

National Exams May 2012
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. A Casio or Sharp approved calculator is permitted.
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) 7, | (ii) 6, | (iii) 7 |
| 3. | (i) 7, | (ii) 7, | (iii) 6 |
| 4. | (i) 7, | (ii) 6, | (iii) 7 |
| 5. | (i) 7, | (ii) 7, | (iii) 6 |
| 6. | (i) 7, | (ii) 6, | (iii) 7 |
| 7. | (i) 7, | (ii) 7, | (iii) 6 |

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1.
 - (i) State the basic objectives of the Occupational Health and Safety Act (OHSA).
 - (ii) Explain the concept of “system safety” in the context of accident investigation.
 - (iii) What are back-out and recovery as they apply to accident prevention?
2.
 - (i) Explain Failure Modes and Effects Analysis (FMEA) in the context of reliability engineering.
 - (ii) What are the elements of a preliminary hazard analysis?
 - (iii) Explain the design deficiencies or defects which causes product or process safety hazards to the user or operator.
3.
 - (i) Certain chemical agents are especially harmful to specific organs. Name the specific organs that are affected by such agents.
 - (ii) Explain the various types of damage caused by chemical agents to skin.
 - (iii) State the possible effects of toxic material on the operator.
4.
 - (i) State the various types of air contaminants. What are the basic approaches to measuring air contaminant exposure?
 - (ii) Define hypoxic hypoxia. What are the causes of hypoxic hypoxia?
 - (iii) What are the properties of the various chemicals used as air purifiers in canisters?
5.
 - (i) What are the features of an effective machine guard or safety device?
 - (ii) State the precautionary measures that are common to operation of all mechanical equipment.
 - (iii) Injuries in industrial plants are due to mechanical causes arising from certain machines. State the typical machines and the types of mechanical injuries.
6.
 - (i) Give some examples of hazard elimination and accident avoidance.
 - (ii) Explain the means by which hazard levels may be limited.
 - (iii) Explain your understanding of initiating and contributing hazards resulting in injury and damage of a pressurized steel tank.
7. A millwright was reaching out to make an adjustment on a flywheel chain on press while standing on a 20-foot ladder. In doing so, he lost his balance and fell onto the shaft and then struck a conveyor and fell to the floor, approximately 15 feet below. This caused a compound fracture of right leg and a property damage of \$5,000 for broken shaft and belts on a large press and broken guard on conveyor belt.
 - (i) Determine the cause of the accident.
 - (ii) State the corrective actions required.
 - (iii) Suggest the follow-up action required.