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

DEGREE IN ENVIRONMENTAL HEALTH SCIENCES

FINAL EXAMINATION PAPER 2016

TITLE OF PAPER : RISK ASSESSMENT, MANAGEMENT AND COMMUNICATION

COURSE CODE : EHM 312

DURATION : 2 HOURS

MARKS : 100

INSTRUCTIONS
: READ THE QUESTIONS & INSTRUCTIONS CAREFULLY
: QUESTION 1 IS COMPULSORY
ANSWER **ANY OTHER THREE** QUESTIONS
: EACH QUESTION **CARRIES 25** MARKS.
: WRITE NEATLY & CLEARLY
: NO PAPER SHOULD BE BROUGHT INTO THE EXAMINATION ROOM.
: BEGIN EACH QUESTION ON A SEPARATE SHEET OF PAPER.

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

QUESTION 1

Write True or False against each letter corresponding to the following statements as they apply to acoustics.

a) Risk management in synonymous with hazard identification and risk assessment.
b) The risk assessment process ensures that factors influencing health are fully understood and adequately quantified so that decisions are taken in a consistent and cost-effective manner.
c) The risk of hearing loss from high noise environments depends on the noise level and the length of time of exposure.
d) The conduct of occupational hygiene surveys and studies is only one phase in the overall effort in determining occupational health hazards.
e) Radiation protection does not cover the concepts of time, distance, and shielding.
f) Barometric hazards can be categorized as hypobaric or high pressure hazards, hyperbaric or low pressure hazards, and hazards from changes in pressure.
g) The concept of the equivalent continuous sound level is used where the noise level fluctuates, as it happens in most industrial situations.
h) The macro-environment of the office, tool, warehouse, etc and the micro-environment that lies underneath the clothing and protective equipment that a worker wears.
i) Ergonomics is the science of fitting workplace conditions and job demands to the capabilities of the working population.
j) The direct field is due to reflections from the room surfaces and the reverberant field is due to noise radiating directly from the source.
k) The dose-response assessment is the relationship between level and probability of effect.

[22 marks]

II.

Define prevalence as applied in occupational health

[3 marks]

QUESTION 2

a) Define occupational health

[3 marks]

b) Define occupational health services

[4 marks]

c) Describe administration controls under the following topics:

i. Employee rotation and reduction of exposure times

[4 marks]

ii. House keeping

[6 marks]

iii. Personal hygiene

[3 marks]

iv. Maintenance programs

[5 marks]

QUESTION 3

a) Describe air-borne pollutants and give one example of each and stipulate its source and an occupational health problem or disease associated with it.

[15 marks]

b) Describe a health and safety risk management framework

[10 marks]

QUESTION 4

i) Describe risk assessment under the following headings:

a) Definition of a risk assessment.

[3 marks]

b) Importance of risk assessment

[4 marks]

c) The goal of a risk assessment

[2 marks]

d) How is a risk assessment carried out?

[4 marks]

e) How are hazards identified?

[4 marks]

ii) Describe the characteristics of successful emission and exposure controls

[8 marks]

QUESTION 5

a) Describe the requirements of a valid measurement as applied in occupational hygiene.

[6 marks]

b) Describe the elements of an effective occupation health management policy.

[6 marks]

c) Describe the purpose of an occupational health assessment

[10 marks]

d) Describe risk communication

[3 marks]

FORMULAE- ACOUSTIC AND HEALTH

1. $W = \sum_{i=1}^{4} \frac{p^{2rms(1)} S_i}{\rho C}$, where $\rho C = 420$ RAYLS.
2. $L_p = 10 \log (p_1/p_0)^2$
3. $NR = 10 \log_{10} = \frac{TA_2}{TA_1}$
4. $SPL_t = 10 \log_{10} [\Sigma 10^{SPL/10}]$
5. $L_W = 10 \log W/W_0$
6. $I = \frac{W}{A}$
7. $I = \frac{p^2_{rms}}{\rho C}$ or $p_{rms} = (I \rho C)^{1/2}$
8. $S.I.L = 10 \log_{10} (I/I_{ref})$
9. $R = \frac{S\bar{\alpha}}{1-\bar{\alpha}} = \frac{19.8}{} = 22.10$
10. $\bar{\alpha} = \frac{S_i\bar{\alpha}_i + S_2\bar{\alpha}_2 + \ldots.}{S_i + S_2}$
11. $SPL_t = SWL + 10 \log_{10} \{ \frac{Q}{4\pi r^2} + \frac{4}{R} \}$
12. $T = \frac{0.161\ V}{S\bar{\alpha}}$
13. $T = \frac{0.161\ V}{-S[\ln(1-\bar{\alpha})] + 4mV}$
14. $\tau = \frac{p_t^2/\rho C^2}{p_i^2/\rho C^2}$
15. $TL_{brick} = 10 \log_{10} \{ \frac{1}{\tau} \}$