National Exams December 2016
11-CS-4 Engineering Management
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) 8,   (ii) 7,   (iii) 5
2. (i) 6,   (ii) 7,   (iii) 7
3. (i) 7,   (ii) 6,   (iii) 7
4. (i) 7,   (ii) 7,   (iii) 6
5. (i) 7,   (ii) 7,   (iii) 6
6. (i) 8,   (ii) 7,   (iii) 5
7. (i) 5,   (ii) 5,   (iii) 5,   (iv) 5

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1. (i) In conducting a risk analysis, explain the use of Fishbone cause and effect diagram (show the diagram. State categories typically used to identify risk causes.
   (ii) What is the purpose of Influence Diagram in performing risk analysis? (Give a figure)
   (iii) What are the key elements of a risk management plan?

2. (i) What are the new engineering technologies available to develop products and processes?
   (ii) State the criteria used to evaluate design alternatives in developing new products and processes
   (iii) What are the design analysis tools used to conduct feasibility assessments to determine their benefits in a product and process development?

3. (i) In the context of product design, explain the concepts of sequential design vs. simultaneous integrated design.
   (ii) Explain the various design criteria that should be followed in developing a product.
   (iii) State the use of simulation models in tracking production processes and identifying production problems.

4. (i) Briefly explain the following quality management techniques: (a) Kaizen, (b) failure mode and effect analysis (FMEA) and (c) quality function deployment (QFD).
   (ii) What is the purpose of root cause analysis used in process management? State the root cause analysis techniques used to dig deeply into a problem.
   (iii) What arc the typical project management software programs used in industry?

5. (i) Explain the basis of developing advertising plans. State the essentials or components of an advertising plan.
   (ii) What are the key elements pf a sales plan.
   (iii) State the role of a sales engineer in a manufacturing company.

6. (i) State the safety areas regulated by occupational safety and health administration (OSHA) to ensure safe operation of facilities in which companies operate.
   (ii) What steps are followed to develop an organizational environmental policy?
   (iii) State the measures that must be taken to ensure that intellectual property is adequately protected.

7. The 3M Company is often used as a great example of a company that encourages creativity. Its policy dictates that 30 percent of annual sales come from products less than four years old. But 3M wasn't always that progressive. Answer the following questions:
   (i) Do large companies find it difficult to innovate because they resist change? Is it because they are big or because they are afraid of the unknown? Why is that?
   (ii) Do smaller companies do better at innovation because they are not so risk averse? Is that because most of them are private companies and not so accountable to outside shareholders?
   (iii) Can you see any connection between innovation and continuous improvement (CI)? Does CI require innovation?
   (iv) If you were vice-president in charge of production at a big company, how would you encourage innovation?