



UNIVERSITY OF SWAZILAND

Faculty of Health Sciences

Department of Environmental Health Science

Main Examination

Dec 2014

Title of paper: AIR SAMPLING AND ANALYSIS I

Course code: EHS 564

Time allowed: 2 HOURS

Marks allocation: 100 Marks

Instructions:

- 1) Answer ANY FOUR (4) questions**
- 2) Each question is weighted 25 marks**
- 3) Write neatly and clearly**
- 4) Begin each question in a separate sheet of paper**
- 5) Numbering within a chosen question should be in a sequential order**

This paper is not to be opened until the invigilator has granted permission

QUESTION 1

- a) What would be the 8 hour TWA for the following? (6)
 - General welding fume
 - Mild steel
 - Stainless steel
- b) A worker exposed to fumes is likely to exhibit some signs and symptoms. After how long will one see these signs, and what are the long effects of exposure? (6)
- c) Why is it important to submit a sample filter cassette with a blank from the same lot number as the sample filter cassette? (3)
- d) In post sample analysis how will you calculate the total volume of the sample? (4)
- e) Take us through the steps that you would take if you were to remove a sampling train from worker (6)

QUESTION 2

- a) A sampler is expected to complete a post-calibration per manufacture recommendations with a representative filter, how useful will this information be to the sampler? (3)
- b) In collecting samples there are certain steps that should be followed, what are they? (10)
- c) When attaching sampling train to a worker why is it important that the cassette will be under the hood when the hood is in the down position? (4)
- d) In selecting a worker to be sampled, what critical information should be known by this worker and in turn what feedback should the worker give? (8)

QUESTION 3

- a) Give a diagrammatic expression with proper labelling of a dust lamp that an OHS officer may use to highlight the presence of particles in the atmosphere (8)
- b) Under what conditions will direct reading instrumentation be useful (6)
- c) How has the International Standards Organization (ISO) defined sampling conventions for the following particulates with their cut of points? (6)
 - Inhalable fraction
 - Thoracic fraction
 - Respirable fraction

- d) What types of gases do dry scrubbers remove in wastewater treatment plants? (4)
- e) Define an electrostatic precipitator (1)

QUESTION 4

- a) Which 3 dependents should one consider if deciding on whom to sample (6)
- b) What is the function of the following devices? (6)
 - Filter holder
 - Harness
 - Suction pump
- c) It is not feasible to sample all workers. What is the rationale for sampling a portion of the workers? (6)
- d) Define a breathing zone and state why is the sampler attached to the lapel (3)
- e) State the importance of monitoring ozone in the workplace (3)

QUESTION 5

- a) Data in air sampling is interpreted based on 5 critical rankings, what are they? (5)
- b) Why is it very important to inform workers of the type of workplace stressors? (6)
- c) Passive sampling methods can be used to detect 2 types of gases, which are these? (4)
- d) List 6 devices that are used to control Nitrogen oxides in the workplace (6)
- e) Differentiate between wet and dry scrubbers (4)