

National Exams December 2008
98-CS-2-Engineering in Society - Health, Safety and the Environment
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.

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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

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1.
 - (i) State the costs associated with OSHA Act and OSHA Standards that companies, especially the smaller ones, generally object to because they feel that such costs are not economically justifiable.
 - (ii) Explain the manner by which workplace health and safety can be improved for all workers through information technology or electronic access to regulatory information and services.
 - (iii) State the new hazards in non-traditional sectors in industry that are emphasized by Occupational Health and Safety Act (OSHA).

2.
 - (i) Give some examples of hazard elimination and accident avoidance.
 - (ii) Explain the means by which hazard levels may be limited.
 - (iii) Explain your understanding of initiating and contributing hazards resulting in injury and damage of a pressurized steel tank.

3.
 - (i) Give some common examples of isolation to prevent injury or damage.
 - (ii) What is the difference between lockouts and lockins? Give some examples of lockout and lockin devices.
 - (iii) State the steps followed in the investigation of an accident. What are the basic or typical equipment used for accident investigation?

4.
 - (i) What are the basic objectives of fire protection, prevention and control?
 - (ii) Explain the means by which the spread of fire can be prevented once fire is discovered.
 - (iii) What are the possible effects of fire hazards?

5.
 - (i) Name some toxic substances and their effects on the human body.
 - (ii) What are the various types of air contaminants? What are the basic approaches to measuring air contaminant exposures?
 - (iii) What are the major types of respiratory protective equipment?

6.
 - (i) What are the sources of vibrations and noise by equipment?
 - (ii) State the characteristics and purpose of (a) an audiometric test program, (b) a sound-level meter, and (c) an octave-band analyzer.
 - (iii) What are the various types of hearing protection devices?

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