

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

RESIT/SPECIAL EXAMINATION

**EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE AND
BACHELOR OF EDUCATION SCIENCE**

CHEM 101: CHEMICAL LABORATORY SAFETY AND SECURITY

STREAMS: BSC & BED SCIENCE

TIME: 2 HOURS

DAY/DATE: THURSDAY 04/11/2021

11.30 A.M – 1.30 P.M.

INSTRUCTIONS:

- **Answer all questions**

QUESTION ONE (30 MARKS)

- a) State three conditions that must exist simultaneously for fire to occur (3 marks)
- b) You are recommended you wear appropriate personal protective equipment (PPE) when working with hazardous chemicals in the laboratory at all times. Discuss why this is important for your safety. (3 marks)
- c) Explain the following type of chemicals (4 marks)
- Corrosive substances
 - Asphyxiants
 - Reproductive and developmental toxins
 - Carcinogens
- d) List two (2) common cryogenes used in the laboratory (2 marks)
- e) State four (4) heating devices used in the laboratories (2 marks)
- f) Explain the guidelines of cleaning up the following types of spills
- Materials of low flammability that are not volatile or that have low toxicity (3 marks)

- ii. Flammable solvents (3 marks)
- g) Explain three (3) causes of ignition (6 marks)
- h) Briefly explain the potential hazards arising from (4 marks)
 - i. Radioactivity in a laboratory setting
 - ii. Nanomaterials

QUESTION TWO (20 MARKS)

- a) Discuss the major chemical exposure routes in the body when handling chemicals in the laboratory (8 marks)
- b) Explain how the following equipment are used in the laboratory to provide safety (9 marks)
 - i. Fume hood
 - ii. Safety showers and eye wash stations
 - iii. Biosafety cabinets
- c) Briefly explain the information found in a material safety data sheet (MSDSs) (3 marks)

QUESTION THREE (20 MARKS)

- a) Briefly describe 3 principles of green chemistry that can be applied in a laboratory (6 marks)
 - b) Explain the major phases to managing a large-scale emergency (8 marks)
 - c) State four consulting sources of information in the laboratory (4 marks)
 - d) Distinguish between acute and chronic exposure of chemicals (2 marks)
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