

National Exams May 2011
98-Ind-B10 - Industrial Safety and Health
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)

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

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1. (i) State the areas other than operator error that can cause failure of equipment and accident. Name and explain the new engineering discipline or concept that grew out of the idea of other areas responsible for accident causation or avoidance.
(ii) State the costs associated with the Occupational Health and Safety Act (OHSA) and OHSA standards that companies, especially the smaller (20 to 250 employees) ones, generally object to because they feel that such costs are not economically justifiable.
(iii) Explain the manner by which unsafe conditions contributing to an unsafe act resulting in an accident, can be uncovered.
2. (i) State your understanding of the terms often used in accident control: (a) standard, (b) code, and (c) regulation.
(ii) What are the uses of standards, codes and regulations in product design?
(iii) What is the purpose of process safety management?
3. (i) What is the purpose of fault-tree analysis (FTA)?
(ii) Explain the manner by which fault-tree analysis can be used for accident investigation.
(iii) What are the limitations of fault-tree analysis?
4. (i) What is your understanding of industrial ecology as applied to manufacturing?
(ii) What is micrometeorology? State the reasons for studying micrometeorology extensively especially in the context of human health?
(iii) What are the responsibilities of facilities and equipment designers in providing safety measures for toxic hazards?
5. (i) State the rules that should be followed for proper use of the respiratory protective equipment.
(ii) State the major types of respiratory protective equipment.
(iii) What are the typical or normal hazardous operations in industry that require respiratory equipment and protective clothing?
6. (i) Explain the design deficiencies or defects which affect product or process safety causing hazards to the user or operator.
(ii) What are back-out and recovery as they apply to accident prevention?
(iii) State the order of preference that should be followed as general principles for eliminating and controlling hazards in industry.
7. A drill-press operator was drilling holes while wearing gloves in metal fasteners to be used in aircraft wing gas tank assemblies. She then attempted to make a tool change while the machine was operating at a slow speed. While she was doing so, the glove on her right hand caught on the revolving drill and caused an amputation of the middle finger on her right hand.
(i) Determine the cause of the accident.
(ii) State the corrective actions required.
(iii) Suggest the follow-up action required.