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)

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.