

National Exams December 2016
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) 6, | (ii) 7, | (iii) 7 |
| 2. | (i) 7, | (ii) 7, | (iii) 6 |
| 3. | (i) 7, | (ii) 7, | (iii) 6 |
| 4. | (i) 7, | (ii) 7, | (iii) 6 |
| 5. | (i) 7, | (ii) 6, | (iii) 7 |
| 6. | (i) 6, | (ii) 7, | (iii) 7 |
| 7. | (i) 7, | (ii) 7, | (iii) 6 |

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1. (i) State the elements of Domino Theory.
(ii) Explain by means of a diagram, the four system safety factors: the four Ms
(iii) What is single factor theory? Explain its limitation.
2. (i) What are the engineering activities that result in hazards in industry?
(ii) State the other (than engineering) factors causing hazards.
(iii) What are the components of communication essential in safety engineering? Show by means of a diagram.
3. (i) State the types of airborne contaminants.
(ii) What are the health effects of chemicals?
(iii) What are the main routes of entry for hazardous substances into the body? Explain.
4. (i) What are the agents and sources of biological hazards?
(ii) Give some broad examples of biohazards.
(iii) State the classification of biohazards.
5. (i) State the characteristics of the following motivational concepts proposed by: (a) Maslow, (b) Herzberg and (c) Vroom.
(ii) What is the purpose of job safety analysis (JSA)? State the aspects of jobs analyzed by JSA?
(iii) State the causes of job stress and the means to reduce and manage stress.
6. (i) State the elements of an occupational safety program.
(ii) State the major elements of an ergonomics program that can be installed in a company to deal with occupational safety and health problems.
(iii) What are the steps followed in implementing an emergency safety plan.
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