

Unit B: Hazardous agents in the workplace

WEDNESDAY 25 JANUARY 2012

3 hours, 0930 to 1230

10 minutes reading time is allowed before the start of this examination. You may not write anything during this period.

Answer both Section A and Section B

SECTION A

This section contains six questions. Answer **ALL SIX** questions.

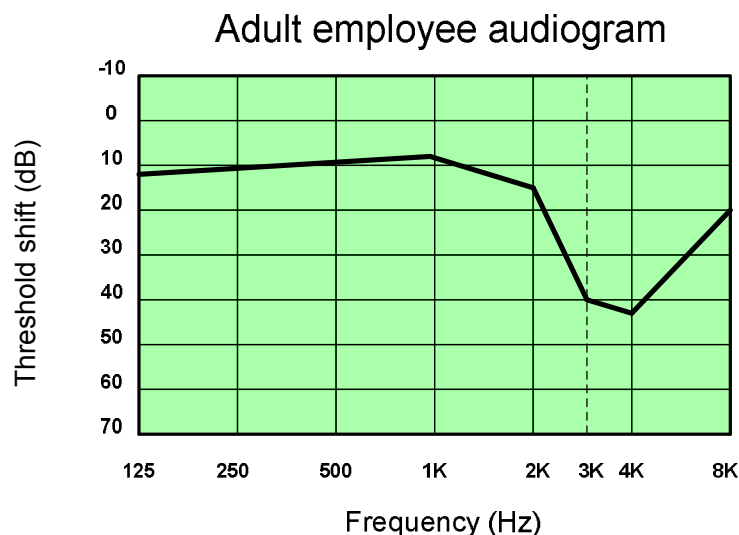
All questions carry equal marks.

The maximum marks for each question, or part of a question, are shown in brackets.

You are advised to spend about **15 minutes** on each question.

Start each answer on a new page.

- 1 The figure below shows an audiogram for an adult employee.



- (a) **Explain** what is meant by 'threshold shift'. (2)
- (b) **Outline** the significance of the shape of the audiogram. (2)
- (c) **Outline** the *benefits AND limitations* of audiometry as part of a hearing conservation programme. (6)

- 2 The most widely used and accepted index for the assessment of heat stress in industry is the Wet Bulb Globe Temperature (WBGT) index.
- (a) **Identify** the measurements that need to be taken to determine the WBGT index. (3)
 - (b) **Outline** the principle of operation of the instruments that should be used to make the measurements. (7)
- 3 Manual handling risk assessments should consider a range of risk factors including those concerning the *task* and the *load*.
- Explain** how risk factors, within the headings of *task* **AND** *load*, relate to nursing staff who carry out manual handling activities when assisting hospital patients with limited mobility. For **EACH** risk factor explained **give** an example relevant to this situation. (10)
- 4 A healthcare research laboratory undertakes work with hazard group 3 biological agents which require containment level 3 controls.
- Outline** a range of *technical* controls that should be used to minimise the risks to those working in the laboratory, where elimination or substitution of the hazard is not possible. (10)
- 5 A grounds maintenance contractor is selecting eye protection to wear during grass strimming.
- (a) **Describe** the specific features of the eye protection required for this task. (7)
 - (b) **Outline** the arrangements the grounds maintenance contractor should put in place when the selected eye protection is in use. (3)
- 6 Human epidemiology and animal studies are methods that can be used to investigate whether a substance is carcinogenic.
- (a) **Outline** the advantages of **EACH** of these methods. (3)
 - (b) **Outline** the disadvantages of **EACH** of these methods. (7)

SECTION B

This section contains five questions. Answer **THREE** questions only.

All questions carry equal marks.

The maximum marks for each question, or part of a question, are shown in brackets.

You are advised to spend about **30 minutes** on each question.

Start each answer on a new page.

- 7** Drug and alcohol misuse can adversely influence performance at work, even when the misuse takes place outside of the workplace.
- (a) **Outline** specific signs that an employer can look for when attempting to identify if an employee has a drug or alcohol misuse problem. (7)
- (b) You have been asked to liaise with an occupational health professional to prepare a company policy on drug and alcohol misuse, which will include reference to drug and alcohol testing.
- (i) **Identify** the situations in which it may be appropriate for an employer to introduce an employee drug and alcohol testing programme. (3)
- (ii) **Outline** the *other* key points that should be included in the company policy on drug and alcohol misuse. (10)
- 8** (a) **Outline** the structure of the skin. (6)
- (b) **Outline** how hazardous substances can enter the body through the skin. (4)
- (c) Construction company employees regularly lay floors and use a cement-based levelling compound which contains chromium VI. Several of the long term employees and one of the new recruits have complained about red and sore skin on their hands.
- (i) **Explain** the possible reasons for the symptoms they are now experiencing. (6)
- (ii) **Outline** control measures that could be used to minimise these symptoms in this situation. (4)
- 9** It is often necessary to monitor an employee's personal exposure to hazardous substances. Some of the measurement principles that can be used include gravimetric analysis, microscopy and chemical analysis.
- For **EACH** of these measurement principles:
- (a) **identify** a type of hazardous substance for which it can be used **AND** **suggest** a typical workplace situation where such a measurement may be necessary; (6)
- (b) **outline** the type of equipment **AND** the methodology used to determine the employee's personal exposure to the hazardous substance. (14)

- 10 Methanol (an organic solvent) is being used in the production of a specialist coating.

An employee's measurement of exposure to methanol varies throughout their 8-hour working day. The results of measurement of their exposure are as follows:

Table 1

Task undertaken by employee	Duration of task	Exposure to methanol (ppm)
Measuring out and adding methanol	15 minutes	320
Adding other components to the mix	1 hour	100
Supervision of mixing and decanting	2 hours	125
Clean down of equipment using solvents	3 hours	150

Assume that exposure is zero at all other times.

- (a) **Calculate** the 8-hour Time-Weighted Average (TWA) exposure to methanol for the employee. Your answer should include detailed working. (8)

Information relating to methanol in EH40 Workplace Exposure Limits is as follows:

Table 2

Substance	CAS Number	Workplace Exposure Limit				Comments
		Long-term exposure limit (8-hour TWA limit reference period)		Short-term exposure limit (15-minute reference period)		
		ppm	mg/m ³	ppm	mg/m ³	
Methanol	67-56-1	200	266	250	333	Sk R11, 23/24/25, 39/23/24/25

- (b) **Outline** the following terms:
- (i) Chemical Abstract Services (CAS) number; (2)
 - (ii) Short-term exposure limit (15-minute reference period). (2)
- (c) Using your results from part (a), the original exposure information in Table 1 and by selecting the relevant data from Table 2, **explain** what actions might be required by the employer in order to comply with the Control of Substances Hazardous to Health (COSHH) Regulations 2002. (8)
- 11 (a) **Identify** the possible health effects from exposure to ionising radiation. (5)
- (b) **Outline** the control measures that should be in place where persons may be exposed to ionising radiation at work. (15)