MIS 373: Basic Operations Management

Assignment 2 (100 points)

True/False questions (2 points each question)

1. The maximin approach involves choosing the alternative with the highest payoff.

2. The term capacity refers to the maximum quantity an operating unit can process over a given period.

3. Among decision environments, risk implies that certain parameters have probabilistic outcomes.

4. For the same manufacturing process, design capacity is always lower than effective capacity.

5. In general, Job-Shop systems have a higher unit cost than continuous systems do.

6. Cycle time is the maximum time allowed for each workstation to complete its work on each unit.

7. Continuous processing is the best way to produce customized output.

8. Capacity decisions often involve a long-term commitment of resources which, when implemented, are difficult or impossible to modify without major added costs.

9. The decision tree approach applies to decision-making under uncertainty.

10. In cost-volume analysis, costs that vary directly with volume of output are referred to as fixed costs because they are a fixed percentage of output levels.

Multiple choices questions (3 points each question)

1. Which closeness rating reflects the undesirability of having two departments located near each other?
   A. A
   B. E
   C. I
   D. U
   E. X

2. The ratio of actual output to design capacity is:
   A. design capacity
   B. effective capacity
   C. actual capacity
   D. efficiency
   E. utilization

3. Determining the worst payoff for each alternative and choosing the alternative with the "best of the worst" is the approach called:
   A. minimin
   B. maximin
   C. maximax
   D. minimax regret
   E. Laplace

4. In which type of operations are you likely to see, at most, only minor variations in the product or service being produced using the same process and the same equipment?
   A. a project
   B. a job shop
   C. repetitive production
   D. batch processing
   E. continuous production

5. Given the following information, what would efficiency be?
   Effective capacity = 50 units per day
   Design capacity = 100 units per day
   Actual output = 30 units per day
   A. 40%
   B. 50%
   C. 60%
   D. 80%
   E. 90%

6. The minimum possible cycle time in a product layout is determined by the:
   A. longest task time
   B. shortest task time
   C. average task time
   D. total task time
   E. none of the above

7. Capacity in excess of expected demand that is intended to offset uncertainty is a:
   A. margin protect
   B. line balance
   C. capacity cushion
   D. timing bubble
   E. none of the above

8. If a line is balanced with 80 percent efficiency, the "balance delay" would be:
   A. 20 percent
   B. 80 percent
   C. 100 percent
   D. unknown, since balance delay isn't related to efficiency
   E. depends on the next operation

9. At the break-even point:
   A. output equals capacity
   B. total cost equals total revenue
   C. total cost equals profit
   D. variable cost equals fixed cost
   E. variable cost equals total revenue

10. If the output rate is increased but the average unit costs also increase we are experiencing:
    A. market share erosion.
    B. economies of scale.
    C. diseconomies of scale.
    D. value added accounting.
    E. step-function scale up.

Assignment 2 Answer Sheet

The assignment 1 is due Monday June 18th by 10:59 am. Hard copy submission is preferred. Please sign the following statement before turning it in:

I have not copied and pasted answers from any of the class members, former class members, or online resources. I understand that if there is evidence that I have violated these restrictions, I will receive 0 points for my grade. My activities will be reported to the university as well.

Signature	Printed Name	Date

True/False questions (2 points each question)

1-5:_____ 6-10:_____

Multiple choices questions (3 points each question)

1-5:_____ 6-10:_____

Short answer questions/Essay questions (5 points each question)

1. Choose **one of these products** and analyze which type of process is suitable for producing it. Please justify your choice.
   1) Restaurant dishes; 2) bread; 3) cars; 4) gasoline.

2. With the process type you selected in the previous question, which layout will you choose to produce it? Why?

Calculation questions (Please illustrate some calculation steps, 40 points in total)

1. A small business owner is contemplating the addition of another product line. Capacity increases and equipment will result in an increase in annual fixed costs of $50,000. Variable costs will be $25 per unit.

   (A) What unit selling price must the owner obtain to break-even on a volume of 2,500 units a year? (3 pts)

   (B) Because of market conditions, the owner feels a revenue of $47 is preferred to the value determined in part A. What volume of output will be required to achieve a profit of $16,000 using this revenue? (3 pts)

2. A manager is quite concerned about the recent deterioration of a section of the roof on a building that houses her firm's computer operations. According to her assistant there are three options which merit consideration: A, B, and C. Moreover, there are three possible future conditions that must be included in the analysis: I, which has a probability of occurrence of .5; II, which has a probability of .3; and III, which has a probability of .2.

   If condition I materializes, A will cost $12,000, B will cost $20,000, and C will cost $16,000.

   If condition II materializes, the costs will be $15,000 for A, $18,000 for B, and $14,000 for C.

   If condition III materializes, the costs will be $10,000 for A, $15,000 for B, and $19,000 for C.

   (A) Draw a decision tree for this problem. (6 pts)

   (B) Using expected monetary value, which alternative should be chosen? (4 pts)

3. A manager has developed the following payoff table that indicates the profits associated with a set of alternatives under two possible states of nature.

Alternative	S1	S2
1	10	2
2	–2	8
3	8	5

Answer the following questions:

(A) If the manager uses **Laplace** as the decision criterion, which of the alternatives would be indicated? (3 pts)

(B) If the manager uses **minimax regret** as the criterion, which alternative would be indicated? (3 pts)

4. Management wants to design an assembly line that will turn out 800 videotapes per day. There will be eight working hours in each day. The industrial engineering staff has assembled the information below:

Task	Time (min)	Immediate Predecessor
A	0.2	--
B	0.2	A
C	0.4	--
D	0.1	--
E	0.3	C, D
F	0.2	B, E
G	0.1	--
H	0.2	F, G
I	0.6	H

(A) Determine the maximum and minimum cycle times. (2pts)

(B) Determine the optimum cycle time to meet the demand. (2 pt)

(C) What is the minimum number of stations needed? (2 pt)

(D) Draw the precedence diagram. (4 pts)

(E) Assign tasks to stations in order of most following tasks first. Please illustrate the steps. (6 pts)

(F) What's the balance delay of your task assignment? (2 pt)