January 2013

Examiners' Report

NEBOSH National Diploma in Occupational Health and Safety - Unit B

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NEBOSH NATIONAL DIPLOMA IN OCCUPATIONAL HEALTH AND SAFETY

Unit B: Hazardous agents in the workplace

JANUARY 2013

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Introduction

NEBOSH (The National Examination Board in Occupational Safety and Health) was formed in 1979 as an independent examining board and awarding body with charitable status. We offer a comprehensive range of globally-recognised, vocationally-related qualifications designed to meet the health, safety, environmental and risk management needs of all places of work in both the private and public sectors. Courses leading to NEBOSH qualifications attract around 35,000 candidates annually and are offered by over 500 course providers, with exams taken in over 100 countries around the world. Our qualifications are recognised by the relevant professional membership bodies including the Institution of Occupational Safety and Health (IOSH) and the International Institute of Risk and Safety Management (IIRSM).

NEBOSH is an awarding body to be recognised and regulated by the Scottish Qualifications Authority (SQA).

Where appropriate, NEBOSH follows the latest version of the *"GCSE, GCE, Principal Learning and Project Code of Practice"* published by the regulatory authorities in relation to examination setting and marking. While not obliged to adhere to this code, NEBOSH regards it as best practice to do so.

Candidates' scripts are marked by a team of Examiners appointed by NEBOSH on the basis of their qualifications and experience. The standard of the qualification is determined by NEBOSH, which is overseen by the NEBOSH Council comprising nominees from, amongst others, the Health and Safety Executive (HSE), the Confederation of British Industry (CBI), the Trades Union Congress (TUC) and the Institution of Occupational Safety and Health (IOSH). Representatives of course providers, from both the public and private sectors, are elected to the NEBOSH Council.

This report on the examination provides information on the performance of candidates which it is hoped will be useful to candidates and tutors in preparation for future examinations. It is intended to be constructive and informative and to promote better understanding of the syllabus content and the application of assessment criteria.

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General comments

Many candidates are well prepared for this unit assessment and provide comprehensive and relevant answers in response to the demands of the question paper. This includes the ability to demonstrate understanding of knowledge by applying it to workplace situations.

There are always some candidates, however, who appear to be unprepared for the unit assessment and who show both a lack of knowledge of the syllabus content and a lack of understanding of how key concepts should be applied to workplace situations.

In order to meet the pass standard for this assessment, acquisition of knowledge and understanding across the syllabus are prerequisites. However, candidates need to demonstrate their knowledge and understanding in answering the questions set. Referral of candidates in this unit is invariably because they are unable to write a full, well-informed answer to one or more of the questions asked.

Some candidates find it difficult to relate their learning to the questions and as a result offer responses reliant on recalled knowledge and conjecture and fail to demonstrate a sufficient degree of understanding. Candidates should prepare themselves for this vocational examination by ensuring their understanding, not rote-learning pre-prepared answers.

Candidates should therefore note that Examiners' Reports are **not** written to provide 'sample answers' but to give examples of what Examiners were expecting and more specifically to highlight areas of under performance.

Common pitfalls

It is recognised that many candidates are well prepared for their assessments. However, recurrent issues, as outlined below, continue to prevent some candidates reaching their full potential in the assessment.

- Many candidates fail to apply the basic principles of examination technique and for some candidates this means the difference between a pass and a referral.
- In some instances, candidates do not attempt all the required questions or are failing to provide complete answers. Candidates are advised to always attempt an answer to a compulsory question, even when the mind goes blank. Applying basic health and safety management principles can generate credit worthy points.
- Some candidates fail to answer the question set and instead provide information that may be relevant to the topic but is irrelevant to the question and cannot therefore be awarded marks.
- Many candidates fail to apply the command words (also known as action verbs, eg describe, outline, etc). Command words are the instructions that guide the candidate on the depth of answer required. If, for instance, a question asks the candidate to 'describe' something, then few marks will be awarded to an answer that is an outline. Similarly the command word 'identify' requires more information than a 'list'.
- Some candidates fail to separate their answers into the different sub-sections of the questions. These candidates could gain marks for the different sections if they clearly indicated which part of the question they were answering (by using the numbering from the question in their answer, for example). Structuring their answers to address the different parts of the question can also help in logically drawing out the points to be made in response.
- Candidates need to plan their time effectively. Some candidates fail to make good use of their time and give excessive detail in some answers leaving insufficient time to address all of the questions.
- Candidates should also be aware that Examiners cannot award marks if handwriting is illegible.
- Candidates should note that it is not necessary to start a new page in their answer booklet for each section of a question.

UNIT B – Hazardous agents in the workplace

Section A – *all questions compulsory*

Question 1 *The Health and Safety Executive's (HSE) Stress Management standards include the following categories:*

(a) demands; ***(4)***

(b) support; ***(2)***

(c) relationships. ***(4)***

*For **EACH** of these categories, **outline** the occupational factors that could contribute to stress amongst call centre workers **AND give** examples where relevant to illustrate your answer.*

This question related to Element 8 of the syllabus and assessed candidates' knowledge of learning outcome 8.2: *Explain the identification and control of workplace stress with reference to legal duties and other standards*.

To gain marks for this question candidates needed to organise their responses as directed in the question. For each of the categories of the stress management standards listed it was necessary to outline the contributing occupational factors **and** give examples. The examples needed to relate to the scenario given in the question, which was a call centre.

The demands of such work that could contribute to stress were work overload, adverse working conditions and unacceptable work patterns. One example relevant in this scenario was work overload could arise as a result of targets being set for answering calls.

In part (b) the lack of encouragement from managers and lack of systems for raising concerns or problems were factors contributing to work-related stress. An example relevant to this situation was the lack of support for call centre workers to receive training.

In a call centre scenario the nature of the work can create problems with working relationships that in turn lead to stress. There were a number of examples of how poor working relationships can develop in this scenario, perhaps due to competition between colleagues to meet targets or as a result of their working in isolation whilst answering customer calls. High staff turnover, a common feature of call centres, is also not conducive to developing good working relationships. Other contributing factors relevant to the relationship stress management standard were also able to gain marks, for example unacceptable behaviour from managers or colleagues.

Question 2 ***Outline*** *the factors an employer should take into account when determining the provision of first-aid arrangements in the workplace.* ***(10)***

This question related to Element 10 of the syllabus and assessed candidates' knowledge of learning outcome 10.4: *Explain the requirements and provision for first aid in the workplace.*

This topic of first aid has recently become examinable in Unit B. It was previously part of the Unit C syllabus. This question asked candidates to consider the factors to consider when determining the provision of first–aid arrangements in a workplace. The HSE guidance requires employers to take a risk assessment approach, considering a wide range of factors.

When answering this outline question candidates were expected to cover a wide range of factors rather than concentrate in detail on just a small number of factors.

All relevant factors are not listed here but information on these can be found in HSE publications including INDG 214. Some factors that should have been mentioned were the nature of risks in the workplace and especially if there were any specific hazards present such as the use of particular chemicals or work in confined spaces. Other factors to consider were the hours worked, shift patterns and the location of workers on a site. Less obvious factors when determining first-aid arrangements are the need to cover the situation when those trained in first aid are on holiday or absent for extended periods of time.

Candidates who confined their answers to a discussion about the number of employees versus the number of trained first aiders and how to organise the provision of first aid boxes and their contents were not properly addressing the question.

Question 3

(a) *The risk of contracting leptospirosis is a concern to windsurfers at a local water sports centre.*

(i) ***Outline*** *the ill-health effects associated with this disease.* ***(2)***

(ii) ***Outline*** *why windsurfers might be at risk.* ***(2)***

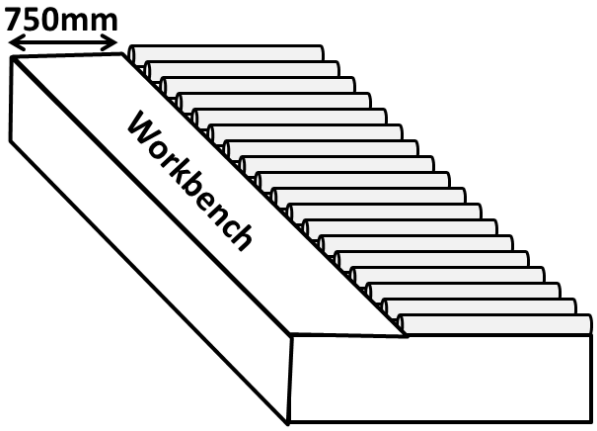
(b) ***Outline*** *the practical steps that the windsurfers can take to minimise the risk of contracting leptospirosis.* ***(6)***

This question related to Element 5 of the syllabus and assessed candidates' knowledge of learning outcome 5.2: *Explain the assessment and control of risk from exposure to biological agents at work*.

In part (a)(i) candidates were able to outline ill-health effects ranging from headaches and muscle pain to more serious ill-health effects such as kidney failure and liver damage (jaundice). In part (a)(ii) many candidates did not mention that it is the nature of the biological agent that put windsurfers at risk. It was necessary to state that it is a bacteria in rats or cattle urine that presents the risk. Many candidates, however, still achieved full marks by outlining the possible routes of transmission.

Part (b) was generally well answered with candidates able to outline a range of steps the windsurfers themselves could take, including maximising dry training or training in the sea (salt water). Other steps included washing down equipment after use, showering after being in the water or washing hands before eating food etc. Few candidates mentioned the possibility of using prophylactic antibiotics since leptospirosis is caused by a bacteria.

Question 4 *An employee on a production line is required to stand in front of his workbench, which is 750mm deep and set at waist height. The employee must frequently lift a 20kg item of equipment from his workbench onto an unpowered roller conveyor which is behind it. The conveyor is set slightly higher than the workbench (see diagram).*



(a) ***Explain*** *why the current method of working is not acceptable.* ***(4)***

(b) ***Outline*** *practical measures that might be considered in order to reduce the ergonomic-related risk to the employee.* ***(6)***

This question related to Element 9 of the syllabus and assessed candidates' knowledge of learning outcome 9.2: *Explain the assessment and control of risks from repetitive activities, manual handling and poor posture*.

Candidates performed reasonably well on this question. When explaining why the current work method was not acceptable it was necessary to recognise that the fixed height of the workbench (at waist height) could lead to stooping and the depth of the bench and conveyor causes the employee to hold the load at a distance from the body, therefore increasing the stress on the lower back. In addition, the need to stand for the duration of the work and the repetitive nature of the task also increased the risks to those undertaking the work. Only a small number of candidates explained that since the load of 20 kg was being handled at arms-length, this was outside the good practice guidelines. If candidates said that this was "against the law," they were not given credit.

In answer to part (b) candidates were able to make sensible measures to reduce the ergonomic-related risks. These included reducing the width of the work bench or arranging it so that the rollers were to the side of the workbench and so avoiding the need to reach. The diagram and the text in the question indicated the difference in height between the workbench and the conveyor. Candidates therefore gained marks for suggesting that they should be at the same height or the conveyor set slightly lower, as both of these options would allow the load to be slid rather than lifted. Other measures concerning automation, the working environment and job rotation were also mark worthy.

Question 5 *The Control of Lead at Work Regulations 2002 (CLAW) require that, where the exposure to lead of any employee is, or is likely to be 'significant', the employer must ensure that the employee is under medical surveillance by a relevant doctor.*

(a) ***Outline*** *the meaning of the term 'significant' in relation to exposure to lead.* ***(2)***

(b) *In an organisation that manufactures lead-acid batteries, some of the employees handle lead oxide powder. These employees take part in biological monitoring to measure their lead-in-blood concentration. The results for two general male employees, X and Y, are shown in the table below.*

Male employee	Lead-in-blood concentration(µg/dl)
X	55
Y	65

(i) ***Explain*** *the relevance of the results for the two general male employees, with reference to CLAW.* ***(4)***

(ii) *Taking into account these results,* ***outline*** *the actions the employer should take in relation to general male employee* ***Y*** *in order to comply with the requirements of CLAW.* ***(4)***

This question related to Elements 2 and 4 of the syllabus and assessed candidates' knowledge of learning outcomes 2.3: *Explain the additional requirements for asbestos and lead,* 4.1: *Explain workplace exposure limits (WELs), the means by which they are established, and their application to the workplace* and 4.2: *Outline the strategies, methods, and equipment for the sampling and measurement of airborne contaminants*.

Answers to this question were limited. There is a concern that accredited course providers and/or candidates have not noted the increased syllabus detail on lead and asbestos in elements 2 and 4 of the syllabus. Candidates need to be familiar with the Control of Lead at Work Regulations and the occupational exposure limits for lead that were necessary to answer part (a) of the question.

In 4.1 of the revised syllabus there is specific reference to the blood-lead concentration action levels and suspension levels and knowledge of these was necessary to interpret the data given in part (b) of the question. Candidates with that knowledge were able to gain good marks by outlining that employee X had a blood-lead concentration above the action level but below the suspension level but employee Y had a blood-lead concentration that exceeded the suspension level.

Part (b)(ii) required candidates to have some knowledge of the process that must occur when it is necessary to suspend an employee because their blood-lead concentration requires this and a doctor has considered it necessary. In addition to the employer suspending the employee, it is necessary to record this in the employee's health record, check that the doctor has communicated this to the employee, review the lead risk assessment and control measures and to check the health of other employees with similar exposures to lead.

Question 6 *An employer requests one of their maintenance workers to fit a new shelf, which involves drilling through some textured asbestos coating. It is estimated the task will take about 1 hour. The employer has determined that this task is classed as 'non-licensed' work under the Control of Asbestos Regulations 2012.*

(a) ***Identify*** *the reasons why the employer has determined this task is classed as 'non-licensed'.* ***(2)***

(b) *The maintenance worker has been requested to follow the good practice set out by the Health and Safety Executive's (HSE) Asbestos Essentials Guidance.*

Outline *the procedure the maintenance worker should follow to carry out this work safely.* ***(8)***

This question related to Element 2 of the syllabus and assessed candidates' knowledge of learning outcome 2.3: *Explain the additional requirements for asbestos and lead*.

The answer to part (a) was inferred in the question and candidates gained marks if they identified that because the work was of short duration, involved asbestos containing materials that had a low risk of fibre release (non-friable) and because the work was maintenance work that was non-continuous, then the task could be considered non-licenced.

The syllabus in element 2 makes reference to 'Asbestos Essentials' the web-based information resource with specific guidance on undertaking work involving asbestos. Candidates who had utilised this resource in their study would have been well placed to answer part (b) of this question.

The procedure for carrying out this work should have included using a hand drill rather than an electric drill, using paste or foam to coat the drill entry point, disposing of the waste as asbestos waste ie double bagged, and cleaning down the area with an H vacuum. Marks were also available for parts of the procedure that were concerned with preparing the area before the work commenced.

Many candidates mentioned the need for personal protective equipment (PPE) and even respiratory protective equipment (RPE). In many cases, however, references to these were vague and this was not sufficient to gain marks at Diploma level when controls for this type of work need to meet particular specifications. Details of the relevant types of PPE ad RPE are given in 'Asbestos Essentials'.

Section B – *three from five questions to be attempted*

Question 7 *A catalogue distribution company has a workforce of 300, employed as drivers, warehouse operatives and office staff, processing telephone and internet orders.*

(a) ***Identify*** *the possible functions of the distribution company's occupational health department:*

(i) *when new employees commence employment;* ***(5)***

(ii) *when an employee returns to work after ill-health.* ***(5)***

(b) ***Outline*** *additional functions the occupational health department can undertake.* ***(10)***

This question related to Element 11 of the syllabus and assessed candidates' knowledge of learning outcome 11.3: *Outline the management of occupational health (including the practical and legal aspects)*.

This was a very popular question. Possible functions when commencing employment are likely to include reviewing health questionnaires and advising management on suitability for employment and if there is a need for reasonable adjustments. When answering part (a)(i), candidates were expected to take note of the scenario and the types of work mentioned in the question. Other possible functions could therefore include eye tests for drivers or DSE users in the office, drug or alcohol screening for drivers of vehicles and forklift trucks and assessments of manual handling capabilities for those in the warehouse.

When an employee returns to work, possible functions of the occupational health department include return to work assessments, liaison with their GP to assist with the implementation of information on a fit note, as well as arranging rehabilitation treatments. Other possible functions relevant to return to work were also mark worthy.

There was a wide range of possible additional functions for the occupational health department in this catalogue distribution company. Only a small selection are mentioned here. Such functions could include maintaining health records, providing first aid treatment and training, health education providing information on diet, exercise or smoking cessation, input to developing policies and procedures etc.

Question 8

(a) ***Outline*** *the advantages and disadvantages of using animal testing as a model to predict the effects of hazardous substances on humans.* ***(6)***

(b) *A principle of the REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals) legislation, is that the testing of hazardous substances on animals should be done as a last resort only.*

Outline *how each of the following methods can be used to provide data on the effects of hazardous substances on humans without undertaking animal testing:*

(i) *in vitro testing;* ***(3)***

(ii) *read-across;* ***(3)***

(iii) *Quantitative Structure Activity Relationship (QSAR).* ***(2)***

(c) *A UK company manufactures 3 tonnes/year of a new hazardous substance for sale within the European Union.*

Outline *the steps the company must take in order to comply with the requirements of the REACH legislation.* ***(6)***

This question related to Element 1 of the syllabus and assessed candidates' knowledge of learning outcome 1.5: *Explain the principles of epidemiology and the principles of toxicological data to the identification of work related ill-health*.

Most candidates who attempted this question were able to gain reasonable marks on part (a).

Parts (b) and (c) of this question drew upon areas of the syllabus (see 1.5) that have been included following the recent syllabus revision. In part (b) many candidates were able to outline that in vitro testing involved experiments carried out in a test tube or petri dish and involved exposing cells or tissues, grown outside a living organism, to a hazardous substance. As a result, an understanding of how that substance was metabolised or affected the cells was gained. Some candidates provided a detailed explanation of the Ames test that was not required by this part of the question.

The other two methods were less well understood. Read-across is based on the assumption that substances with similar chemical structures will have similar toxicological effects on humans, so this approach can be used to avoid or reduce the need for animal testing on new substances that are similar in structure to those already tested. Instead the data already recorded for similar substances can be read-across to predict the toxicological properties of the new substances. QSAR uses computer based models to predict the likely effects of substances on humans. The predictions are based on chemical structure and can also provide an estimation of the risks in relation to the levels of exposure.

Answers to part (c) showed a lack of basic knowledge about the requirements of REACH legislation that is included in B1 of the syllabus. Candidates should have recognised that, based on the quantities being manufactured (ie more than 1 tonne), the REACH legislation was applicable and the substance must be registered with the European Chemicals Agency (ECHA). Part of this registration process was to provide technical information on the physiochemical, toxicological and the eco-toxicological properties of the substance. A safety data sheet would need to be provided to users. If changes were made to the substance or the quantities being manufactured were to increase, then this would need to be notified and further information may have to be provided.

Question 9 *There are a number of methods available to determine noise attenuation offered by hearing protection.*

An employer has selected hearing protection using the single number rating (SNR) method and information below.

Sound pressure level	91dB(C)
Single number rating (SNR) for selected hearing protection	29

(a) ***Explain*** *how to determine a realistic estimate of the A-weighted sound pressure level entering the ear of the operators wearing this hearing protection.* ***(4)***

(b) ***Explain*** *if the attenuation provided by this hearing protection is appropriate.* ***(2)***

(c) ***Identify TWO*** *other methods that could be used to determine if the hearing protection selected provides appropriate attenuation.* ***(2)***

(d) *For* ***EACH*** *of the methods identified in part (c),* ***outline*** *the data required in order to be able to calculate the attenuation provided by this hearing protection.* ***(4)***

(e) *Other than noise attenuation,* ***outline*** *factors the employer should consider when selecting hearing protection.* ***(8)***

This question related to Element 6 of the syllabus and assessed candidates' knowledge of learning outcome 6.4: *Explain the principles of controlling noise and noise exposure*.

Candidates are expected to be able to explain the selection, maintenance and use of hearing protection. The practical approaches to doing this are listed in the revised syllabus and this question focused on the SNR method. The structure of the question, broken down into 5 parts, guided candidates through the process of hearing protection selection.

Parts (a) and (b) relied on candidates being able to perform a simple calculation using their knowledge of the SNR method; where the exposure at the ear (E) is equal to sound pressure level minus the SNR value. ie E=91-29 = 62 dB(A). However it is then necessary to correct for "real world factors" by + 4 dB resulting in a realistic estimate of exposure at the ear of 66 dB(A). Candidates could explain how to do the calculation in words or simply perform it using the numbers given and both approaches gained marks. Many candidates seemed to have little if any understanding of the role of SNR in hearing protection selection.

The conclusion drawn from this calculation provides the answer to part (b). It shows that the hearing protection selected provides good attenuation. However, because it reduces the exposure at the ear to less than 70 dB(A), it could be considered to be over protection. This can result in problems of communication between workers whilst wearing the hearing protection or difficulty in hearing warning sounds.

Parts (c) and (d) required candidates to have a basic understanding of the use of the other two methods of selecting hearing protection listed in 6.4 of the syllabus. Again many candidates seemed to have a gap in their understanding of this part of the Diploma syllabus.

Most candidates gained marks for part (e) of this question. Selection of hearing protection should also take into account a wide range of other factors some of which are mentioned here, namely compatibility with other personal protective equipment, comfort and fit, user preference for ear defenders or ear plugs, cost, level of training required for their use, storage requirements etc.

Question 10 *You have been sent a copy of a local exhaust ventilation (LEV) examination and test report conducted by an external organisation. The report relates to an LEV system in one part of your company's production area. The production manager has asked you to comment on the suitability of this report before the company commissions further LEV examination and testing work throughout the rest of the factory.*

(a) ***Outline*** *the measurements that you would expect to have been taken as part of the examination and testing of the LEV system.* ***(4)***

(b) *In addition to these measurements,* ***outline*** *other information that should be contained in the report.* ***(16)***

This question related to Element 3 of the syllabus and assessed candidates' knowledge of learning outcome 3.1: *Explain local exhaust ventilation and procedures to ensure effective ventilation*.

This was a popular question choice in section B. In part (a) most candidates were able to outline measurements that would usually be taken on an LEV system. Those who methodically considered the components of the LEV system and then outlined the measurement(s) relevant to each component produced a well organised and complete response to part (a).

To gain good marks on part (b) it was necessary for candidates to organise their thoughts and provide a wide range of information that would be included in such a report. The information needed to be outlined rather than listed. In summary, the report should have included the following types of information: administrative details (eg dates, names, addresses etc), technical details about the LEV system use and design, data on measurements taken, equipment used and its calibration, observations and recommendations made. A summary of the range of information found in this type of report is given in the document HSG 258.

Question 11

(a) *The Ionising Radiations Regulations 1999 require an employer handling radioactive materials to appoint a radiation protection supervisor.*

Outline** the factors the employer should consider when deciding on this appointment.* ***(7)

(b) *An employer can also be required to designate some employees working with radioactive materials as a 'classified person'.*

Outline** the circumstances that can result in this designation being necessary.* ***(3)

(c) *For those employees designated as a 'classified person' the employer is required to assess their exposure to all ionising radiation. The employer can use film badges to make this assessment.*

(i) ***Outline** the legal requirements relevant to making this assessment.* ***(5)***

(ii) ***Outline** how this assessment can be carried out using film badges.* ***(5)***

This question related to Element 7 of the syllabus and assessed candidates' knowledge of learning outcome 7.3: *Explain the effects of exposure to ionising radiation, its measurement and control*.

Responses to this question were generally limited, with few candidates having the necessary level of knowledge required for element 7 of the syllabus.

Most candidates achieved reasonable marks in part (a), even if they were not familiar with the Ionising Radiations Regulations (IRR) that set out the factors to consider when deciding on the appointment of a radiological protection supervisor. The revised syllabus includes the role, competency and training of RPA and RPS and further information on this is in the approved code of practice L121, a tutor reference in the syllabus. Those without knowledge of this part of the syllabus could have relied upon their more general knowledge about the appointment of competent persons in other aspects of health and safety and still have gained a number of the marks available. Marks were awarded for consideration of the person's knowledge and understanding of the work being undertaken, the IRR, any local rules that apply and the precautions needed to undertake the work safely. Anyone appointed as an RPS would need to have sufficient information and training to be competent in their role and this would include knowing what to do in an emergency. Another important consideration would be their ability to command authority.

The term '*classified persons'* is included in 7.3 of the syllabus, along with reference to the radiological exposure limits relevant to classified persons. Therefore candidates were expected to have some understanding of the circumstances that lead to this designation. Some candidates were able to recall the numerical values of the exposure doses that bring about this designation and were credited for that. However, it was possible to gain marks on this part of the question without that information. Other circumstances that were mark-worthy were, being 18 years or over and working in a controlled area. Few, if any, candidates drew the distinction between effective dose and equivalent dose that is relevant in this designation.

Answers to part (c)(i) were limited but part (c)(ii) was better answered. In part (c)(i) the key requirements are to follow the IRR requirements and to use an approved dosimetry service (ADS). Marks were also available for reference to dose record

keeping (for 50 years or until the age of 75) and communication of dose records by the ADS to the employer. In response to part (c)(ii) most candidates were able to outline how to use film badges including where to wear them and for how long. Marks were also available for outlining what happened to the badge following exposure to radiation and how the results on dose received by an individual were obtained and reported.

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