December 2009

Examiners' Report

NEBOSH National Certificate in Environmental Management

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CONTENTS

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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

Question 1

(a) ***Identify*** *the categories of waste.* ***(4)***

(b) ***Outline****:*

(i) *the main advantages;* ***(8)***

(ii) *the main disadvantages* ***(8)***

associated with the landfilling of wastes.

In part (a) the categories of waste are controlled, inert, nonhazardous, hazardous, clinical and radioactive. Most candidates were able to identify at least four of them.

Part (b) (i), the advantages of landfill are that it is generally low cost compared with other alternatives and large capacity is available in some areas. A wide variety of wastes can be land filled, including residues from other waste treatment options. Local rubbish can be dealt with locally and the operation can provide local jobs. Landfill gas can be used for power generation. Sites can be unobtrusive if well designed and, after use, the restored sites should offer space for leisure or wildlife. Candidates were able to identify the first few of these advantages but few got beyond that.

In part (b) (ii) candidates generally identified most of the disadvantages. These are that older sites in particular can be a source of air and water pollution from gas emissions and leachate and that the closed sites can be a source of contaminated land. In extreme cases there have been fires and explosions. In some areas, for example the south east, there is a shortage of suitable sites near to where waste is generated. The convenience of landfill can preclude the development of better alternatives, for example recycling or the adoption of those with better conversion of waste into energy. Local jobs created are lowly paid and the operation can cause nuisance problems to near neighbours. Tightening of standards by the EU Landfill Directive and the escalation of the landfill tax rates increasingly influence the economic choice of alternative methods of disposal.

Question 2

Outline *the characteristics and distinctions between:*

(a) *common law and statute law;* ***(4)***

(b) *civil law and criminal law.* ***(4)***

There were some good answers to this question but many candidates struggled to differentiate between the sources and types of law and mixed up their answers to the two different parts.

For part (a) common law and statute law are primary sources of law. The former (also known as case law) is the accumulated judicial decisions made by courts when hearing similar cases. Statute law is produced by Parliament and written in statutes or Acts of Parliament and often promulgated in Regulations. Acts supersede all other forms of law and only Parliament can make, modify, amend or revoke statutes.

For part (b) civil law and criminal law are different types of law. Civil law is mainly derived from common law and is concerned with the rights and duties of individuals and organisations towards each other; violations are known as torts. The standard of proof is the "balance of probabilities" and remedies may be in the form of damages or compensation. Criminal law is concerned with breaches of statute and prosecutions are brought by statutory bodies such as the Environment Agency or local authorities. The main aim of prosecution is to punish and deter and sanctions can be fines or imprisonment. The standard of proof is therefore "beyond reasonable doubt".

Question 3 ***Outline** why deforestation is seen as an environmental concern.* ***(8)***

Most candidates did reasonably well in this question. Reasons included damage to local habitats and wildlife, impacts on the local population - including impacts on lifestyle and food sources. The economic impact can affect tourism and jobs. There is also reduced carbon storage and oxygen production, impacts on the local climate, and reduced recycling of nutrients. No-one mentioned loss of rare tree species or disruption to the regulation of the water cycle although the potential increased soil erosion did get included.

Question 4 *An organisation operates under an Environmental Permit (IPPC) which sets emission limit values for releases to air and to a surface water stream.*

Outline** the active **AND** reactive monitoring arrangements that you would expect to be in place to ensure compliance with the emission limit values.* ***(8)

This question was poorly answered with few candidates achieving even half marks. There was some confusion between active and reactive monitoring. Most candidates identified sampling of air and water emissions as active monitoring but no-one mentioned mass balance calculations for fugitive releases to air. Other aspects of active monitoring include site inspections to identify potential risks, flow measurement of discharges to surface water and the need for calibration. Reactive monitoring covers a narrower range of activities, eg collecting data on near misses, monitoring of complaints by the workforce and neighbours and any enforcement actions.

Question 5

(a) ***Identify** any **TWO** types of enforcement notice that may be served by an inspector, **giving** the conditions that must be satisfied before **EACH** type of notice is served.* ***(4)***

(b) ***Outline FOUR** powers available to an inspector when investigating a pollution incident other than the serving of enforcement notices.* ***(4)***

In part (a) most candidates identified two types of enforcement notice in the correct context. The choice includes prohibition notices where there is imminent risk of serious environmental damage from an activity not covered by an environmental permit; suspension notices where there is serious risk of pollution from an authorised process; variation notices if the conditions of an authorisation require to be changed; revocation of part or all of a permit if the person operating an installation ceases to be a fit and proper person or they cease to be the operator; an enforcement notice if permit conditions are not being met; an abatement notice by a local authority for causing nuisance and a remediation notice in respect of contaminated land.

For part (b) the powers available to an inspector are extensive and most candidates identified four successfully. Those that included serving enforcement notices had not read the question properly.

Inspectors can enter premises at any reasonable time or where they suspect there is a dangerous situation, taking a police constable if required. They may inspect or take copies of records, take samples, measurements and photographs, take possession of articles and substances or render them harmless, dismantle them or retain them. They may also require a person to answer questions and make a voluntary statement or to give facilities and assistance within that person's control. They may use any other powers necessary for the purpose of exercising any of the above powers (eg cautions for obstructing them from doing their duty) and, of course, initiate prosecutions.

Question 6 ***Identify FOUR*** *sources of information:*

(a) internal; ***(4)***

(b) external ***(4)***

to an organisation that could be consulted when undertaking environmental impact assessments.

This question was well answered.

Part (a), internal sources include audit, inspection and investigation reports, data from incidents and near misses, maintenance records, job and task analysis, the results of environmental monitoring to evaluate risk, raw material and energy usage and supply, informal data from staff etc. and historical records for the site.

Part (b), external sources can include manufacturers, trade associations, legislation, regulatory bodies (EA, SEPA, LAs), international and European standards, IT and subscription sources (such as DEFRA, Envirowise, IEMA), external audits and English Nature or Wildlife Trusts.

Question 7 ***Describe*** *the essential features and mechanism of "The Water Cycle".* ***(8)***

The essential features of the water cycle are that water is evaporated by solar energy from open waters (sea, rivers and lakes), plants emit water vapour into the atmosphere by transpiration and animals by respiration. This water vapour forms clouds in the high atmosphere where it cools and condenses into rain, ice or snow and falls back to earth. The water returns directly to large bodies of water or is absorbed into the ground - groundwater sources eventually find their way back into the major water bodies - thus completing the cycle. Man intervenes in the cycle by abstracting water for use, returning it after use and treatment. Most candidates managed to describe at least some of the above. However, no-one mentioned the storage of water in ice and glaciers or the essential role of the cycle in cleaning and purifying water.

Question 8

(a) ***Outline*** *the business benefits of minimising waste.* ***(5)***

(b) ***Identify*** *the five environmental options, in hierarchical order, that form the waste hierarchy to look at which treatment option is best for the environment.* ***(3)***

Most candidates did well in both parts of this question.

In part (a) the key business benefit is more efficient use of raw materials and packaging and the facilitation of waste segregation and ultimate disposal with the bonus of minimising storage on site. All of this leads to the potential to save money. Compliance with environmental legislation becomes easier and cheaper and PR benefits accrue with employees, customers, insurers, suppliers and the general public by demonstrating environmental responsibility.

In part (b) the correct order is: prevent (or eliminate), reduce, reuse, recover (including recycle, compost and recover energy) and responsible disposal.

Question 9

BS EN ISO 14001:2004 requires that an organisation identifies its 'significant environmental aspects'.

Identify *factors that should be considered in determining whether an environmental aspect is significant.* ***(8)***

This question was well answered with most candidates getting at least some marks. Legislative requirements would normally automatically render a factor significant. The other principal factors to consider are the raw materials and their sources, potential impact of emissions and adequacy of controls, the potential scale and severity of the impact, the probability of occurrence, the duration of the associated impact and the sensitivity of the receiving environment. Contractual requirements, the concerns of interested parties and the effects on public image may also be important and the costs associated with the impact or managing it could also be taken into account.

Question 10

(a) ***Give*** *the meaning of the following terms:*

(i) chemical oxygen demand (COD); ***(2)***

(ii) biological oxygen demand (BOD). ***(2)***

(b) ***Outline TWO*** *different sources of pollutants that may cause increased biological oxygen demand in surface water.* ***(4)***

For part (a) no-one produced a satisfactory definition of COD or BOD. Loss of oxygen is a critical result of many types of water pollution. BOD and COD are measures of the oxygen demand of potential pollutants measured by analytical tests in a laboratory. COD is the amount of oxygen consumed from an oxidising agent (potassium or sodium dichromate) when a sample is heated under defined conditions (typically boiling for 4 hours at acid pH). This is a chemical reaction and the oxygen can be consumed by organic or some inorganic substances. BOD is measured by incubating a sample in the presence of oxygen and microorganisms for five days at 20°C. The oxygen is consumed by biodegradable organic matter (and ammonia under some conditions).

This more closely reflects what happens in nature but the test takes a lot longer to produce a result. The tests measure different things so the results would not normally be the same although the relationship between the two can be relatively constant for many polluting discharges. Consequently COD is often used as a convenient surrogate for BOD.

Part (b), in order to answer this part of the question candidates needed to understand what BOD was even if they could not give an accurate definition. Pollutants which increase the BOD of water will be those containing a high concentration of biodegradable matter. Examples include sewage, wastes from food production, farms, paper mills, timber mills, some chemical plants and accidental spillages of such matter as milk, beer or any of the above. The pollutants nitrate and phosphate which cause eutrophication do not directly cause an increase in BOD.

Question 11 *A company has an emergency plan to deal with a range of emergencies including fire, explosion, chemical spillage and flooding.*

Outline** the steps which should be taken to ensure these plans are not only in place but will work effectively when required.* ***(8)

This question was generally well answered including some excellent answers. A few candidates failed to gain marks by describing the content of an emergency plan which was not asked for. Good answers recognised that in order for emergency plans to work well, key steps include training for new staff and refresher training for existing staff and ensuring that everyone is aware of their responsibilities. Practices and drills - involving neighbours and primary responders as appropriate - and regular liaison with those parties are also important. Any real incidents or alarms need to be evaluated and any shortcomings in the plan rectified.

Regular reviews of plans and updating them if circumstances change must also be advised to those involved. Maintenance and testing of systems and alarms is important and emergency signage, instructions to visitors, emergency equipment and PPE all need to be regularly checked. Copies of the plan should be held off site and in the emergency control centre which should be clearly identified and equipped. These need to contain up to date contact details of both internal and external parties. Finally an external audit of the plan should build confidence.

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