

National Exams December 2012
11-CS-2-Engineering in Society – Health and Safety
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) 6, (iii) 7
4. (i) 6, (ii) 7, (iii) 7
5. (i) 6, (ii) 7, (iii) 7
6. (i) 6, (ii) 6, (iii) 8
7. (i) 7, (ii) 7, (iii) 6

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1. (i) State the engineering activities in general, where the engineers should be able to recognize safety and health hazards and implement controls for them.
(ii) What are the design engineering activities in particular, where the engineers can eliminate, reduce or control safety and health risks?
(iii) What is your understanding of the three Es of safety: engineering, education and enforcement?
2. (i) State the principles and priorities of hazard control that are helpful for selecting controls for hazards.
(ii) What is the purpose of safety devices? Give examples of safety devices.
(iii) Explain the steps followed in accident investigation. What are the investigation tools/ equipment used in accident investigation?
3. (i) State the safety practices and safeguards for controlling hand tools hazards?
(ii) State the factors that contribute to manual materials handling injuries, especially low back pain.
(iii) What are the frequently recommended lifting procedures?
4. (i) Explain the characteristics of the following fire detectors: (a) heat detectors, and (b) smoke detectors.
(ii) State the characteristics of the following sprinkler systems: (a) wet-type, (b) dry-type and (c) deluge.
(iii) What is your understanding of the fire suppression systems that do not use water?
5. (i) What are the components of risk management process?
(ii) State the steps followed in chemical risk assessment?
(iii) Explain the procedures followed in risk reduction in chemical processing plants?
6. (i) Explain the types of hearing loss?
(ii) State the engineering controls used for noise and vibration?
(iii) State the characteristics and purpose of: (a) sound level meter, (b) impulse meter, (c) frequency analyzer, and (d) dosimeter.
7. A millwright was reaching out to make an adjustment on a flywheel chain on a 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 his right leg and property damage of \$5,000 for a broken shaft and belts on a large press and broken guard on the conveyor belt.
(i) Determine the cause of the accident.
(ii) State the corrective actions required.
(iii) Suggest the follow-up actions required