



UNIVERSITY OF SWAZILAND
Faculty of Health Sciences
Department of Environmental Health Science

BACHELOR OF SCIENCE IN ENVIRONMENTAL
MANAGEMENT AND OCCUPATIONAL HEALTH

MAY 2017 FINAL EXAMINATION PAPER

TITLE OF PAPER : FUNDAMENTALS OF INDUSTRIAL HYGIENE
COURSE CODE : EHM 428
DURATION : 2 HOURS
MARKS : 100

INSTRUCTIONS

1. Read the questions & instructions carefully
2. Question 1 is compulsory
3. Answer ANY OTHER THREE (3) questions
4. Each question is weighted 25 marks
5. Write neatly and clearly
6. Begin each question in a separate sheet of paper
7. Numbering within a chosen question should be in a sequential order
8. BEGIN EACH QUESTION ON A SEPARATE SHEET OF PAPER.

**DO NOT OPEN THIS QUESTION PAPER UNTIL PERMISSION IS GRANTED
BY THE INVIGILATOR.**

QUESTION 1

- a) Write short notes on the 5 tenets of industrial hygiene. (20)

The following are multiple choice questions. Write the letter and corresponding number only. Each answer carries 1 mark. (5)

- b) Too many levels of management, chronic and recurring internal problems, and numerous meetings attended by many people are typically symptoms of:
- i. Poor communications.
 - ii. Lack of management training.
 - iii. Poor employee morale.
 - iv. A flawed organizational structure.
- c) Workers in a brass foundry complain of a fever and general malaise on Mondays following a weekend respite from work. You will plan to arrive at the plant equipped to obtain:
- i. Blood samples to detect carbon monoxide exposures.
 - ii. Air samples to measure exposures to zinc fume.
 - iii. Potable water samples to detect PCB concentration.
 - iv. Urine samples to measure exposures to lead.
- d) A maintenance worker must enter an empty reactor vessel for cleaning, inspection and lining repair. In the absence of continuous ventilation and testing of the air in the vessel, you would recommend:
- i. An organic vapor respirator for the worker and a helper with a life line within earshot.
 - ii. Performance of the work at night with prior notice to the city's emergency response unit.
 - iii. Flushing the tank with a suitable organic solvent before the worker enters
 - iv. A Self Contained Breathing Apparatus and fixed life line for the worker and a helper directly outside the tank.

- e) The ACGIH Threshold Limit Value is primarily intended to guard against:
- i. Delayed lung edema.
 - ii. Respiratory tract irritation.
 - iii. Tubular kidney injury.
 - iv. Mottling of tooth enamel.
- f) Which one of the following health effects may be manifested by chronic overexposure to benzene?
- i. Bladder tumors
 - ii. Cholinesterase depression
 - iii. Abdominal colic
 - iv. Leukemogenic cancer

[25 marks]

QUESTION 2

- a) During the World War I the urgency to work in munitions led to poor working conditions. A committee was therefore established to control many of these bad practices. Name the areas that this committee concentrated on. (4)
- b) In the 1960s Sherwood and Greenhalgh documented the first sampling pump and head. Name the three outcomes of this development. (6)
- c) What would be the three (3) components that one will need in order to quantify exposure to a pollutant? (6)
- d) Outline the current guidance to what workers may be exposed to under excursions. (6)
- e) What type of work environments would be depicted by the following? (3)
- i. Oxygen enriched
 - ii. Oxygen deficient
 - iii. Confined space

[25 marks]

QUESTION 3

- a) What contributions to industrial hygiene have been brought by the following scientists that are still applicable even now? (20)
- i. Hippocrates
 - ii. Paracelsus
 - iii. Ramazzini
 - iv. John Stenhouse
 - v. Haldane.
- b) Write the following symbols in full and indicate what they represent in industrial hygiene (5)
- i. SEN
 - ii. S
 - iii. BEIs
 - iv. AL
 - v. REL

[25 marks]

QUESTION 4

- a) Define a push-pull system in confined spaces. (3)
- b) Outline the 5 components of exposure assessment. (10)
- c) List the potential industrial pollutants associated with the following;
- i. Foundry emissions. (3)
 - ii. Combustion products. (3)
- d) Briefly indicate the primary objective of comprehensive exposure assessment. (6)

[25 marks]

QUESTION 5

- a) Define the following terms as they relate to industrial hygiene:
fundamental, art and science. (6)
- b) Name the type of chemicals determinant that one would find in the following biological media. (3)
- i. Urine
 - ii. Exhaled air
 - iii. Blood
- c) Differentiate between the following types of sampling: (8)
- i. Grab
 - ii. Personal
 - iii. Area
 - iv. Integrated
- d) Write short notes on personal dust sampling. (8)

[25 marks]