

GX2592

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NATIONAL UNIVERSITY OF IRELAND, GALWAY

SUMMER EXAMINATIONS 1999/2000

HIGHER DIPLOMA IN APPLIED SCIENCE
(OCCUPATIONAL HEALTH AND HYGIENE)

Occupational Hygiene (EP 853)

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5 questions to be answered
Time allowed: 3 hours

Question 1

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

- aerodynamic diameter;
- fume;
- impaction;
- inhalable fraction;
- PM₁₀ ;
- size distribution.

Outline briefly the ways in which airborne particulate matter can pose a threat to a person's health and comfort and the natural defence mechanisms that one's body has to deal with it.

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.

Question 2

In relation to organic vapours explain the meaning of four of the following terms:

- absorption spectrum;
- occupational exposure limit (OEL);
- time weighted average (TWA) concentration;
- saturation vapour pressure (SVP);
- sensitisation;
- upper explosive limit.

Outline the methods available to measure the concentration of an organic solvent vapour in air. Describe one method in more detail and comment on its suitability to measure the TWA over an eight hour shift.

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

Period	Operation	Concentration (ppm)	
08.00 - 09.00	Preparation	4	
09.00 - 12.00	Operation	20	
12.00 - 12.45	Lunch break	0	
12.45 - 15.45	Operation	20	
15.45 - 16.00	Clean Up	12	PTO

Question 3

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

- relative humidity;
- mean radiant temperature;
- core temperature of the body;
- clo;
- heat index;
- psychrometric chart.

Discuss briefly the factors which influence the thermal comfort of workers and how the body tries to cope with very hot working conditions.

Describe briefly the measures you would recommend to protect personnel who are working regularly in very hot conditions.

Question 4

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

- audio frequencies;
- A-weighting;
- decibel scale;
- permanent threshold shift;
- phon;
- octave band analysis.

Describe briefly the causes of noise induced hearing loss and the measures you would suggest to reduce the exposure of workers to noise at work before resorting to personal protective equipment.

What factors should be taken into consideration in selecting personal hearing defenders?

Question 5

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

- radioactive isotope;
- absorbed dose;
- sievert;
- half life;
- scintillation counter;
- bremsstrahlung.

Give the principal properties of three types of ionising radiation and the methods by which they transfer energy to the absorbing medium.

What control measures would you recommend to reduce the exposure of workers to ionising radiation ?

Question 6

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

- lux;
- luminaire;
- adaption of the eye;
- glare;
- stroboscopic effect;
- laser.

Mention three parts of the non-ionising range of the electromagnetic spectrum and a health hazard associated with each part.

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

Question 7

In relation to local exhaust ventilation systems explain the meaning of **four** of the following terms:

- capture velocity;
- transport velocity;
- plenum;
- static pressure;
- air mover;
- discharge velocity.

Describe the main components of a local exhaust ventilation system, paying special attention to ways of increasing its ability to capture the contaminant.

What are the main advantages and disadvantages on installing a local exhaust ventilation system?

Question 8

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

- the measurement of airflow in ducts
- information sources in occupational hygiene
- air conditioning and Sick Building Syndrome
- air cleaning devices
- occupational hygiene and the protection of the environment
- vibrations and the human body