

2528/202
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ENVIRONMENTAL POLLUTION CONTROL,
HEALTH AND SAFETY
June/July 2017
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 the following for this examination:

answer booklet;

non-programmable scientific calculator.

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 4 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 the questions in this section.

1. Explain the effect of sulphur dioxide exposure on the following:
 - (a) human health; (2 marks)
 - (b) plant health. (2 marks)
2. State any four negative effects of acid rain. (4 marks)
3. (a) Differentiate between aldehyde and ketone. (2 marks)
(b) Draw chemical structures of acetaldehyde and acetone. (2 marks)
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CC(=O)C
4. State four ways in which mercury could be released through human use into the environment. (4 marks)
5. Name the pesticide used to control the following organisms:
 - (a) snails and slugs; (1 mark)
 - (b) microscopic round worms; (1 mark)
 - (c) vertebrates; (1 mark)
 - (d) fish. (1 mark)
6. State four importance of safeguarding the welfare of employees by the management of a processing industry. (4 marks)
7. List four personal protective equipment required by a worker in a factory producing nails. (4 marks)
8. Explain how the following factors can contribute to accidents in a workplace:
 - (a) poor emergency response procedures; (2 marks)
 - (b) poorly trained staff. (2 marks)
9. The following are preventive and protective measures that should be taken into consideration by a safety engineer when assessing and dealing with risks in a workplace:
 - minimize the risk;
 - eliminate the risk;
 - provide for personal protective equipment;
 - control the risk at source.Arrange them in order of priority. (4 marks)
10. State four occupational rights that workers in an organization are entitled according to Health and Safety Act of Kenya 2007. (4 marks)



SECTION B (60 marks)

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

11. (a) State the three ingredients required for photochemical smog to form. (3 marks)
- (b) Outline the process of formation of photochemical smog in a city with petroleum industries. (5 marks)
- (c) Explain any three harmful effects of smog. (6 marks)
- (d) Explain three ways that an environmentalist can use to control the release of hydrocarbons to the environment by automotive engines. (6 marks)

12. Table 1 shows the results of analysis of effluent from a city sewage system.

Table 1

Component	Concentration, mg/L
Biorefractory organics	15
Grease and oil	8
Heavy metals	4
Chelating agents	3

- (a) Draw a bar graph showing percentage proportion of each pollutant. (8 marks)
- (b) Name the possible source of the pollutants. (1 mark)
- (c) State four methods used in removing biorefractory compounds in water. (4 marks)
- (d) Name three heavy metals that can be found in the sewage. (3 marks)
- (e) If the sewage was discharged at the rate of 100 L/hr, determine the amount of grease and oil released in kg per day. (4 marks)
13. (a) An environmental officer is charged with the responsibility of ensuring safe and healthy working environment to employees. Explain any six duties of the officer. (12 marks)
- (b) Explain any four duties that individual workers in a processing industry are charged with to ensure their own safety. (8 marks)
14. (a) Differentiate between a risk and hazard. (2 marks)
- (b) Explain three consequences of having frequent occupational accidents and diseases to an organization. (6 marks)



(c) Explain the following techniques of workers' health surveillance in situations where workers are likely to be exposed to hazardous substances:

- (i) pre-placement medical examination; (3 marks)
- (ii) periodic medical examination; (3 marks)
- (iii) a return-to-work medical examination; (3 marks)
- (iv) post assignment health examination. (3 marks)

15. (a) Explain five benefits to an organization of keeping a report of injuries, diseases and dangerous occurrences in the workplace. (10 marks)

(b) A cement manufacturing industry wishes to recruit an officer to run its occupational health services department. List any five job descriptions of the officer. (10 marks)

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