

**National Exams May 2014**  
**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)**

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

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1.
  - (i) 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.
  - (ii) State the means by which workplace safety and health can be improved through information technology or electronic access to regulatory information and services.
  - (iii) What are the cooperative agreements the companies may establish with OHSA for maintaining safe and healthful employment to obtain exemption from certain formal inspections?
  
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) 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) What is your understanding of the following in the context of skin absorption:  
(a) corrosives, (b) dermatitis, (c) eye damage and (d) gastrointestinal absorption.
  - (ii) What are the chemicals used as air purifiers in canisters?
  - (iii) Explain briefly the following equipment or apparatus: (a) self-contained air or oxygen-breathing apparatus, and (b) air-line breathing equipment.
  
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 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.