

National Exams December 2017**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. Candidates may use one of two calculators, the Casio or Sharp approved models.
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. Show all calculations.

Marking Scheme (marks)

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|----|--------|---------|---------|
| 1. | (i) 7, | (ii) 7, | (iii) 6 |
| 2. | (i) 6, | (ii) 7, | (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) 6, | (ii) 8, | (iii) 6 |

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1. (i) What are the typical environmental hazards? Explain your understanding of environmental hazards.
(ii) What are the effects of environmental hazards?
(iii) Explain the sources of environmental hazards?
2. (i) What is your understanding of cumulative trauma or repeated motion injuries resulting from repeated motion or use of tools and equipment.
(ii) Explain the typical cumulative trauma injuries or disorders, such as (a) trigger finger, (b) carpal tunnel syndrome and (c) tenosynovitis.
(iii) State the basic principles of machine guarding.
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. An employee in a foundry was using an over-head wall mounted electrically controlled crane to move a heavy casting from one position to another at his workstation. The casting weighed approximately 3,000 pounds. While he was moving the casting, it fell, causing the hoist cables to snap and strike the employee a glancing blow at his head. Fortunately, he was wearing a protective head gear, or the blow could have been fatal when the hoist eyebolt assembly failed.
(i) Determine the cause of the accident.
(ii) State the corrective actions required.
(iii) Suggest the follow-up action required.