Mansoura University
Faculty of Engineering
Department of Production Engineering and Mechanical Design

Humanities (3)

January 2011, for students at Production Engineering and Mechanical Design Department, 2nd year (back).
Please answer all questions, aided with **graphics** as possible (Time: 2 hrs.).

First Question:
Assume that a windowless room contains one switch and four light bulbs and the switch can only fail to close. Develop a fault tree for the top event "Dark room," if the interruption of electrical power coming into the room can only be caused either by fuse failure or power failure. Suppose that the probability of any basic fault event is 0.02 to find the reliability of lighting using FTA.

Second Question:
A company manufactures four products A, B, C, and D. The major organizational functions are production, marketing, purchasing, personnel, finance, and research and development. Furthermore, the company has three decentralization regions X, Y, and Z. Construct, on a matrix chart, a combined organizational structure.

Third Question:
A manufacturing company has two plans for an investment. The first plan proposes to develop an independent product *Z*. This product can generate earnings of $500,000 or losses of $300,000. The probability that product *Z* earns is estimated at %90. The second plan introduces the option of developing either product *X* or *Y*. There is about 80% probability that product *X* can earn $2 million and about 20% chance that it will lose $500,000. If product *X* is successful, the manufacturer can also develop product *A* with 80% probability of earning $1.5 million and a 20% chance of losing $200,000. By contrast, product *Y* has 95% probability of earning $2.5 million and a 5% chance of losing $1 million. If product *Y* is successful, the company has an opportunity to develop another product, *B*, with 95% probability of earning $1.5 million and a 5% chance of losing $800,000. Product *A* and *B* will only be produced if products *X* and *Y*, respectively, are successful. Determine the decisions that the company should follow.

Fourth Question:
1-Describe and compare the basic ways to displace a manager, using a tabular form.

2-Summarize the functions of engineering department in an organization.

3-Explain the basic relationships in organizational structures.

4-Scheme the routes through which an engineer can obtain managerial positions.

My best wishes
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Department of Production Engineering and Mechanical Design