



TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering and Technology
Department of Mechanical & Automotive Engineering
UNIVERSITY EXAMINATION FOR:
BSc. Mechanical Engineering/BTECH Mechanical Engineering & BTECH Marine
Engineering

TMC/EMC 4211: HEALTH, SAFETY & ENVIRONMENT ENGINEERING
SPECIAL/SUPPLEMENTARY EXAMINATION

SERIES: SEPTEMBER 2018

TIME: 2 HOURS

DATE: Pick Date Sep 2018

Instruction to Candidates:

You should have the following for this examination

- *Answer booklet*
- *Non-Programmable scientific calculator*

This paper consists of **FIVE** questions. Attempt any other **THREE** questions.

Maximum marks for each part of a question are as shown.

Do not write on the question paper.

Question ONE

- Discuss **SIX** challenges in the delivery of occupational health and safety services
(3marks)
- Explain **THREE** classifications of hazards in engineering (3marks)
- The energy Act is an Act of parliament to amend and consolidate the law relating to energy. Explain any **TWO** sections of the Kenya energy Act (4marks)
- Discuss **FOUR** sections of the Kenya occupational safety & health Act (5marks)
- Give **THREE** classification of waste on basis of radioactivity and explain the methods of disposal of these wastes (5marks)

Question TWO

- a) Explain the following aspects of Part IX of the Environmental management and coordination Act
 - i. Environmental Restoration Orders
 - ii. Environmental Easements (4marks)
- b) Name FOUR institutions which are representatives of the Government Ministries responsible for the implementation of the Environmental Management and Coordination Act (2marks)
- c) Risk matrices experience several problematic mathematical features making it harder to assess risks. Explain FOUR of these problems (4 marks)
- d) Explain THREE major sections of the Kenya water ACT (3marks)
- e) Give THREE classification of hazardous waste as used in the environmental protection Act and explain TWO methods of hazardous waste disposal (7marks)

Question THREE

- a) Define the term policy statement as used in Occupational Health and safety and give THREE specific objectives of the policy (4 marks)
- b) Give THREE duties of each of the following as indicated in OSH policy document
 - i. Ware house & delivery staff
 - ii. Safety officer
 - iii. Supplier (5 marks)
- c) Define the term risk management and explain FOUR major steps to be followed during risk mitigation (5marks)
- d) The main purpose of treating waste water is to prevent pollution of the receiving waters. Many techniques have been devised to accomplish this aim for both large and small quantities of water. draw the schematic diagram of a typical waste water treatment plant and explain the process (6 marks)

Question FOUR

- a) List FIVE stakeholders involved in the implementation of the occupational health & Safety policy and explain the role of each (**5 marks**)
- b) Define the term Risk matrix and explain **FOUR** categories of harm severity (5marks)
- c) Define the term SOP and explain the following types of SOPs
 - i. Technical SOP
 - ii. Administrative SOP (5marks)
- d) Air quality management sets the tools to control air pollutant emissions. The selection of control technologies depends on environmental, engineering, economic factors and pollutant type. Discuss the mechanisms of air pollution Control (5marks)

Question FIVE

- a) Define the term environmental impact assessment as used in the Environmental management and co-ordination Act and list TWO offences relating to environmental Impact Assessment (3 marks)
- b) Give SIX regulations outlined in the Environmental management and co-ordination Act on toxic & hazardous materials (3marks)
- c) Explain the critical injury protocol used in Occupational health and Safety (2marks)
- d) Differentiate between fault tree and event tree methods of hazard analysis (4marks)
- e) If not written correctly, SOPs are of limited value. Explain SIX steps used in the process of making a good SOP (3marks)
- f) There are several aims in managing solid waste. Discuss the following techniques of solid waste management
 - i. Land fills
 - ii. Incineration
 - iii. Scrubbers (5marks)