



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

DEGREE IN ENVIRONMENTAL HEALTH SCIENCES  
SUPPLEMENTARY 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 assessment is the determination of quantitative or qualitative value of risk related to a concrete situation.
- b) Risk management is a scientifically based process consisting of hazard identification, hazard characterization, exposure assessment and risk characterization.
- c) Hazard identification is the causal link between agent and effect.
- d) The risk assessment process ensures that factors influencing health are fully understood and adequately quantified so that decisions are taken inconsistently and in a cost-effective manner.
- e) The risk of hearing loss from high noise environments depends on the noise level and the length of time of exposure.
- f) The conduct of occupational hygiene surveys and studies is only one phase in the overall effort in determining occupational health hazards.
- g) Dose-response assessment is the relationship between level and probability of effect
- h) Improvement in the workplace conditions and increase of illness or disability are due to actions within the workplace and result from the implementation of risk prevention and control measures.
- i) Occupational Exposure Limit (OEL) is the airborne concentration of chemical agents and levels of physical agents and represents conditions under which it is believed that nearly all workers may be repeatedly exposed day after day with adverse effect.
- j) Epidemiology is a study of how and why diseases are distributed in groups of people and the application of findings to control health problems.

[20 marks]

**II.**

Determine the LEP, d for a worker having the following exposure pattern.

- 87dB (A) for 2 hours
- 89 dB (A) for 3 hours
- 92 dB (A) for 1.5 hours

[5 marks]



**QUESTION 2**

- a) Define risk as applied in occupational health and safety. [3 marks]
- b) Describe risk management. [12 marks]
- c) Describe why it is important to carry out a risk assessment and prepare a risk statement. [10 marks]

**QUESTION 3**

- i. Describe three types of air-borne pollutants and give one example of each and stipulate its source and an occupational health problem or disease associated with it. [9 marks]
- ii. Describe the legal requirements for an employer to manage safety and health at work so as to prevent accidents and ill-health. [16 marks]

**QUESTION 4**

Describe the hazard substances management procedures under the following headings;

- a) Material Safety Data Sheets (MSDSs) [8 marks]
- b) Receipt of chemical products on site [5 marks]
- c) Storage facilities [9 marks]
- d) Sampling [3 marks]

**QUESTION 5**

Describe ergonomics under the following headings;

- a) The nature and scope
  - b) Ergonomics-related hazards in the workplace
  - c) Work-related musculoskeletal disorders manual handling
  - d) Equipment and workplace design
  - e) Shift work and related issues
- [25 marks]



FORMULAE- ACOUSTIC AND HEALTH

1.  $W = \sum_{i=1}^4 p_{rms(i)}^2 S_i$ , 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.  $SPL_t = 10 \log_{10} [ \sum 10^{SPL/10} ]$
5.  $L_W = 10 \log W/W_0$
6.  $I = \frac{W}{A}$
7.  $I = p_{rms}^2$  or  $p_{rms} = (I \rho C)^{1/2}$
8. S.I.L =  $10 \log_{10} (I/I_{ref})$
9.  $R = \frac{S\bar{\alpha}}{1-\bar{\alpha}} = \frac{19.8}{1-\bar{\alpha}} = 22.10$
10.  $\bar{\alpha} = \frac{S_1\bar{\alpha}_1 + S_2\bar{\alpha}_2 + \dots}{S_1 + S_2}$
11.  $SPL_t = SWL + 10 \log_{10} \left\{ \frac{Q}{4\pi r^2} + \frac{4}{R} \right\}$
12.  $T = \frac{0.161 V}{S \bar{\alpha}}$
13.  $T = \frac{0.161 V}{-S [\ln (1 - \bar{\alpha})] + 4mV}$
14.  $\tau = \frac{p_1^2/\rho C^2}{p_i^2/\rho C^2}$
15.  $TL_{brick} = 10 \log_{10} \left\{ \frac{1}{\tau} \right\}$