

National Exams December 2016
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) 8, (ii) 6, (iii) 6
4. (i) 6, (ii) 7, (iii) 7
5. (i) 7, (ii) 7, (iii) 6
6. (i) 7, (ii) 6, (iii) 7
7. (i) 6, (ii) 6, (iii) 8

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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) 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) 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) State the means by which damage resulting from a hazard can be minimized and controlled.
 - (ii) What are the order of preferences that should be followed as general principles for eliminating and controlling hazards in industry?
 - (iii) State the common precautionary measures that must be followed in the operation of all mechanical equipment.

7. A shipping department packager in a small manufacturing plant placed a gear on a layout table and sprayed it with a rust preventative before packing it for shipment. After the employee had sprayed several gears, the spray gun became clogged and failed to operate. The employee tried to clean the clogged spray gun tip. At that instant, the gun discharged, and the employee’s left thumb was severely lacerated and subsequently had to be amputated.
 - (a) Determine the cause of the accident.
 - (b) State the corrective actions required.
 - (c) Suggest the follow-up action required.