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

DEGREE IN ENVIRONMENTAL HEALTHSCIENCES

SUPPLEMENTARY EXAMINATION PAPER 2016

TITLE OF PAPER	:	PRINCIPLES OF OCCUPATIONAL HEALTH AND SAFETY
COURSE CODE	:	EHM 211
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

I.

For the following statements as applied in principles of occupational, health and safety write whether they are true or false.

a) Occupational skin diseases (OSD) are the most common occupational diseases.
b) Contact dermatitis is not the most common occupational skin disease.
c) Chemical agents are the main cause of occupational skin diseases and disorders
d) Physical agents are divided into two types: primary irritants and sensitizers.
e) Physical agents may be friction pressure abrasions lacerations and contusions.
f) Dermal Absorption is the transport of a chemical from the outer surface of the skin into the skin and into the body.
g) Pesticides and organic solvents are the most commonly used chemicals in the workplace and could potentially result in systemic toxicity if they penetrate through the skin.
h) The reverberation time is dependent on the volume of the room and the absorption properties of the material.
i) The speed of sound depends only on the absolute temperature of the air.
j) The degree of annoyance from noise depends on the individual's attitude to the noise and the quality and the magnitude of the sound.
k) Sound is produced when a vibrating source in an elastic-medium, such as air, causes pressure variations which are transmitted through the medium.

[22 marks]

II.

Name three physical hazards.

[3 marks]

QUESTION 2

a) A sound has a sound intensity level of 90 dB. What is the sound intensity and sound pressure of the sound?

[8 marks]

b) Describe how noise can affect human beings under the following headings:
   i. Damage to hearing

[9 marks]

   ii. Disturbance of sleep and communication

[8 marks]

QUESTION 3

a) Describe the four steps of carrying out an occupational survey.

[12 marks]

b) Describe the two main types of occupational hazards and give an example of a disease or condition associated with each of them.

[8 marks]

c) Describe two categories of occupational contact dermatitis.

[5 marks]

QUESTION 4

a) Describe dermal absorption of chemical agents.

[8 marks]

b) A factory shell 4 x 6 x 10m has a reverberation time of 1.5s. Determine the average absorption coefficient of the factory shell.

[5 marks]

c) Describe dust pollutants and how they can affect the health of people exposed to them.

[12 marks]

QUESTION 5

a) Describe the following occupational diseases:
   i. Asbestosis
   ii. Mesothelioma
   iii. Carcinoma

[12 marks]

b) Describe control measures and monitoring in asbestos mining to prevent asbestosis.

[7marks]

c) Prove that doubling the pressure leads to an increase of 6 dB in the sound pressure level.

[6 marks]

FORMULAE

1. $W = \sum_{i=1} \frac{p^{2rms(1)} S_i}{\rho C}$, where ρC = 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. $\bar{\alpha} = \frac{S_1\bar{\alpha}_1 + S_2 \bar{\alpha}_2 + \ldots}{S_1 + S_2}$
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. $TL_{brick} = 10 \log_{10} \{\frac{1}{\tau}\}$