MACHAKOS UNIVERSITY

University Examinations 2019/2020Academic year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF PHYSICAL SCIENCES

FIRST YEAR FIRST SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (PUBLIC HEALTH)

HPH 103: LABORATORY METHODS FOR PUBLIC HEALTH

DATE: 5/12/2019 **TIME: 8.30-10.30 AM**

INSTRUCTIONS TO CANDIDATES

- The paper consists of **two** sections.
- Section **A** is **compulsory**.
- Answer any **two** questions from section **B**.

SECTION A

QUESTION ONE (30 MARKS)

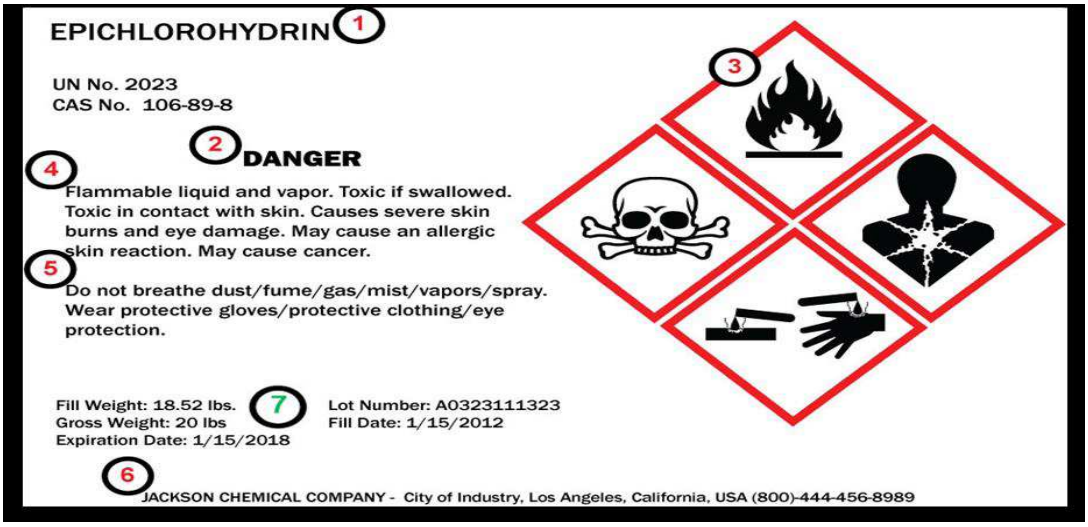
a) Listed below are some of the key determinants of laboratory safety under standard operating procedures. For each, write down three measures that should be observed by laboratory personnel. (9 marks)

i) General personal safety

ii) Eye safety

iii) Safe handling of biologically hazardous material

b) The figure below is usually attached to chemical containers by manufacturers.



i) State the name given to the above figure (1 mark)

ii) Identify the information represented by number 1 – 6 (6 marks)

c) Define standard operating procedures (SOPs) and state their importance in laboratory operations. (2 marks)

d) Describe what is meant by a chemical hygiene plan (CHP). (2 marks)

e) Explain why glass is the preferred material for most laboratory apparatus (3 marks)

f) Name three glassware for qualitative use and three for measuring/ volumetric purposes (6 marks)

g) Define a buffering agent (1 mark)

SECTION B

QUESTION TWO (20 MARKS)

a) Describe the format of a laboratory report (7 marks)

b) State Four advantages of cleaning glassware in a washer over mechanical washing.(4 marks)

c) Name the **three** types of glass soiling and for **each give two** examples (6 marks)

d) State Three fundamental requirements for a cleaning agent. (3 marks)

QUESTION THREE (20 MARKS)

a) Differentiate between accuracy and precision (2 marks)

b) State and briefly discuss **THREE** types of errors. (6 marks)

c) Identify **THREE** sources of systematic errors and give **TWO** examples for each. (6 marks)

d) Describe how the above errors can be minimized or controlled in the laboratory. (6 marks)

QUESTION FOUR (20 MARKS)

a) Describe a procedure for the calibration of a 25 mL pipette (10 marks)

b) After a busy day of preparing and analyzing samples in the laboratory, you are faced with a large amount of beakers, Erlenmeyer flasks, test tubes, pipettes and burette. Describe how you would successfully achieve cleaning and drying of the pieces of glassware for the next day's use. (10 marks)

QUESTION FIVE (20 MARKS)

a) Define a safety data sheet (2 marks)

b) Explain the importance of safety data sheet (4 marks)

c) Define the following terms and give an example for each: (6 marks)

i. Acid

ii. Base

iii. Conjugate base

d) You are requested to prepare 500 mL of 0.1 M nitric acid. The nitric acid available in the university store is found to contain the following information: Assay = 65.0 %

Density = 1.384 – 1.416

Describe clearly how you would prepare the requested nitric acid.

(Show your calculations clearly) (8 marks)