

**National Exams December 2014**  
**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) 6, (ii) 7, (iii) 7
4. (i) 7, (ii) 6, (iii) 7
5. (i) 7, (ii) 6, (iii) 7
6. (i) 7, (ii) 6, (iii) 7
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) Briefly state the project management techniques used in a new product, process or service development.  
(ii) State the basic steps followed in managing a project.  
(iii) State the techniques used for a successful project planning and the reasons for project failure.
4. (i) State the components of a balance sheet and define each component.  
(ii) Financial analysis is used to determine whether a given project merits the requested funding. Explain briefly the engineering economic analysis techniques used for the purpose.  
(iii) Explain the concepts of: (a) just-in-time (JIT) inventory control, (b) materials resource planning (MRP) and (c) manufacturing resource planning (MRP II).
5. (i) State your understanding of Chris Argyri's common classical organization concept.  
(ii) Explain McClland's achievement-affiliation concepts dealing with need to achieve.  
(iii) What is your understanding of Lickert's concept of the characteristics of high and low producing organizations?
6. (i) State the characteristics of traditional organizational structure.  
(ii) What is your understanding of systems thinking and in particular Metanoia - a shift of mind?  
(iii) State the strategies used for effective leadership.

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?