

## BA 3352: Design Questions

1. Dell wants to offer 27 different laptops to its customers. Laptops will differ according to three components: processor, memory and hard drive. Each of these components has three versions high, medium and low.
  - a) Can Dell offer 27 laptops with three versions of these three components? Explain. If yes, how many types of laptops share the same component?
  - b) If Dell decides not to use low hard drive capacity, then how many distinct laptops can it assemble out of the three components?
  - c) If Dell decides to use low hard drive capacity only with low memory, then how many distinct laptops can it assemble out of the three components?
  
2. The product to be designed in service industries can take various forms like tour groups, bands, etc. While working as a tour operator, you are to accommodate 8 tourists into two vans for today's excursion. If each of two vans can take at most 5 people in how many ways can you accommodate 8 tourists?
  
3. A manager is to form a band from 4 people: Alfonso, Beatrice, Nburgo and Feng. Band requires a vocalist, a keyboard player, an electro-guitarist and a bass guitarist.
  - a) If each of the people can play each instrument and can sing, how many different arrangements for a band possible?
  - b) If only Beatrice can sing, how many different arrangements for a band possible?
  - c) If only Beatrice and Feng can sing, how many different arrangements for a band possible? The person who does not sing can still play all the instruments.
  
4. Can we take the Supply Chain Management Concentration as a SOM product? How much flexibility does this product have in meeting various student needs? Point out one aspect of flexibility that is not in the product but might have a significant effect on the student enrollment.
  
5. Prepare a flowchart for completing the Supply Chain Management Concentration. Identify the courses as steps towards the completion of the concentration. Indicate courses that can be taken in parallel. But suppose that OPRE 6302 is a prerequisite for OPRE 6363, OPRE 6366 and OPRE 6370. Also OPRE 6366 is a prerequisite for OPRE 6367 and OPRE 6368. To keep your flowchart small, include only prerequisites, basic business core courses and required SCM core courses.
  
6. Kano Model for the Supply Chain Management Concentration. From your stand point, what are the "must have", "expected" and "excitement" characteristics of the Supply Chain Management Concentration? Explain.
  
7. Read "Do you want pickled beets with that?" on pp.131-132. Give 2 examples of how operations function is impacted by the differences in product offerings among different countries?
  
8. Why does Microsoft redesign its product Office (Word, Excel, etc.) every 2-3 years? Decide if the reasons are economic, social, demographic, political, legal, technical, or are they related to competition,

cost, availability or liability?

9. Answer Problem 1 on p.153 of Stevenson.
10. Answer Problem 2 on p.153 of Stevenson.
11. A device has three components A, B and C. The system operates only when both A and B, or C by itself operates. Lifetime of A, B and C have independent exponential distributions with mean 100, 200 and 50 hours.
  - a) Draw the reliability diagram of this system.
  - b) Let  $p_A$ ,  $p_B$  and  $p_C$  be the probability that the component A, B and C are working functionally at the 50th hour. Find  $p_A$ ,  $p_B$  and  $p_C$ .
  - c) Express the probability of device working functionally at the 50th hour in terms of  $p_A$ ,  $p_B$  and  $p_C$ .
12. A device has three components A, B and C. The system operates when either one of A, B, or C operates. Lifetimes of A, B and C have independent exponential distributions with mean 10, 20 and 5 hours.
  - a) Draw the reliability diagram of this system.
  - b) Let  $p_A$ ,  $p_B$  and  $p_C$  be the probability that the component A, B and C are working functionally at the 6th hour. Find  $p_A$ ,  $p_B$  and  $p_C$ .
  - c) Express the probability of device working functionally at the 6th hour in terms of  $p_A$ ,  $p_B$  and  $p_C$ .