

OLLSCOIL NA hÉIREANN, GAILLIMH  
NATIONAL UNIVERSITY OF IRELAND, GALWAY

SUMMER EXAMINATIONS 2000/2001

HIGHER DIPLOMA IN APPLIED SCIENCE  
(OCCUPATIONAL HEALTH & HYGIENE)

Occupational Hygiene (EP 853)

Dr. C. Hartley  
Dr. T.C. O'Connor

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

**Question 1**

In relation to a gaseous substance explain the meaning of **four** of the following terms:

- Occupational exposure limit (OEL)
- Time weighted average (TWA) concentration
- Diffusion coefficient (D)
- Adsorption
- Absorption spectrum
- Grab sample

Outline the principal methods available to measure the concentration of trace amounts of a gaseous contaminant in workplace air.

Describe in more detail **either** a method to measure the personal exposure of a worker to a gas **or** a method to monitor an area in a workplace for the occurrence of dangerous concentrations of a gas.

Comment on the suitability of the method described for determining 15 minute and 8 hour occupational exposure limits

**Question 2**

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

- Aerodynamic diameter
- Impaction
- Inhalable fraction
- Fume
- Class 100 clean room
- Size distribution

Outline the ill-health effects that can be caused by particulate matter.

P.T.O.

Describe briefly a method to determine the mass concentration of respirable particles in air, mentioning the precautions you would take to get an accurate result.

Calculate the 8 hour time weighted average exposure of a worker from the following data:

Period	Operation	Concentration (mg / m <sup>3</sup> )
08.00 - 08.30	Meeting	0.0
08.30 - 12.30	Operating	2.0
12.30 - 13.15	Lunch break	0.0
13.15 - 16.15	Operating	2.0
16.15 - 17.00	Maintenance	4.0

### Question 3

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

- Relative humidity
- Kata thermometer
- Core body temperature
- Heat stress index
- Mean radiant temperature
- Saturation vapour pressure

Explain briefly the factors that influence the thermal comfort of workers.

Outline the measures that you would recommend to protect the health of workers engaged in processes that involve material at very high temperatures.

### Question 4

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

- Audio frequencies
- Audiometry
- Decibel scale
- Octave band analysis
- Time of reverberation
- Temporary threshold shift
- Resonance

Outline the engineering and administrative measures that you would suggest to reduce the exposure of workers to the noise of a machine.

A room contains eight identical machines. The noise level in the room is 65 dBA when no machines are operating and 79 dBA when one machine is operating. What would the noise level be when all eight machine are operating?

### Question 5

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

- Radioactive isotope
- Half life
- Sievert
- Non-stochastic effect
- Bremsstrahlung
- Specific ionization

Explain why ionizing radiation should be regarded as a hazard to health.

Describe briefly a method to measure the exposure of a worker to ionizing radiation.

What measures would you recommend to reduce the exposure of a worker who uses a source of gamma rays in her work?

### Question 6

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

- Illuminance
- Retina
- Adaption of the eye
- Glare
- Colour rendering index
- Luminaire

Describe briefly the factors, which should be considered when specifying the lighting system for an industrial manufacturing facility and for the safety and visual comfort of the workers.

### Question 7

Describe briefly the main components of a local exhaust ventilation system.

Discuss in more detail the design considerations and operational procedures that you would recommend for the capture of a contaminant and for removing it from the air stream. Illustrate your answer with a particulate contaminant of your choice.

### Question 8

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

- [a] Occupational Hygiene and the protection of the environment
- [b] Vibrations and the human body
- [c] Respiratory protective equipment
- [d] The measurement of air flow in ducts
- [e] Sources of information in Occupational Hygiene
- [f] The transport and deposition of particulate matter indoors.