

**OLLSCOIL NA hÉIREANN, GAILLIMH  
NATIONAL UNIVERSITY OF IRELAND, GALWAY**

**SUMMER EXAMINATIONS 1999/2000**

**MSc OCCUPATIONAL HEALTH & ERGONOMICS**

**Occupational Hygiene (EP 505)**

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**TIME ALLOWED: 3 hours  
5 questions to be answered**

**Question 1**

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

- occupational exposure limits (O.E.L.);
- time weighted average (T.W.A.) concentration;
- lower explosive limit (L.E.L.);
- saturation vapour pressure (S.V.P.);
- sensitisation;
- absorption spectrum.

Outline the sampling strategy and instrumentation that you would recommend for assessing the exposure of workers to a mixture of known organic vapours in a small printing works and the precautions to be taken to minimise the hazards.

Explain how the O.E.L. of a mixture of similar compounds that affect the same target organ is calculated.

**Question 2**

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

- aerodynamic diameter;
- respirable fraction;
- impaction;
- mobility;
- size distribution;
- fibre.

Describe briefly the methods available and precautions to be taken in either (a) *or* (b)

(a) to sample airborne particles to determine their chemical composition, shape and mass concentration, by chemical, microscopic and gravimetric analysis;

*or*

(b) to clean particles from an air stream on an industrial scale.

### Question 3

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

- relative humidity;
- heat stress index;
- hypothermia;
- clo;
- mean radiant temperature;
- core body temperature.

Describe briefly the health hazards for people working under conditions of severe heat and of severe cold and the administrative and engineering measures you would recommend to minimise these hazards in each situation.

### Question 4

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

- audio frequencies;
- audiometer;
- decibel scale;
- octave band analysis;
- acoustic power;
- absorption coefficient.

Outline the measures available to control noise exposure levels from a machine in relation to the source of the noise, the transmission path and the receiver.

What are the current legislative requirements on the exposure of employees to noise?

### Question 5

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

- absorbed dose;
- sievert;
- radioactive isotope;
- stochastic effects;
- bremsstrahlung;
- gamma rays.

Outline the methods available to detect ionising radiation. Describe two methods of detecting gamma rays in more detail, commenting on their efficiency and suitability to estimate the exposure of a person to a flux of gamma rays.

What measures would you recommend to minimise the exposure of workers to gamma rays? If 12 mm of lead absorber reduces a flux of gamma rays by half, to what level will 36 mm of lead reduce it ?

### Question 6

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

- illuminance;
- glare;
- colour rendering index;
- daylight factor;
- discharge spectrum;
- stroboscopic effect.

Lighting at work is for seeing. With an engineering company in mind, discuss this statement in relation to:

- (a) tasks in the design and general offices;
- (b) work in machine and fabrication shops, including storage areas.

### Question 7

Personal protective equipment (PPE) is prescribed as the last resort in current legislation. Discuss why this is so.

Outline circumstances, with examples, where you regard the use of personal protective equipment as justifiable.

### Question 8

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

- (a) The measurement of air flow in ducts
- (b) 'Sick Building Syndrome' causes and remedies
- (c) Occupational hygiene and the protection of the environment
- (d) Fan laws and characteristics
- (e) Material safety data sheets, their use and importance
- (f) Sources of information on occupational hygiene.