



TECHNICAL UNIVERSITY OF MOMBASA

SCHOOL of Applied and Health Sciences

Department of Pure & Applied Sciences

UNIVERSITY EXAMINATION FOR

DIPLOMA IN ANALYTICAL CHEMISTRY(DAC 24S)

DIPLOMA IN SCIENCE LABORATORY TECHNOLOGY(DSLT 24S)

ACH 2105 LABORATORY SAFETY AND ETHICS

END OF SEMESTER EXAMINATION (ordinary)

SERIES: 2024

TIME:2HOURS

DATE:DEC 2024

Instructions to Candidates

You should have the following for this examination

Answer Booklet, examination pass and student ID

This paper consists of **five** questions. Attempt question ONE (Compulsory) and any other TWO questions.

Do not write on the question paper.

Question ONE

- A. (i) List TWO potential hazards associated with autoclave 1 Mark
- (ii) State THREE causes of electrical hazard 3 Marks
- B. (i) State precaution to observe when handling biological samples 3 Marks
- (ii) Name TWO gases which are toxic 1 Mark
- C. (i) State symptom of mild to moderate heat stress 3 Marks
- (ii) List TWO cryogenic fluids 1 Mark
- D. Draw hazard symbols for the following:
- (i) Harmful 2 Marks
- (ii) Highly flammable 2 Marks

- E..State the classification of burns 4 marks
- F (i) Explain why cryogenic fluids produce large volumes of gas when they vaporize 2 Marks
- (ii) List FOUR house hold products which can cause a chemical burn 2 Marks
- G. Explain precautions taken to minimize mercury contamination in the laboratory 4 Marks
- H. List TWO types of acute health effects 2 Marks

Question TWO

- A) Explain specification to be included in a design of a laboratory that support both safety and productivity 5 Marks
- B) Describe signs of chemical exposure 5Marks
- C) Describe the aims of first Aid 5 Marks

Question THREE

- A) Outline guidelines to be followed for battery charging 6 Marks
- B) Describe the key practices to implement when handling particularly hazardous Substance. 7 Marks
- C) Describe the first Aid performed when cryogenic fluid comes in contact with the skin 2 marks

Question FOUR

- A) Explain factors that affect the body temperature regulation 5 Marks
- B) Outline the procedure for splashes into Eye with a chemical 3 Marks
- C) Discuss precaution taken to avoid suffering negative effects from chemicals 7 marks

Question FIVE

- A) Outline the recommended guidelines to minimize the mercury spills and exposures 5 Marks
- B) Explain the procedure perform during recovery position to a person under going first Aid 7 Marks
- C) Discuss how laboratory accidents can be minimize 3 Marks

ACH 2105 Laboratory Safety and Ethics

Lecturer: mwirigi m'twaruchiu mtwaruchiumwirigi@tum.ac.ke 0721-648461

Meetings: MONDAY 10: 00 a.m – 1:00 p.m

Dac 2024m

OBJECTIVES: Describe the safety precautions recommend for the laboratory. Describe the design of chemical laboratories, Explain the importance of safety, cleanliness, and good habits in the laboratory, Perform general laboratory activities, Care for laboratory equipments and apparatus.

Assessment: Assignment 5%, Tests 15%, Practicals 20%, Examination 60%.

COURSE CONTENT: Hazards and prevention in chemical laboratories; mechanical, electricity, fire, radiation, explosions glass and chemicals. Safety designs and hosekeeping; Personal safety, general cleanliness, avoidance of dangers. Accidents. First-aid. Poisoning and treatment; nerve, corrosive and irritant.

COURSE DESCRIPTION OUTLINE AND SCHEDULE

WEEK	TOPIC	DETAILS
2	Introduction	<ul style="list-style-type: none">• Exploration of course outline• safety aspects in laboratory• Types of hazards and risks
3	Physical hazards and prevention	<ul style="list-style-type: none">• Lighting, battery charging• Heating devices• heat stress,• Cold traps• Autoclaves• Centrifuges and centrifuge rotor care• cryogenic safety and cryogenic liquids
4	Chemical hazards and prevention	<ul style="list-style-type: none">• Biohazards materials• Radioactive materials• Explosive compounds• Hazard symbols• Effects of chemical exposure• Sign and Symptoms• types of health effects• emergency procedures• Personal safety
5	Laboratory Apparatus	<ul style="list-style-type: none">• Selection of glassware for high and low pressure,• Use of Glass Under Vacuum• Glassware Washing• Setting up Laboratory Apparatus and Equipment• Preparation of Glass Tubing and Stoppers

		<ul style="list-style-type: none"> • drilling a stopper • Insertion of Glass Tubes or Rods into Stoppers • Assembling Apparatus
6	C.A.T-1, Practicals	<ul style="list-style-type: none"> • User maintenance of equipment
7	Laboratory Accidents and injuries	<ul style="list-style-type: none"> • Fire • Chemical burns • Gas • Spills and breakages • Falls and slips • Hand tools • Contamination
8	Emergencies	<ul style="list-style-type: none"> • General Preparation for Emergencies • Handling the Accidental Release of Hazardous Substances • Treatment of Injured and Contaminated Personnel • Spill Containment, Handling Leaking Gas Cylinders • Responding to Fires • Handling spills of elementary mercury
9	Safety designs and Good housekeeping	<ul style="list-style-type: none"> • Types of laboratories • Laboratory designs • biosafety cabinets, • Organization of the laboratory • prevent slips, trips, and falls
10	C. A T –II Practicals	<ul style="list-style-type: none"> • Setting up Laboratory Apparatus and Equipment
11	First Aid	<ul style="list-style-type: none"> • Introduction • Aims of first Aid • Recovery position • cardio-pulmonary resuscitation(cpr)
12	Peripheral neuropathy(Nerve Damage) and chemical irritations	<ul style="list-style-type: none"> • Symptoms • causes neuropathies, • Skin irritations and burns, • Eye, nose, and throat irritations and burns, • Mild to moderate poisoning
13	Chemical burns	<ul style="list-style-type: none"> • Types of chemical burns • Chemical burns Causes and risk factors • Emergency Medical care of chemical burns • Chemical burns diagnosis • Chemical burn treatment

		<ul style="list-style-type: none">• Chemical burn complications and prevention
14	Revision	