

National Exams May 2011
98-CS-2-Engineering in Society - Health, Safety and the Environment
3 hours duration

Notes:

1. If doubt exists as to the interpretation of any question, the candidate is urged to submit with the answer paper, a clear statement of any assumptions made.
2. This is a Closed Book exam. No calculators are allowed for this exam.
3. Any five questions constitute a complete paper. Only the first five questions as they appear in your answer book will be marked.
4. All questions are of equal value.
5. Write your answers in point-form whenever possible, but fully.

Marking Scheme (marks)

1. (i) 6, (ii) 6 (iii) 8
2. (i) 6, (ii) 7, (iii) 7
3. (i) 7, (ii) 6, (iii) 7
4. (i) 7, (ii) 6, (iii) 7
5. (i) 6, (ii) 7, (iii) 7
6. (i) 7, (ii) 7, (iii) 6
7. (i) 6, (ii) 8, (iii) 6

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1. (i) State the responsibilities of employers and employees under the Occupational Health and Safety Act (OHSA).
(ii) What factors or aspects are considered in performing economic analyses of safety and of actual or potential losses?
(iii) Explain the emphasis placed by Occupational Health and Safety Act (OHSA) to deal with the new hazards in non-traditional sectors of industry that include service industries.
2. (i) Explain the design deficiencies or defects which affect product or process safety causing hazards to the user or operator.
(ii) What is the purpose of job safety analysis? State the steps followed in conducting a job safety analysis.
(iii) What are the features of an effective machine guard or safety device?
3. (i) Isolation can be used to prevent injury or damage. Give some examples.
(ii) State briefly the methods used to reduce failure rate.
(iii) State the steps followed in the investigation of an accident. What are the basic or typical equipment used for accident investigation?
4. (i) State the characteristics of various detection systems.
(ii) What are the various sources of ignition?
(iii) State the means by which fires can be suppressed.
5. (i) What is hypoxia? What are the effects of hypoxia on people?
(ii) Explain the major types of respiratory protective equipment.
(iii) State the characteristics of the various chemicals used as air purifiers in canisters.
6. (i) What are the engineering controls that can be used to reduce vibration and noise levels in industry?
(ii) State the means of isolating sources and isolating personnel from noise exposure.
(iii) Explain the elements of a hearing conservation program (HCP).
7. An employee in a foundry was using an over-head wall-mounted electrically controlled crane to move a heavy casting from one position to another at his workstation. The casting weighted approximately 3,000 pounds. While he was moving the casting, it fell, causing the hoist cables to snap and strike the employee a glancing blow to his head. Fortunately, he was wearing protective head gear, or the blow could have been fatal when the hoist eyebolt assembly failed.
(i) Determine the causes of the accident.
(ii) State the corrective actions required.
(iii) Suggest the follow-up action required.