

March 2010

Examiners' Report NEBOSH National Certificate in Environmental Management



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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 over 25,000 candidates annually and are offered by over 400 course providers in 65 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 recognised and regulated by the UK regulatory authorities:

- The Office of the Qualifications and Examinations Regulator (Ofqual) in England
- The Department for Children, Education, Lifelong Learning and Skills (DCELLS) in Wales
- The Council for the Curriculum, Examinations and Assessment (CCEA) in Northern Ireland
- The Scottish Qualifications Authority (SQA) in Scotland

NEBOSH follows the “GCSE, GCE, VCE, GNVQ and AEA Code of Practice 2007/8” published by the regulatory authorities in relation to examination setting and marking (available at the Ofqual website www.ofqual.gov.uk). 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.

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 are failing because they 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.
- 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.

UNIT NEC1 – Management and control of environmental hazards

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- Question 1**
- (a) ***Describe** the main features of a BS EN ISO 14001:2004 environmental management system.* (10)
- (b) ***Identify FIVE** benefits **AND FIVE** limitations of introducing an environmental management system based on BS EN ISO 14001:2004 into the workplace.* (10)
-

For part (a) the main features of the environmental management system (EMS) are headlined as policy, planning, implementation and operation, checking and corrective actions, and management review. Good answers needed to expand on these with details of the contents. Answers were variable with there being a number of very good answers, but also a number of very poor answers. Many candidates also mentioned the initial environmental review which is not part of the management system.

In part (b) the initial benefits ought to be to the environment with improved management of environmental risk and opportunities to reduce environmental impacts by using fewer resources and minimising waste. These can result in significant business benefits such as reduced costs and lower risks of prosecution. Further benefits can come from reduced insurance premiums, better PR and relations with key stakeholders and opportunities for competitive advantage against competitors without an EMS. The EMS also provides an audit trail and sets targets against which performance can be measured. Integration with safety and quality management systems will also offer cost savings and deliver other business benefits. Candidates were generally able to identify five benefits from this list.

There are fewer limitations from the introduction of an EMS. Time and financial commitments both to introduce and then audit and maintain an EMS may be difficult, especially for a small business. Lack of management support or resistance from staff may also be a problem and there may be a lack of knowledge or skills required for implementation. There is no requirement for public reporting and, in some cases, there may be negligible improvement in environmental performance.

Despite this shorter list, many candidates came up with five limitations although this part was less well answered.

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- Question 2**
- A local resident has telephoned your company complaining that an oil discharge from your site is contaminating a local watercourse. It is a large site with storage for oil and refuelling and parking facilities.*
- Identify** the short-term actions that should be taken by the site operator.* (8)
-

The initial responses need to include some information gathering such as details of the complainant and the location and time of observation. This may help in inspecting the watercourse, outfalls and discharge points, oil storage facilities and interceptors and ascertaining if there have been deliveries or movements of oils. The EA and water company should be advised and key internal contacts including the emergency response team should be alerted. It may also be necessary to contact known downstream activities. Initiation of the emergency plan is also important, for example, limiting access, locking off plant or sealing drains, deploying spill and emergency kits and taking samples of discharges and the watercourse.

There were some good answers to this question but some candidates did not read the question carefully enough and included long term actions such as investigations and recommendations for action. Marks were also not awarded for descriptions of emergency plans.

Question 3 *A large high street chain store selling clothes, household goods and food wants to reduce its environmental impact.*

(a) **Identify FOUR potential significant aspects.** (4)

(b) **Outline FOUR ways to reduce the associated environmental impacts of ONE of the aspects identified in part (a).** (4)

In part (a) the significant aspects of an enterprise as described are likely to be packaging, transport, energy use, waste production and use of natural or other raw materials. Although generally well answered, some candidates confused aspects with impacts which resulted in lower marks and led to confusion in answering part (b).

For part (b) good answers correctly outlined impacts associated with one aspect identified in (a) and then elaborated actions on which could be taken by the store to reduce them.

Question 4 *A construction company is tendering for a contract to demolish some existing workshops and replace them with a new office and a vehicle parking area. The client wants the proposal to demonstrate good environmental practice.*

Identify the main environmental issues to be considered in preparing the tender. (8)

There are two activities that need to be considered – demolition and new construction. In the former case, waste management including the opportunities for recycling materials such as metals or rubble and possible hazardous materials such as asbestos need to be included. The potential for nuisance from noise or dust and the possibility of contaminated land should also be mentioned.

For the construction phase, the choice of materials for construction – minimising the use of non-renewable resources and recycling demolition waste is important. Equally so is the design of the building with energy efficiency and such issues as solar gain and the use of renewable energy sources being stressed. There may also be opportunities for rainwater harvesting and providing some areas for wildlife. Parking areas need to take account of the risk of oil pollution and sustainable drainage should also be considered. Decent landscaping and the use of local materials and labour are also environmentally beneficial but also help to keep the local community on side.

General issues to be considered include the possible requirements for Site Waste Management Plans (dependent on contract value) and an EMS for suppliers or contractors. There may be a need to identify or protect local flora and fauna and any special sites. Good management and site supervision will be essential to deliver these requirements.

Most candidates answered this question well although a few concentrated on the demolition and failed to gain the marks for the construction element.

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- Question 5**
- (a) **Identify TWO** greenhouse gases. (2)
 - (b) **Identify TWO** typical sources of greenhouse gases. (2)
 - (c) **Outline** how emissions of greenhouse gases may contribute to 'climate change'. (4)
-

In part (a) most candidates mentioned carbon dioxide as a greenhouse gas but not all managed to correctly identify another from methane, sulphur hexafluoride, some VOCs and HCFCs.

The formation of carbon dioxide from the combustion of fossil fuels was the most common answer in part (b). Landfill gas or leakage from coal mines and natural gas facilities as a source of methane were also acceptable. The other GHGs mainly arise from industry or more general use of solvents and refrigerants.

For part (c) about half the candidates outlined how GHGs prevent the re-radiation of solar energy back into space. Very few outlined how this results in a raising of the global air temperature and consequential terrestrial warming and other climate changes due to increased energy and water vapour in the atmosphere. Some candidates erroneously linked climate change with the depletion of the ozone layer and others went on to describe the impacts in detail which was not required.

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- Question 6**
- Outline** the main internal documentation which may be reviewed during an externally led audit of the environmental performance of a manufacturing plant. (8)
-

This question was generally very well answered. Key documents to be reviewed would include previous audits and records of emission monitoring, energy and raw materials use and waste production and recycling. Complaint data, enforcement notices or other communications from regulators and accident and incident reports would also be reviewed. The company policy and procedures or EMS manual would also be inspected along with the legal aspects register, any consents and permits and evidence of compliance. Maintenance logs and the results of site inspections are also likely to be required. Staff training records and the results of attitude surveys could also be reviewed along with minutes from management reviews of any of the above.

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- Question 7**
- (a) **Give** the meaning of the term 'ecosystem'. (2)
 - (b) **Describe** the ways in which air pollution can impact upon an ecosystem. (6)
-

Part (a) was generally very poorly answered, with very few candidates correctly identifying both of the key points about an ecosystem – that it consists of a defined area, and in particular that it refers to a community of inter-related species.

Part (b) was answered better. Human health effects such as asthma, acid rain damaging water and plant life and emissions of greenhouse gases causing global warming were most frequently mentioned. However, vegetation can also be affected by absorption through leaves or, after deposition on soil, by the roots. Pollutants can then build up in concentration and affect the health of animals that feed on the plants. Air borne pollutants can also deposit in water and affect the organisms there. Often these effects are chronic and develop over time, possibly building up in the food chain and affecting the biodiversity of the ecosystem. In extreme cases, acute poisoning can result in rapid death of plants and animals.

Question 8 ***Outline** the principles of the following control measures, **giving** an example of a type of pollutant that can be removed using **EACH** of them:*

(a) *electrostatic precipitator;* (4)

(b) *wet scrubber.* (4)

Both parts of this question were generally well answered.

Electrostatic precipitators rely on particles in an air stream gaining a charge as they pass between wires carrying a high voltage. The charged particles are then attracted to oppositely charged plates where they collect allowing the cleaned gas to discharge. The plates are cleaned by shaking or vibrating them with the particles falling into a trap. This equipment is used for particles such as dust, grit or fume but not for particles that can form an explosive mixture in air.

A wet scrubber relies on the contaminated air flowing upwards against a cascade of water or an acid or alkaline solution. Soluble gases and particles are removed and the cleaned air flows out of the top. Horizontal plates or a fine spray give a large surface area for the water and this improves efficiency. The contaminated solution has to be removed from the base and treated separately. This technique can be used for particles as in (a), including those that may form explosive mixtures with air. It also works well with vapours and odours and other gases, especially if the water solution is adapted to the gas (e.g. an alkaline solution to remove sulphur dioxide).

Question 9 (a) ***Identify FOUR** atmospheric pollutants that may be released from a coal fired power station.* (4)

(b) ***Outline** the control hierarchy for reducing air pollution emissions.* (4)

In part (a) most candidates managed to correctly identify at least three pollutants from among sulphur and nitrogen oxides, carbon dioxide and monoxide, dust or fly ash, smoke or soot and some metals.

Part (b) was not necessarily specific to a power station so references to this or another process were acceptable. A few candidates wrongly answered this part with references to the waste hierarchy. Those that answered fully identified elimination or prevention as the first stage by ceasing the process or changing the process or materials. The second stage is to minimise emissions or reduce them to the lowest practicable level by means of control devices, process management or choice of materials. The final stage is to render the discharge harmless by use of a filter or dilution and dispersal through a chimney.

Question 10 ***Outline** the potential environmental effects that may arise from contaminated land.* (8)

The potential environmental effects from contaminated land are most frequently ground or surface water pollution by leached contaminants. Human health may be affected by direct contact with the soil, ingestion or inhalation of dust or vapours. There may be odours or other forms of air pollution. Any of these can also affect wildlife directly or by loss of habitat.

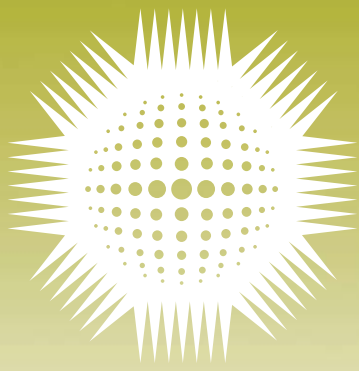
In some circumstances there may be fire or explosion risks or damage to building materials or maybe radiation risk. In most cases there will be loss of amenity value and restrictions on future use without some form of treatment.

Most candidates were able to outline some of these effects with a few gaining full marks.

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|--------------------|-----|--|------------|
| Question 11 | (a) | <i>Identify FIVE sources of environmental noise.</i> | (5) |
| | (b) | <i>Identify the possible effects of environmental noise on the community.</i> | (3) |

For part (a) most candidates were able to answer well from among the potential sources of transport and road traffic, construction work, aeroplanes, agricultural activities, workshops or factories, pubs and clubs, intruder or vehicle alarms and noisy neighbours.

In part (b) most candidates mentioned human health effects such as loss of sleep or stress with fewer recognising high blood pressure, heart disease or hearing damage in extreme cases. There is also the potential to disrupt wildlife, particularly breeding birds, causing public or private nuisance or, at certain frequencies and intensity, structural damage to buildings.



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