2219 : ANALYTICAL PHARMACEUTICAL CHEMISTRY

SPECIAL/SUPPLEMENTARY : EXAMINATIONS

SERIES: February 2013

TIME: 3 HOURS

INSTRUCTIONS:

You should have the following for this examination

- *Answer booklet*

This paper consists of **THREE sections A, B and C.**

Answer ALL questions

This paper consists of 10 PRINTED pages

SECTION A (40MARKS)

1. In order to Assay the amount of acetylsalicylic and in Aspirin 300mg tablets B.P the following steps were employed:-

A: Preparation of 0.1M Na₂CO₃ standard solution to be used to standardize solution B (HCl)

B: Use standardized solution B (HCl) to standardize solution A (NaOH)

C: Use standardized solution B (HCl) to determine the excess of solution A (NaOH) that did not react with Acetyl salicylic Acid and hence determine the amount of ASA ni aspirin 300mg tablets B.P.

STEP A

(i) Calculate the amount of Na₂CO₃ required to prepare 0.1M, 250ml Na₂CO₃(aq) (Na = 23, C= 12, O = 16) **(2marks)**

Three aliquots each 25.0ml of 0.1m Na₂CO₃(aq) were pipetted into separate conical flasks and then titrated with solution B (HCl) labeled 0.2M, using methyl orange indicator. The burette readings were as follows 0.00 and 24.94 for the first aliquot, 25.00 and 51.02 for the second aliquot and 0.00 and 26.01 for the third aliquot.

(ii) Tabulate the obtained results **(5marks)**

(iii) Calculate the average volume of the titrant used **(2marks)**

(iv) Write the reaction equation (2marks)

(v) How many moles of Na_2CO_3 reacted with HCl (1mark)

(vi) How many moles of HCl reacted with Na_2CO_3 in (v) above (2marks)

(vii) Calculate the molarity of the Acid (2marks)

(viii) Find the factor (F) of solution B (HCl) (2marks)

STEP B

26.32cm³ of the standardized solution B (HCl) completely neutralized 5.00cm³ of solution A (NaOH). Calculate the molarity of solution A (NaOH) (3marks)

STEP C

- (i) Five tablets of aspirin were weighed and the weight noted to be 1.18g
 - (ii) All the tablets were crushed in a mortar and 0.5g of Power transferred into a conical flask with 30cm³ of distilled water
 - (iii) 25.0cm³ of solution A (NaOH) (excess) were added and the mixture boiled for 15 minutes to hydrolyse the aspirin.
 - (iv) The hydrolyzed mixture was cooled and transferred into a 250cm³ volumetric flask and diluted with distilled water to the mark. The contents were then mixed well.
 - (v) 25.0cm³ portions of the diluted reaction mixture were titrated with the standardized solution B (HCl) in presence of phenolphthalein indicator. The average volume of acid used was 10.74cm³.
- a) Write a balanced equation for the reaction of acetylsalicylic acid with sodium hydroxide.

(2marks)

- b) Write a balanced equation for the reaction of excess sodium hydroxide and HCl **(1mark)**

- c) Calculate:

- (i) Moles of HCl that reacted with sodium hydroxide. **(2marks)**

- (ii) Moles of excess sodium hydroxide in 25.0cm³ portion **(1mark)**

- (iii) Moles of excess sodium hydroxide in 250cm³ portion **(1mark)**

(iv) Moles of sodium hydroxide initially present before hydrolysis **(2marks)**

(v) Moles of sodium hydroxide that actually reacted with acetylsalicylic acid **(1mark)**

(vi) Moles of acetylsalicylic acid in 250cm³ solution **(2marks)**
[C=1, H = 1 O = 16]

(vii) Weight of acetylsalicylic acid in 250cm³ solution (0.5g of powder) **(2marks)**

(viii) Acetylsalicylic acid content per tablet (in milligram) **(3marks)**

- (ix) If B.P specifications content of aspirin is 99.5% to 101.0% of the prescribed or stated amount, do the above results in (VII) conform to the specifications? Show your working

(2marks)

SECTION B (20marks)

Answer all questions in this section

2. 30.8g of a mixture of sodium carbonate and sodium chloride was dissolved to make 400cm³ of solution. 25cm³ of this solution required 30.7cm³ of 1 M HCL for complete neutralization

- i) Name a suitable indicator for this titration **(1mark)**

- ii) Write the formula of the substance that reacts with the acid. **(1mark)**

- iii) Write an equation for the reaction that takes place. **(1mark)**

- iv) Calculate moles of acid used. **(2marks)**

- v) Calculate moles of sodium carbonate in 25cm³ of solution . **(1mark)**

- vi) Calculate the moles of sodium carbonate in 400cm³ of solution. **(1mark)**
