

National Exams December 2017

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) 7, (ii) 7, (iii) 6
6. (i) 7, (ii) 7, (iii) 6
7. (i) 7, (ii) 7, (iii) 6

1. (i) State the costs associated with Occupational Health and Safety Act (OHSA) and OHSA Standards that companies, especially the smaller ones, generally object to because they feel that such costs for improvement are not economically justifiable.
(ii) What is your understanding of the concept of “system safety”, while dealing with accident causation or avoidance?
(iii) State the new hazards in non-traditional sectors in industry that are emphasized by the OHSA Act.
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) Explain the manner by which engineering deficiencies can cause or contribute to accidents.
(ii) State the means by which accidents can be prevented in industry.
(iii) Describe the various safety features that can be installed in hand drills to prevent accidents.
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 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) 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.