

National Exams December 2003

98-CS-2-Engineering 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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98-CS-2, Engineering in Society - Health, Safety and the Environment

1. (i) In making worker safety inspection in industrial plants, state the priorities that are generally followed.
(ii) Most safety considerations are evaluated in terms of economical or financial terms. Explain the various factors that are considered and compared in making such economic analyses.
(iii) What are the basic objectives of Occupational Health and Safety Act (OHSA)?
2. (i) What is the purpose of job safety analysis? State the steps followed in conducting a job safety analysis.
(ii) What are the features of an effective machine guard or safety device?
(iii) What are the limitations of quantitative (based on statistics) inspections of plant safety? State the reasons for the preference of qualitative plant safety inspections.
3. (i) Explain the methods by which hazard levels in industry can be limited or contained.
(ii) Give examples of isolation, lockout, lockin and interlock devices.
(iii) Accidents may occur where people are injured. Explain the manner by which medical responses in emergencies is carried out.
4. (i) Explain the manner by which immediate evacuation of personnel is provided, once a fire is discovered in a building.
(ii) Explain the means by which the spread of fire can be prevented once a fire is discovered.
(iii) State the four classes of fires and appropriate extinguishing media for each classification of fires.
5. (i) What is hazardous waste? State the characteristics of a hazardous waste.
(ii) What are the possible hazards or effects of toxic materials?
(iii) Explain the major types of respiratory protective equipment.
6. (i) What are the adverse effects of vibration, sound and noise?
(ii) State the characteristics and purpose of (a) audiometric test program, (b) sound-level-meter (A), and (c) octave-band analyzer.
(iii) The sound/noise intensity in many industries exceeds the maximum levels set by the standard. What are the means of controlling noise in industry?
7. A drill-press operator was operating a drill press while wearing gloves. She attempted to change the tooling while the machine was running. Her glove caught on the revolving drill, and her left little finger was amputated.
(i) Determine the cause of the accident.
(ii) State the corrective actions required.
(iii) Suggest the follow-up action required.