UNIVERSITY OF SWAZILAND

FACULTY OF HEALTH SCIENCES

DEPARTMENT OF ENVIRONMENTAL HEALTH SCIENCE

BSc DEGREE IN ENVIRONMENTAL HEALTH SCIENCES

MAIN EXAMINATION, NOVEMBER, 2021

TITLE OF PAPER AIR SAMPLING FUNDAMENTALS FOR WORKPLACES

COURSE CODE : EHS 456

TIME : 2HOURS

TOTAL MARKS : 100

INSTRUCTIONS:

1. **QUESTION 1 IS COMPULSORY**
2. **ANSWER ANY OTHER THREE QUESTIONS**
3. **ALL QUESTIONS ARE WORTH 25 MARKS EACH**
4. **BEGIN THE ANSWER TO EACH QUESTION IN A SEPARATE SHEET OF PAPER.**

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QUESTION 1

I. Multiple choices: Write True or False against each letter corresponding to the following statements as they apply to risk management.

a) Before sampling begins, decisions should be made regarding whether the results are to be qualitative or quantitative.

b) Ground level ozone and airborne particles are the two air pollutants that pose the greatest risk to human health

c) Vapour: A substance which does not normally exist as a liquid or solid at normal room temperature and pressure.

d) There are two types of precipitation:-thermal precipitation and electrostatic precipitation.

e) In adsorption sampling: gaseous pollutants are absorbed in a solvent when both the pollutant and absorbent are in close contact.

f) Most hazardous materials fall into three main categories: dusts and particulates, gases and vapours, or bio-aerosols.

g) POLARITY:-Tendency of a substance to evaporate at normal temperatures.

h) In chromatography, the main chemical attribute regarded when choosing a column is the polarity of themixture. .

i) The Personal Environmental Monitor (PEM) is a lightweight, personal sampling device for collecting particulates of either 2.5 or 10 μm.

j) A Primary standard is an instrument that bases measurements on direct, measurable linear dimensions that will not change over time, or be altered by temperature or atmospheric pressure, such as the soap bubble flow meter range.

k) The identification of airborne contaminants requires a sampling technique that collects a representative sample.

(22 marks)

II. Name the three basic measurements that an air sample requires.

(3 marks)

QUESTION 2

a) List five factors that determine the survival of microorganisms within a bio-aerosol.

(5 marks)

b) Describe workplace monitoring

(7 marks)

c) How Is Air Quality Measured?

(5 marks)

d) What constitutes the air?

(5 marks)

e) What is microbial air sampling?

(3 marks)

QUESTION 3

a) Fill the blank spaces in the table below:

(16 marks)

Table1. Air sampling methods and examples of equipment:

(Sampling methods and descriptions and samplers for each)

Method	**Principle**	**Suitable to measure:**	**Collection media or surface**	**Rate of collection (L/min.)**
Impingement in liquids				
Impaction on solid surfaces				
Sedimentation				
Filtration				

b) Describe the sampling of airborne particulates sedimentation and filtration.

(9 marks)

QUESTION 4

i. Describe air sampling and its purpose.

(10 marks)

ii. Describe Air quality monitoring.

(5 marks)

iii. What are the basic considerations of air sampling?

(5 marks)

iv. State five factors must be considered when choosing an air sampling instrument.

(5 marks)

QUESTION 5

a. Describe the procedure for air sampling using an IOM sampler

(10 marks)

b. Briefly describe how air sampling pumps work.

(3 marks)

c. Describe air sampling under the following headings:

I. Filter sampling for inhalable dust.
II. Filter sampling for respirable dust.
III. Sorbent sampling.
IV. Bag sampling

(12 marks)