2922/202
ENVIRONMENTAL POLLUTION CONTROL,
HEALTH AND SAFETY
Oct./Nov. 2022
Time: 3 hours

THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN ENVIRONMENTAL SCIENCE AND TECHNOLOGY

MODULE II

ENVIRONMENTAL POLLUTION CONTROL, HEALTH AND SAFETY

3 hours

INSTRUCTIONS TO CANDIDATES

You should have an answer booklet for this examination.
*This paper consists of **TWO** sections; **A** and **B**.*
*Answer **ALL** the questions in section **A** and any **THREE** questions from section **B** in the answer booklet provided.*
*Each question in section **A** carries **4** marks while each question in section **B** carries **20** marks.*
Maximum marks for each part of a question are as shown.
Candidates should answer the questions in English.

This paper consists of 3 printed pages.

Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

SECTION A (40 marks)

*Answer **ALL** questions in this section.*

1. State **four** factors which affect dispersion of air pollutants in chemical plants. (4 marks)

2. Name **four** products of atmospheric reactions of nitrogen oxides. (4 marks)

3. (a) Describe 'carbonyl compounds'. (2 marks)

   (b) State **two** reasons why carbonyl compounds pose environmental concerns. (2 marks)

4. State **four** properties of pesticides that make them water pollutants. (4 marks)

5. Describe **four** chemical properties of heavy metals. (4 marks)

6. Distinguish between chemical hazard and biological hazard. (4 marks)

7. State **four** reasons for investigating accidents in the workplace. (4 marks)

8. State **four** obligations of workers in ensuring safety in their place of work. (4 marks)

9. State **four** reasons why it is important to conduct regular safety inspections in a factory. (4 marks)

10. List **four** negative acts of workers in a mining plant that may compromise their safety. (4 marks)

SECTION B (60 marks)

*Answer any **THREE** questions from this section.*

11. (a) Explain how each the following strategies can be used to control emission of harmful gases to the atmosphere:

    (i) scrubbing gases; (2 marks)
    (ii) production reduction; (2 marks)
    (iii) use of alternative less harmful inputs. (2 marks)

    (b) (i) Draw the chemical structure of hexafluoroethane; (2 marks)
    (ii) Explain how hexaflouroethane causes global warming. (4 marks)

    (c) State **two** sources of hydrogen sulfide in the environment. (2 marks)

    (d) Outline the process of eutrophication in a fresh water lake. (6 marks)

12. (a) (i) Name **two** elements whose presence signify smog in a city. (2 marks)
(ii) State **four** effects of smog in the environment. (4 marks)
(iii) Name **three** constituents required in the formation of smog. (3 marks)

(b) (i) Describe 'biological oxygen demand' (BOD). (2 marks)
(ii) Outline the procedure for measuring BOD of a water sample. (4 marks)
(iii) State the limitation of using BOD to test water quality. (2 marks)

(c) Name **three** additives of a detergent that cause environmental pollution. (3 marks)

13. (a) State any **six** circumstances that necessitate safety and health training of workers in an organisation. (6 marks)

(b) Explain **four** benefits of having accident prevention measures in a food processing factory. (8 marks)

(c) State **six** responsibilities of employees in regards to safety under occupational safety health Act. (6 marks)

14. (a) Explain **five** goals of a health and safety committee in a manufacturing firm. (10 marks)

(b) Describe **four** responsibilities of a safety manager in an organisation. (10 marks)

15. (a) State **four** indicators of a positive safety culture in an organisation. (4 marks)

(b) Explain **four** factors which can hinder workers from observing safety measures in an organisation. (8 marks)

(c) Describe **four** ways of designing a safe work environment in a chemical processing plant. (8 marks)

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