UNIVERSITY OF SWAZILAND

Faculty of Health Sciences

Department of Environmental Health Science

Main Examination 2012

Title of paper: AIR SAMPLING AND ANALYSIS 1

Course code: EHS 564

Time allowed: 2 HOURS

Marks allocation: 100 Marks

Instructions:

1) QUESTION 1 IS COMPULSORY
2) Answer ANY OTHER THREE (3) questions
3) Each question is weighted 25 marks
4) Write neatly and clearly
5) Begin each question in a separate sheet of paper

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

QUESTION 1

a) Match the following parameters with the appropriate description. Do not write the description. E.g. a) = z (20)

Parameter	description
a. Glass type	i. This device is heated and then contaminate will be flushed out
b. Gas badges	ii. These are not suitable for personal use
c. Detector tube	iii. Identify emission source locations or "hot spots."
d. Passive sampling	iv. Involves the attachment of a sampling train to the employee.
e. Integrated sampling	v. Suitable for sampling airborne dusts, fumes, and mists.
f. Media filters	vi. The contaminate would just collect at its solid stage
g.Continuous monitors	vii. This does not give a good estimate of a worker's exposure
h. Static (area) sampling	viii. It contains crystals that are treated with chemical which would react with a particular gas and change its colour
i. Grab sampling	ix. Provide useful information regarding ambient air quality
j. Metal type	x. Once the chemical changes color the air can then be analyzed

b) Within a sampling strategy there is a clear need for the 'sampler' to identify over what sort of period should a sample be taken. If you were to be the sampler, outline the considerations which should be taken into account before adopting an appropriate sampling regime? (5)

QUESTION 2

a) List 3 basic types of occupational exposure collection techniques (6)

b) Contaminants in the workplace can either be classified according to their physical and physiological action on the human body. Apportion these given toxic contaminants to the relevant physiological classes (7)

- ❖ Acid mist
- ❖ Carbon monoxide
- ❖ Ethy ether
- ❖ Lead (Pb)
- ❖ A chemical with a latency period of 20 years
- ❖ Particulate Matter
- ❖ A chemical that may cause growth retardation

c) Name the 3 routes of exposure to contaminants and then discuss the one that is the most common exposure for air pollutants (10)

d) What are the 2 effects of exposure that toxic agents my usually be generalized into (2)

QUESTION 3

a) In a company that has a large number of employees one has to put in place a sampling strategy. What are the consideration that the employer is expected to meet once a significant exposure to contaminants has been observed (12)

b) Define an employee exposure (3)

c) What is a Maximum Risk Employee and its determinants (8)

d) When undertaking a sampling exercise in a coal mine, in your opinion is there a need to include administrative personnel such as Secretaries? Give reasons for your decision to include or exclude administrative personnel (2)

QUESTION 4

a) Compare and contrast the following types of sample measurements (20)

   i. Full period single sample measurement

   ii. Full period consecutive sample measurement

   iii. Partial period single sample measurement

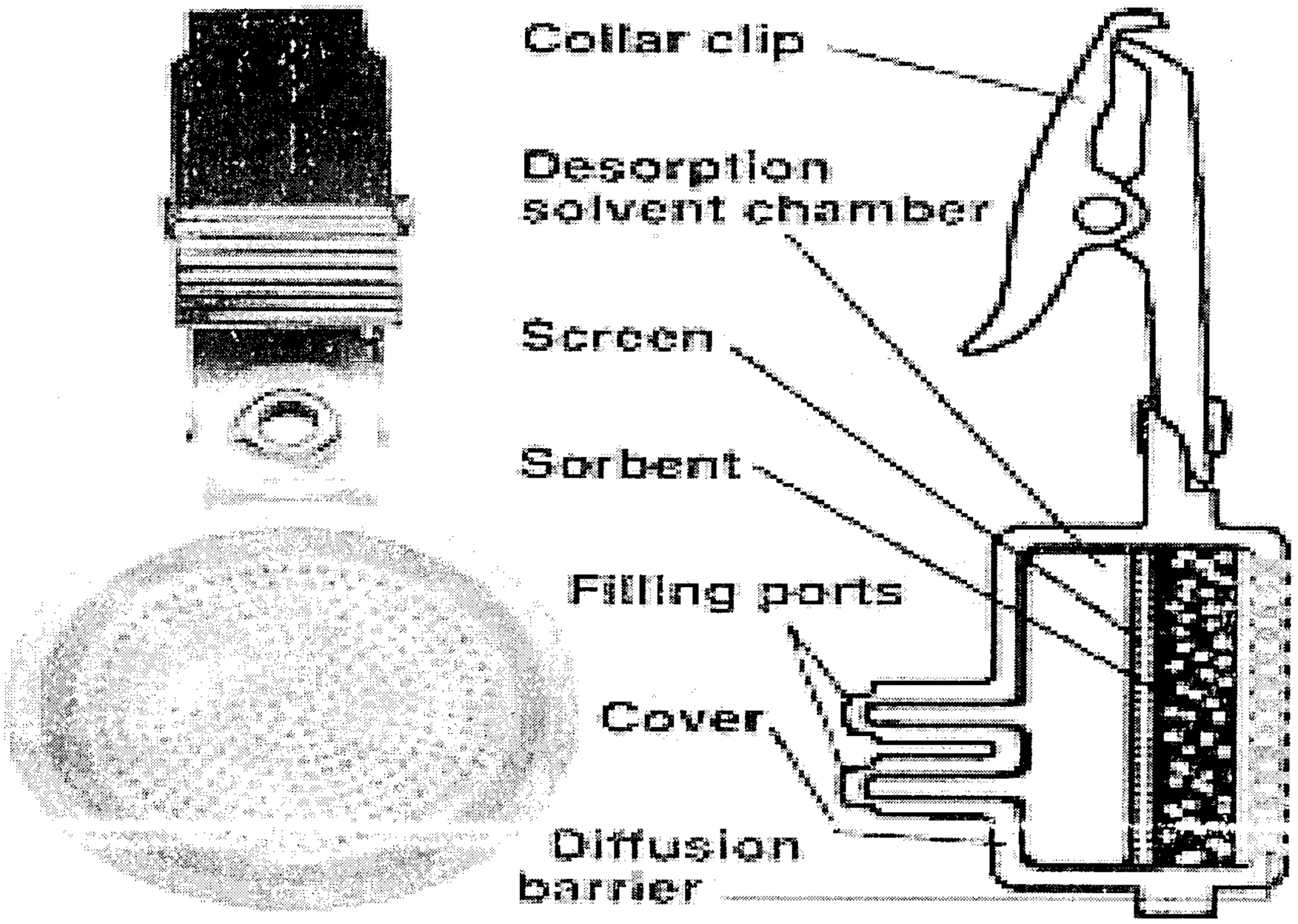
   iv. Grab sample measurement

b) What are the 3 exposure measurements that a decision on strategies regarding compliance is based on? (3)

c) Define the concept of sampling the maximum risk employee (2)

QUESTION 5

a) Using the device below, explain how you would use it to undertake your analysis (10)



b) Briefly describe series passive sampling techniques (10)

c) Define a sampling strategy (5)