July 2010

Examiners' Report

NEBOSH National Diploma in Occupational Health and Safety- Unit A

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NEBOSH LEVEL 6 DIPLOMA IN OCCUPATIONAL HEALTH AND SAFETY

Unit A: Managing health and safety

JULY 2010

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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 to be 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 the question 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 any 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 A – Managing health and safety

Section A – *all questions compulsory*

Question 1 *HSG65 and OHSAS 18001 are both nationally recognised health and safety management system models.*

(a) *Select **ONE** of the health and safety management system models mentioned above **AND draw** a labelled diagram showing the main elements of the model and any links between those elements.* ***(6)***

(b) *For your chosen model, **identify** the system elements into which the following activities would fit:*

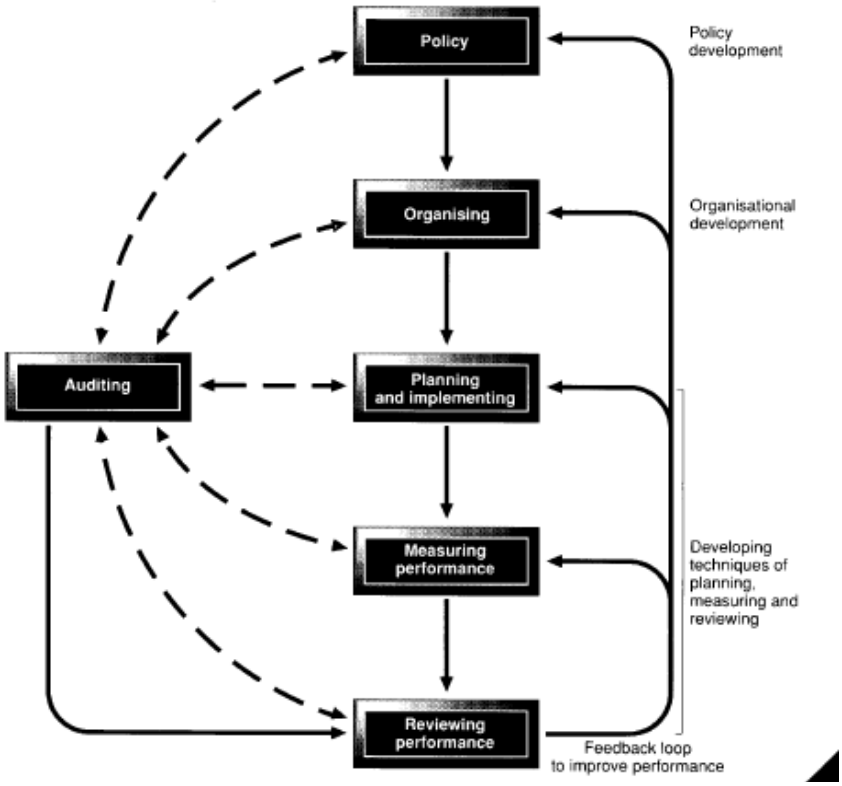
(i) *promotion of employee competence;* ***(1)***

(ii) *setting and revising of health and safety objectives;* ***(1)***

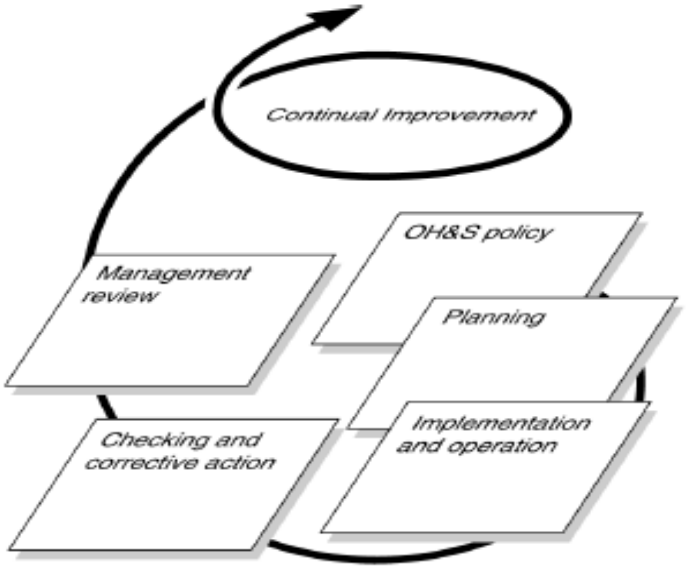
(iii) *carrying out health surveillance;* ***(1)***

(iv) *establishing health and safety responsibilities for individuals.* ***(1)***

For part (a), marks were available for a diagram that included the relevant components in the right order together with the correct links between the components. Most candidates opted for the HSG65 model and they were expected to produce the following diagram:



Those who chose OHSAS 18001 the following:



Some candidates found difficulty in sketching correctly the link arrows and feedback loops, but generally most made a reasonable attempt at producing their chosen model.

In answering part (b), candidates were expected to show their understanding of their selected model by identifying the system elements into which four named activities would fit. For example, in the HSG 65 model, the promotion of employee competence would fall within the organising element, while in OHSAS it would be included in the implementation and operation section. In the former model, health and safety responsibilities would be dealt with in the organising section while in the latter it would be included in the section dealing with implementation and operation. Many candidates found difficulty in assigning the activities to the correct system elements suggesting a lack of understanding of the models at an appropriate level of detail.

Question 2

(a) ***Identify*** *the objectives of Failure Mode and Effects Analysis (FMEA).* ***(2)***

(b) ***Outline*** *the methodology of FMEA* ***AND give*** *an example of a typical safety application.* ***(8)***

An acceptable answer for part (a) of the question would have identified that the objectives of FMEA are to analyse each component of a system in order to identify the possible causes of its failure and the effects of the failure on the system as a whole.

The methodology of FMEA involves breaking a system down into its component parts and identifying how each part could fail and all possible causes for its failure; identifying the effects of the failure on the system as a whole in terms of the severity of the consequences and assessing the probability of failure; identifying means for the detection of the failure such as by sensors; allocating a risk priority number to each component based on the probability and severity of failure and the effectiveness of its detection; devising actions to reduce the risk to a tolerable level and documenting the results in a suitable format.

There were some good answers provided for this question, but there were many candidates who seemed to be confused between the objectives and methodology of FMEA. Candidates were asked to provide a suitable example of the safety application of the analysis but this all too often produced a reference to an anonymous chemical plant without any supporting information on where or how the analysis might be applied.

Question 3 ***Outline*** *how the health and safety professional can help to develop and support the arrangements for consultation with employees on health and safety matters.* ***(10)***

Familiarity with the requirements of the Safety Representatives and Safety Committees Regulations and the Health and Safety (Consultation with Employees) Regulations would have assisted candidates to answer this question. Initially, the health and safety professional might advise on the requirements of the Regulations and the good and accepted practices to be followed both by safety committees and safety representatives; make proposals for local arrangements for formal consultation; offer advice and support for the training arrangements of safety representatives and representatives of employee safety and arrange for the necessary resources to be provided to enable them to carry out their duties. They might also usefully influence the constitution, composition and agenda of the safety committee and by attending the meetings of the committee, provide professional advice to assist the members in their deliberations while additionally advising on the arrangements for direct consultation with employees and encouraging informal consultation at routine team meetings and briefings. Finally they will have a part to play in encouraging senior management members to take an active part in both formal and informal consultation and to respond promptly to proposals made and concerns expressed during the consultation process.

Answers to this question were disappointing. Many candidates seemed not to have read the question with sufficient care and concentrated on the safety professional's duties in general rather than on their involvement in developing and supporting the arrangements for consultation with employees.

Question 4 ***Describe****, with practical examples, the statutory duties set down in Section 4 of the Health and Safety at Work etc Act 1974. Your answer should contain a description of the duty holders, the duties concerned and those whom the Section is designed to protect.* ***(10)***

The question was concerned with the duties set down in Section 4 of the HSAW Act, a section with whose requirements many candidates seemed to be unfamiliar. Those who were aware of the section's requirements should have found no difficulty in obtaining all or at least most of the marks available. The section imposes duties on persons in control of non-domestic premises which are made available to others, who are not their employees, as a place of work or as a place where plant or substances are provided for their use. The duties include taking reasonable measures to ensure that the premises, the means of access and egress to them and the plant and substances provided for use are safe and without risks to health. The measures that it will be reasonable to expect the duty holder to take will depend both on the degree of control which he/she has, and this may be determined by a contract of tenancy, and on the test of reasonable practicability.

This question was poorly answered with many candidates showing confusion between the requirements of the section and those of Sections 2 and 3. There was also confusion with the requirements of Section 6 which on more than one occasion were quoted at length. Very few dealt with the fundamental issues such as non-domestic premises made available as a place of work while even fewer recognised the issues concerning control and tenancy which are key issues in the section.

Question 5

(a) ***Outline*** *the main defences to a civil action for breach of statutory duty.* ***(8)***

(b) *Where two or more parties act jointly to commit a negligent act they are said to have joint and several liability for such negligence.*

Outline *the meaning of 'joint and several liability' in these circumstances.* ***(2)***

In answer to part (a) of the question, initial procedural defences that might be offered were that the action was out of time or was not allowed by the relevant statute. If neither were held to be valid, then it might be argued that there was no breach of the duty owed by the defendant under the statute and if there was a breach, it did not cause the injury to which the action referred. It could further be argued that the claimant was not within the class of persons protected by the statute nor was the harm suffered by the claimant of the type that the statute was designed to prevent. Reference to relevant case law such as Corn v Weirs Glass (Hanley) Ltd would have gained an additional mark. The problems in answering this part of the question arose from the difficulties experienced by many candidates in differentiating between negligence and the requirements of a civil action for breach of statutory duty. Some candidates did not read the question carefully and described what would be required to prove a breach rather than the defences that might be put forward to counter the claim.

For part (b), there was little understanding shown of the meaning of 'joint and several liability'. A good answer would have outlined that all parties involved in committing the negligent act are individually liable for the full amount of damages. Such damages may be recovered in full from any one of the negligent parties following a successful civil action. The party thus sued may then claim a contribution from the others who are jointly liable.

Question 6 *An advertising campaign was used to promote improvement in safety standards within an organisation. During the period of the campaign the rate of reported accidents significantly increased and the campaign was considered to be a failure.*

(a) ***Outline*** *the reasons why the rate of reported accidents may have been a poor measure of the campaign's effectiveness.* ***(2)***

(b) ***Outline FOUR*** *proactive (active) monitoring techniques which might be used to assess the organisation's health and safety performance.* ***(8)***

There was a good response to part (a) of the question with many candidates identifying that a reason why the number of reported accidents had increased was because they may have previously been under reported either because of a deficiency in the existing reporting procedures or ignorance on the part of the employees that reporting was necessary. Raised awareness, prompted by the advertising campaign, could have led to previously unreported accidents now being reported and that, in the absence of any other data, it would not be possible to gauge whether or not the increase was "real". Other reasons why using the number of reported accidents might be an unsatisfactory way of measuring the effectiveness of the campaign could be that the anticipated improvement in health and safety standards may not be apparent until some time after the campaign has ended or that the campaign may have focused on specific hazards which are not the basis of many of the reported accidents.

In answering part (b), candidates could have chosen from a number of proactive monitoring techniques which might be used to assess the organisation's health and safety performance. For example, these might have included safety inspections involving physical inspections of the workplace to identify hazards and unsafe conditions; safety audits, where the systematic critical examination of all aspects of an organisation's health and safety performance against stated objectives is carried out, and safety tours involving unscheduled inspections to observe the workplace in operation without prior warning. Reference might also have been made to other techniques such as safety sampling, safety surveys, environmental monitoring, safety climate measures, behavioural observation and benchmarking though, since this was an 'outline question' reference to the technique by name only without further detail of what the technique involved would not have been sufficient to obtain the marks available.

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

Question 7 *A designer is designing a safety-critical, electrical control system. The system consists of a number of components arranged in series. One of the components is a detector which has a reliability of 0.95. The designer is considering installing two identical detectors in parallel to improve the reliability of the system.*

(a) ***Calculate*** *the improvement in reliability that using two identical detectors in parallel would give when compared with a single detector.* ***(4)***

(b) ***Outline*** *the issues that would need to be considered when assessing whether the proposed extra detector in parallel should be adopted.* ***(3)***

(c) *Assuming that the decision is taken to use two detectors in parallel,* ***outline*** *other ways in which the reliability of the control system could be improved.* ***(9)***

(d) *The designer has been warned that his assumptions of improved reliability from two detectors in parallel might be undermined by common mode failure.*

Outline *the meaning of 'common mode failure'* ***AND outline*** *why it may affect the reliability as calculated in (a) above.* ***(4)***

In answer to part (a), Examiners expected candidates to produce the following calculation:

The reliability of the parallel components = 1- [(1- 0.95)(1- 0.95)] = 0.998 or 99.8%
The improvement in reliability would therefore be 0.998 - 0.95 = 0.048 or 4.8%

Candidates are reminded that they should produce their calculations in full in order to demonstrate their full understanding of the problem posed and to ensure that if they make an arithmetical error they can still obtain some marks – assuming their approach was correct.

Issues that would need to be considered in assessing whether the proposal for the extra detector in parallel should be adopted include the probability of system failure and its consequences; legal requirements and advice contained in industry and HSE codes of practice and guidance; the initial cost of the additional detector coupled with the subsequent expense connected with its ongoing maintenance and inspection and risk tolerability criteria such as those for example contained in 'reducing risks protecting people'. Many candidates referred only to the issue of cost.

In answering part (c), candidates were expected to outline additional ways in which the reliability of the control system could be improved such as the use of design stage failure tracing techniques such as FMEA and HAZOP; introducing purchasing quality control arrangements to ensure the most reliable detectors are used and using two different types of equipment to minimise the risk of common mode failure; ensuring the system components are tested before installation and that they are correctly installed by competent personnel; arranging for the introduction of procedures for the periodic inspection, testing and maintenance of the system including the replacement of components within their useful life; providing training to employees in operating the system and in fault detection and using indicators or warnings to indicate component failure.

For part (d), a common mode failure might be outlined as a type or cause of failure that could affect more than one component at a time, even when the components are supposed to be arranged to operate independently of each other. The reliability calculations for components in parallel assume independent failure modes and the existence of common mode failures would mean that the actual reliability was less than that calculated. This part of the question was not well answered.

Question 8

(a) ***Describe*** *the statutory reporting and recording requirements under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995 that apply when someone is either injured at work or by a work activity.* ***(10)***

(b) *Good accident investigation requires an analysis of information that has already been gathered so that immediate and underlying causes of the accidents can be identified.*

Outline FIVE *methods or techniques that can be used to help in the identification of immediate and underlying causes during such an analysis.* ***(10)***

The reporting and recording duties under the Regulations fall to the responsible person who is nominally the employer or the person in control of the premises where the accident occurred. When a person at work is killed or suffers a major injury such as an amputation or permanent or temporary loss of sight, a report has to be sent to the enforcing authority/ incident control centre by the quickest practicable means (e.g. telephone) and a written report submitted forthwith on F2508. If a person who has suffered a major injury accident subsequently dies within a year of the date of the accident, the enforcing authority must be informed in writing. If an employee suffers an an accident which is not classed as major but following which he/she is incapable of carrying out their normal work for a period of more than three days, a written report on F2508 must be submitted to the enforcing authority within ten days. In the case of an accident to a non-employee as a result of a work activity, the responsible person must report forthwith both those that cause death or result in major injury or hospitalisation. Alternative reporting arrangements to the above involving electronic or telephone reporting direct to the Incident Contact Centre may also be used. Finally, records of reportable incidents including the name of the injured person, the date and time of the accident and the date the report was submitted to the enforcing authority, must be kept for a period of three years. Answers to this question were particularly disappointing and some candidates again did not read the question with care and wasted time in describing the reporting arrangements for dangerous occurrences and diseases.

There are a number of methods or techniques that may be used to assist in the identification of the immediate and underlying causes of accidents during their investigation. These would include amongst others: identifying the immediate causes for each event leading up to the accident and then for each immediate cause, identifying one or more underlying causes; using a structured ‘why’ questioning analysis, using immediate and underlying cause checklists such as HSG245 (adverse event analysis) or HSG65 (Appendix 5); carrying out an events and causal effects analysis – a graphical method of linking accident events with causal factors and using a team of people with relevant knowledge to identify both the immediate and underlying causes.

Candidates could also have referred to other techniques or methods such as the use of fault tree analysis, event tree analysis, or the Ishikawa (fishbone) cause and effect analysis. However, a reference by name only would not have been a sufficient response to obtain the marks available and candidates would need to provide additional information to demonstrate their understanding of the techniques and how they might be used in an accident investigation. While answers to this part of the question were to a better standard than those provided for part (a), there were still many candidates who described the various stages of an accident investigation and focused on the methods for gathering information rather than its analysis. Others showed awareness of the different methods or techniques that might be used but by name only and not of how they might be used for the purpose described in the question.

Question 9

(a) ***Outline*** *the meaning and relevance of the following terms in the context of controlling human error in the workplace:*

(i) *'ergonomics';*

(ii) *'anthropometry';*

(iii) *'task analysis'.* ***(6)***

(b) *Excluding ergonomic issues,* ***outline*** *ways in which human reliability in the workplace may be improved. In your answer, consider 'individual', 'job' and 'organisational' issues.* ***(14)***

For part (a) of the question, an acceptable outline of the meaning and relevance of ergonomics in the context of controlling human error in the workplace would have been – the design of equipment, task and environment to take account of human limitations and capabilities; that of anthropometry – the collection of data on human physical dimensions which can then be applied to equipment design; and that of task analysis – the breaking down of tasks into successively more detailed actions which allows an analysis of the scope for human error with each action. Answers to part (a) were to a reasonable standard though for 'ergonomics' some candidates still rely on "the interface between man and machine" which falls far short of what was required.

In part (b), candidates were asked to outline ways in which human reliability in the workplace might be improved, structuring their answers around individual, job and organisational issues. As far as the individual is concerned, this would involve careful selection taking into account skills, qualifications and aptitude; the provision of appropriate training both at the induction stage and to meet subsequent job specific needs; the consideration of the special needs of those who may be more vulnerable; monitoring personal safety performance; using workplace incentive schemes and assessing job satisfaction and providing health surveillance and a counselling service for those suffering from the effects of stress.

Issues connected with the job include the introduction of task analysis for critical tasks; the design of work patterns and shift organisation to minimise stress and fatigue; the use of job rotation to minimise monotony; the introduction of good communication arrangements between individuals, shifts and groups and using a sufficient number of personnel to avoid constant time pressures.

Finally, for issues connected with the organisation, candidates could have referred to the development of a positive health and safety culture the provision of good leadership example and commitment; the introduction of effective health and safety management systems; maximising employee involvement in health and safety issues; ensuring effective arrangements for employee consultation; the introduction of procedures for change management and the provision of an adequate level of supervision. Credit was also available for relevant examples of management system elements or safety culture development relevant to human reliability.

Whilst this part of the question was generally well answered, some candidates might have improved their responses, made them more logical and avoided repetition if they had used the three suggested headings. Some dealt with environmental issues such temperature, lighting and noise which was not required.

Question 10

(a) *In relation to Community Law within the European Union (EU),* ***distinguish*** *between Directives and Regulations.* ***(4)***

(b) *The Treaty of Rome contains two different articles (Article 95 and Article 137) under which directives affecting health and safety may be made.* ***Explain*** *the role of these two different articles* ***AND****, in* ***EACH*** *case,* ***give*** *an example of a directive affecting health and safety at work that has been made under the relevant article.* ***(6)***

(c) *The EU Pregnant Workers Directive was translated into UK law, in part by introducing specific requirements into the Management of Health and Safety at Work Regulations 1999 in the form of Regulations 16 to 18.*

Describe *these requirements.* ***(10)***

In answering part (a) of the question candidates were expected to include that an EC Directive must be implemented by a member state in national legislation by a definite date and the national law must be interpreted to be consistent with the intention of the directive. An EC Regulation on the other hand is binding on those at whom it is directed without the need for implementing legislation. Many candidates were aware of Directives but were uncertain about the purpose of Regulations.

For part (b), the intention of Article 95 is to remove barriers to trade, to allow the unrestricted movement and sale of goods and to harmonise product safety standards. The machinery directive could have been cited as a directive made under this article. The purpose of Article 137 on the other hand is to set and harmonise minimum standards of health and safety at work throughout the Community and to encourage improvement in those standards. Relevant examples would have been the Framework Directive or the Work Equipment Directive. There were some good answers provided for this part of the question with many candidates showing an awareness of the key roles of each directive.

Part (c) was poorly answered with many lacking a basic knowledge of Regulations 16 to 18. Candidates were expected to refer initially to the need for an employer to carry out an assessment of the additional risks that might be present for pregnant employees or those who are nursing mothers. This is required whenever women of child bearing capacity are employed and not just when or if they are pregnant and this point was missed by many. If the risks cannot be controlled by ordinary statutory control measures, the employer should take other actions such as changing the working conditions or hours of work of the employees affected to avoid risk if this is reasonable. Where this is not reasonable or would not avoid the risk, then the employees concerned should be suspended from work for as long as necessary on full pay.

If a medical practitioner or midwife considers it to be necessary, a pregnant woman should be suspended from working at night provided that the employer is provided with a certificate to this effect from the practitioner concerned. However, an employer is not obliged to alter the conditions of work of an employee unless he/she has received written notification that the employee is pregnant or is a nursing mother and this again was a point which was hardly ever mentioned.

Question 11 *A number of external bodies may influence health and safety standards in an organisation.*

Using specific examples of external bodies, ***explain*** *in* ***EACH*** *case* ***why*** *they influence internal decision making on health and safety matters in an organisation.* ***(20)***

Examples of external bodies who might influence health and safety standards in an organisation could have included Parliament and the legislation it produces; enforcing authorities and the powers available to them; courts and the legal decisions that they make; clients and customers and their expectations; contractors and/or competitors and the pressures they might exert; trade unions; insurance companies with their ability to increase employer or public liability insurance or even refuse cover; public opinion and pressure groups; technical standards or professional bodies such as CEN, IOSH and ILO; accrediting bodies; and consultants and training providers.

In each case, it was necessary to indicate why the external influence might impact on internal decision making on health and safety matters within an organisation. For example, legislation might exert its influence because of a desire to behave lawfully or from fear of prosecution; trade unions may influence decision making via the appointment and training of safety representatives or by campaigning on specific issues; and accrediting bodies may influence decision making through an organisation's desire to retain a registration or award to support the image of a business in the eyes of the market or of its employees.

There were generally good answers provided for this question though some candidates believed the HSC was still in existence. If there were failings it was because candidates described the activities of the external bodies rather than how they influenced decision making on health and safety matters in an organisation In some cases, candidates simply gave an external body with no further information.

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