

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

FOURTH YEAR EXAMINATION FOR THE AWARD OF DEGREE
OF BACHELOR OF SCIENCE, BACHELOR OF EDUCATION SCIENCE
& BACHELOR OF SCIENCE IN BIOMEDICAL SCIENCE

CHEM 101: CHEMICAL LABORATORY SAFETY AND SECURITY

STREAMS: BSC , BED (SCI), BSC (BIOCHEM), BSC (BIOMED) TIME: 2 HOURS

DAY/DATE: WEDNESDAY 06/12/2017

8.30 A.M. – 10.30 A.M.

INSTRUCTIONS: ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS

QUESTION ONE (30 MARKS)

- (a) (i) Define chemical hygiene plan [½ mark]
(ii) Give four topics to be included in a chemical hygiene plan. [2½ marks]
- (b) List and explain four general laboratory safety rules. [2 marks]
- (c) Briefly explain the following terms:
(i) Flash point
(ii) Pyrophoric chemicals
(iii) Irritants
(iv) Cryogenic liquids [5 marks]
- (d) Define the material safety and data sheets (MSDS) and give four information that is contained in the MSDSs. [5 marks]
- (e) Briefly explain three precautions when storing compressed gas cylinder. [3 marks]
- (f) Discuss briefly four fundamental principles of working with chemicals. [4 marks]
- (g) List four housekeeping rules for working in the laboratory. [2 marks]
- (h) Briefly discuss the four biosafety levels. [4 marks]
- (i) Enumerate and explain four preliminary assessments to be done when working with nanomaterial. [2 marks]

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QUESTION TWO (20 MARKS)

- (a) Discuss briefly two major elements of environmental health and safety management system. [4 marks]
- (b) Explain four rules of a chemical hygiene officer. [4 marks]
- (c) Enumerate with an explanation four items to be included in a laboratory inspection program. [4 marks]
- (d) Briefly explain two control measures for the following hazards
 - (i) Dust explosions
 - (ii) Pyrophorics [4marks]
- (e) List four risks to laboratory security. [4 marks]

QUESTION THREE (20 MARKS)

- (a) Using an example give the four common classification of fires. [4 marks]
- (b) Discuss four routes of exposure to chemicals in the laboratory. [4 marks]
- (c) Define green chemistry and explain three ways in which it can be applied in the laboratory. [4 marks]
- (d) Discuss four special precautions for minimizing exposure to highly toxic chemicals. [4 marks]
- (e) Briefly explain four functional work practices in biosafety. [4 marks]

QUESTION FOUR (20 MARKS)

- (a) Briefly discuss two considerations to be done before
 - (i) Purchasing/ordering of chemicals
 - (ii) Inventory and tracking of chemicals
 - (iii) Storage of chemicals [6 marks]
 - (b) Explain four prudent practices for working with the following:
 - (i) Radioactive materials
 - (ii) Flammable materials
 - (iii) Electrical equipment
 - (iv) Cryogenic liquids [8 marks]
 - (c) Briefly personal protective equipment used in the lab. [4 marks]
 - (d) Give four (4) characteristics of waste. [2 marks]
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