

OLLSCOIL NA hÉIREANN, GAILLIMH  
NATIONAL UNIVERSITY OF IRELAND, GALWAY

SUMMER EXAMINATIONS 2000/2001

MSc OCCUPATIONAL HEALTH & ERGONOMICS

Occupational Hygiene (EP 505)

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**TIME ALLOWED: 3 hours**  
**FIVE (5) questions to be answered**

**Question 1**

In relation to airborne particulate matter explain the meaning of **four** of the following terms:

- aerodynamic diameter
- impaction
- isokinetic sampling
- respirable fraction
- fibre
- dust lamp

Discuss briefly the concepts of 'size' and 'size distribution' in relation to airborne particles. How is 'size' related to where particles are deposited in the respiratory tract?

Describe a method to determine the size distribution of airborne particles in the micron size range.

**Question 2**

In relation to gases and vapours explain the meaning of **four** of the following terms:

- time weighted average (TWA) concentration
- asphyxiant
- absorption spectrum
- vapour pressure
- adsorption
- Fick's law of diffusion

Outline the methods that are available to measure the concentration of inorganic gases in the atmosphere. Describe in more detail a method to determine the TWA in a workplace of an inorganic gas of your choice and discuss briefly the factors that affect the accuracy of the results.

What precautions would you recommend for persons who have to enter confined spaces?

### Question 3

In relation to the thermal environment explain the meaning of **four** of the following terms:

- psychrometric chart
- kata thermometer
- make up air
- infiltration
- mean radiant temperature
- heat index

Describe briefly the factors that influence indoor air quality in an office environment.

Discuss the influence of the ventilation system design and operation on the occurrence of "sick building" syndrome in an office environment.

### Question 4

In relation to sound explain the meaning of **four** of the following terms:

- decibel scale
- octave band analysis
- A weighting
- time of reverberation
- absorption coefficient
- noise rating curve

Describe briefly the main routes by which the noise of a machine may be propagated through a building and the measures that you would recommend for a noise control programme to deal with it.

If the sound intensity level from an omnidirectional source on a pole in the centre of a large level open field is 77 dB at a distance of 12 m from the source, what would the intensity be at a distance of 24 m from the source ?

### Question 5

In relation to light explain the meaning of **four** of the following terms:

- luminance
- glare
- colour rendering index
- luminaire
- retina
- visual acuity

Describe briefly the principal sources of light in common use and comment on their suitability for a task that involves fine detail and colour matching.

### Question 6

In relation to ionizing radiation explain the meaning of **four** of the following terms:

- radioactive isotope
- specific ionization
- bremsstrahlung
- quality factor
- gray
- stochastic effects

Describe briefly the processes by which alpha particle, neutrons, and gamma rays affect body tissue.

Outline the methods available to detect ionizing radiation and comment on their efficiency in detecting gamma rays.

### Question 7

In relation to respiratory protection equipment (RPE) explain the meaning of **four** of the following terms:

- nominal protection factor (NPF)
- half mask
- self contained breathing apparatus
- break through
- filter classification
- powered air supply quality

Outline the circumstances in which the use of RPE is justified.

Describe the main elements of a respiratory protection programme and the limitations and disadvantages found with RPE in practice.

### Question 8

Write notes on **two** of the following:

- [a] Occupational Hygiene and the protection of the environment
- [b] The measurement of air flow in ducts
- [c] Air cleaning devices
- [d] The hierarchy of control of hazards
- [e] Working in very cold environments
- [f] The transport and deposition of particulate matter indoors