Chapter 05: Strategic Capacity Planning for Products and Services

True / False Questions

1. The term capacity refers to the maximum quantity an operating unit can process. **TRUE**

2. Capacity decisions are usually one-time decisions; once they have been made, we know the limits of our operations.
FALSE

3. Stating capacity in dollar amounts generally results in a consistent measure of capacity regardless of the actual units of measure.
FALSE

4. Design capacity refers to the maximum output that can possibly be attained.
TRUE

5. If the unit cost to buy something is less than the variable cost to make it, the decision to make or buy is based solely on the fixed costs.
FALSE

6. Increasing productivity and also quality will result in increased capacity.
TRUE

7. Utilization is defined as the ratio of effective capacity to design capacity.
FALSE

8. Increasing capacity just before a bottleneck operation will improve the output of the process.
FALSE

9. An example of an external factor that influences effective capacity is government safety regulations.
TRUE

10. Cost and competitive priorities reduce effective capacities.
FALSE

11. Capacity increases are usually acquired in fairly large "chunks" rather than smooth increments.
TRUE

12. 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.
FALSE

13. The break-even quantity can be determined by dividing the fixed costs by the difference between the revenue per unit and the variable cost per unit.
TRUE

14. According to the reading on restaurant sourcing practices, only fast-food restaurants are able to ‘bring in' outsourced foods.
FALSE

15. The greater the gap between current and desired capacity the greater the opportunity for profit.
FALSE

16. The current trend toward global operations has made capacity decisions much easier since we have the whole world in which to consider operations.
FALSE

17. Capacity planning requires an analysis of needs; what kind, how much and when.
TRUE

18. Waiting line analysis can be useful for capacity design, especially for service systems.
TRUE

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

20. Outsourcing some production is a means of supporting a constraint.
FALSE

Multiple Choice Questions

21. Outsourcing some production is a means of _____ a capacity constraint.
A. Identifying
B. Modifying
C. Supporting
D. Overcoming
E. Repeating

22. A basic question in capacity planning is:
A. what kind is needed
B. how much is needed
C. when is it needed
D. all of the above
E. none of the above

23. Which of these factors wouldn't be subtracted from design capacity when calculating effective capacity?
A. personal time
B. maintenance
C. scrap
D. operating hours per day
E. all of the above would be subtracted in the calculation

24. A reason for the importance of capacity decisions is that capacity:
A. limits the rate of output possible
B. affects operating costs
C. is a major determinant of initial costs
D. is a long-term commitment of resources
E. all of the above

25. Which of the following is the case where capacity is measured in terms of inputs?
A. hospital
B. theater
C. restaurant
D. all of the above
E. none of the above

26. Unbalanced systems are evidenced by
A. Top heavy operations
B. Labor unrest
C. Bottleneck operations
D. Increasing capacities
E. Assembly lines

27. Maximum capacity refers to the upper limit of:
A. inventories
B. demand
C. supplies
D. rate of output
E. finances

28. The impact that a significant change in capacity will have on a key vendor is a:
A. supply chain factor
B. process limiting factor
C. internal factor
D. human resource factor
E. operational process factor

29. The maximum possible output given a product mix, scheduling difficulties, quality factors, and so on, is:
A. utilization
B. design capacity
C. efficiency
D. effective capacity
E. available capacity

30. Efficiency is defined as the ratio of:
A. actual output to effective capacity
B. actual output to design capacity
C. design capacity to effective capacity
D. effective capacity to actual output
E. design capacity to actual output

31. Utilization is defined as the ratio of:
A. actual output to effective capacity
B. actual output to design capacity
C. design capacity to effective capacity
D. effective capacity to actual output
E. design capacity to actual output

32. Which of the following is a factor that affects service capacity planning?
A. the need to be near customers
B. the inability to store services
C. the degree of volatility of demand
D. the customer's willingness to wait
E. all of the above

33. Which of the following is a tactic that helps service capacity management?
A. pricing
B. promotions
C. discounts
D. advertising
E. all of the above

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

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

36. Given the following information, what would efficiency be?
Effective capacity = 80 units per day
Design capacity = 100 units per day
Utilization = 48%
A. 20%
B. 35%
C. 48%
D. 60%
E. 80%

37. 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%

38. Given the following information, what would utilization be?
Effective capacity = 20 units per day
Design capacity = 60 units per day
Actual output = 15 units per day
A. 1/4
B. 1/3
C. 1/2
D. 3/4
E. none of these

39. Which of the following is not a strategy to manage service capacity?
A. hiring extra workers
B. backordering
C. pricing and promotion
D. part time workers
E. subcontracting

40. Which of the following is not a determinant of effective capacity?
A. facilities
B. product mix
C. actual output
D. human factors
E. external factors

41. Capacity planning decisions have both long-term and short-term considerations. Which of the following statements are true?
(I) Long-term considerations relate to the overall level of capacity.
(II) Short-term considerations relate to the probable variations in capacity requirements.
(III) Short-term considerations determine the "effective capacity."
A. Only one of the three statements is true.
B. I and II
C. II and III
D. I and III
E. All three statements are correct.

42. The extra demand intended to offset uncertainty is a:
A. margin protect
B. line balance
C. capacity cushion
D. timing bubble
E. none of the above

43. Short-term considerations in determining capacity requirements include:
A. demand trend
B. cyclical demand variations
C. seasonal demand variations
D. mission statements
E. new product development plans

44. Which of the following is not a criterion for developing capacity alternatives?
A. design structured, rigid systems
B. take a big-picture approach to capacity changes
C. prepare to deal with capacity in "chunks"
D. attempt to smooth out capacity requirements
E. identify the optimal operating level

45. Seasonal variations are often easier to deal with in capacity planning than random variations because seasonal variations tend to be:
A. smaller
B. larger
C. predictable
D. controllable
E. less frequent

46. Production units have an optimal rate of output where:
A. total costs are minimum
B. unit costs are minimum
C. marginal costs are minimum
D. rate of output is maximum
E. total revenue is maximum

47. When the output is less than the optimal rate of output, the unit cost will be:
A. lower
B. the same
C. higher
D. could be either higher or lower
E. could be either higher, lower or the same

48. When buying component parts, risk does not include:
A. loss of control
B. vendor viability
C. interest rate fluctuations
D. need to disclose proprietary information
E. all are risk factors

49. 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

50. What is the break-even quantity for the following situation?
FC = $1,200 per week
VC = $2 per unit
Rev = $6 per unit
A. 100
B. 200
C. 600
D. 1,200
E. 300

51. An alternative will have fixed costs of $10,000 per month, variable costs of $50 per unit, and revenue of $70 per unit. The break-even point volume is:
A. 100
B. 2,000
C. 500
D. 1,000
E. none of these

52. For fixed costs of $2,000, revenue per unit of $2, and variable cost per unit of $1.60, the break-even quantity is:
A. 1,000
B. 1,250
C. 2,250
D. 5,000
E. none of these

AACSB: AS
Difficulty: Medium
TLO: 5
Taxonomy: Application

53. Which of the following are assumptions of the break-even model?
I. Only one product is involved.
II. Everything that is produced can be sold.
III. The revenue per unit will be the same regardless of volume.
A. I only
B. I and II only
C. II only
D. II and III only
E. I, II and III

54. 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.

55. The method of financial analysis which focuses on the length of time it takes to recover the initial cost of an investment is:
A. payback
B. net present value
C. internal rate of return
D. queuing
E. cost-volume

56. Determining the timing and degree of capacity change can use the approach of:
A. lead time flexibility strategy
B. expand early strategy
C. wait-and-see strategy
D. backordering
E. delayed differentiation

57. The method of financial analysis which results in an equivalent interest rate is:
A. payback
B. net present value
C. internal rate of return
D. queuing
E. cost-volume

Multiple Choice Questions

The owner of Firewood To Go is considering buying a hydraulic wood splitter which sells for $50,000. He figures it will cost an additional $100 per cord to purchase and split wood with this machine, while he can sell each cord of split wood for $125.

63. What would the potential profit be if he were to split 4,000 cords of wood with this machine?
A. $0
B. $200,000
C. $100,000
D. $75,000
E. $50,000

64. How many cords of wood would he have to split with this machine to break even?
A. 5,000
B. 3,000
C. 2,000
D. 1,000
E. 0

65. How many cords of wood would he have to split with this machine to make a profit of $30,000?
A. 3,200
B. 1,500
C. 2,000
D. 1,000
E. 500

66. If, for this machine, design capacity is 50 cords per day, effective capacity is 40 cords per day, and actual output is anticipated to be 35 cords per day, what would be its utilization?
A. 100%
B. 80%
C. 75%
D. 70%
E. 0%

67. If, for this machine, design capacity is 50 cords per day, effective capacity is 40 cords per day, and actual output is expected to be 32 cords per day, what would be its efficiency?
A. 100%
B. 80%
C. 75%
D. 70%
E. 0%

The owner of a greenhouse and nursery is considering whether to spend $6,000 to acquire the licensing rights to grow a new variety of rosebush, which she could then sell for $6 each.

68. What would the profit be if she were to produce and sell 5,000 rosebushes?
A. $0
B. $9,000
C. $15,000
D. $10,000
E. $30,000

69. How many rosebushes would she have to produce and sell in order to break even?
A. 1,600
B. 2,400
C. 2,000
D. 1,000
E. 1,500

70. How many rosebushes would she have to produce and sell in order to make a profit of $6,000?
A. 1,600
B. 2,400
C. 3,000
D. 1,000
E. 4,000

71. If her available land has design and effective capacities of 3,000 and 2,000 rosebushes per year respectively, and she plans to grow 1,200 rosebushes each year on this land, what will be the utilization of this land?
A. 0%
B. 40%
C. 60%
D. 67%
E. 100%

72. If her available land has design and effective capacities of 3,000 and 2,000 rosebushes per year, respectively, and she expects to be 80% efficient in her use of this land, how many rosebushes does Rose plan to grow each year on this land?
A. 1,600
B. 2,400
C. 3,000
D. 2,000
E. 1,000

A Virginia county is considering whether to pay $50,000 per year to lease a prisoner transfer facility in a prime location near Washington, D.C. They estimate it will cost $50 per prisoner to process the paperwork at this new location. The county is paid a $75 commission for each new prisoner they process.

73. What would be the counties annual profit if they were to process 4,000 prisoners per year at this new location?
A. $0
B. $75,000
C. $50,000
D. $100,000
E. $300,000

74. How many prisoners would they have to process annually to break even at this new location?
A. 5,000
B. 8,000
C. 2,000
D. 4,000
E. 6,000

75. How many prisoners would they have to process annually to make a profit of $100,000 at this new location?
A. 5,000
B. 8,000
C. 2,000
D. 4,000
E. 6,000

76. If the holding area at this new location has design and effective capacities of 10,000 and 7,500 prisoners processed annually, respectively, and 5,000 prisoners will be processed per year, what will be the utilization of the holding area?
A. 0%
B. 30%
C. 50%
D. 60%
E. 100%

77. If his holding area at this new location has design and effective capacities of 10,000 and 7,500 prisoners processed annually, respectively, and they plan to be 80% efficient in their use of this space, how many prisoners does the county plan to process per year?
A. 5,000
B. 8,000
C. 2,000
D. 4,000
E. 6,000

Doctor J. is considering purchasing a new blood analysis machine to test for HIV; it will cost $60,000. He estimates that he could charge $25.00 for an office visit to have a patient's blood analyzed, while the actual cost of a blood analysis would be $5.00.

78. What would be his profit if he were to perform 5,000 HIV blood analyses?
A. $0
B. $40,000
C. $60,000
D. $25,000
E. $100,000

79. How many HIV blood analyses would he have to perform in order to break even?
A. 12,000
B. 2,400
C. 3,000
D. 1,000
E. 5,000

80. How many HIV blood analyses would he have to perform in order to make a profit of $15,000?
A. 3,000
B. 4,800
C. 5,000
D. 12,000
E. 3,750

81. If this new blood analysis machine has design and effective capacities of 6,000 and 5,000 blood analyses per year, respectively, and Dr. J. expects to perform 4,500 HIV blood analyses each year, what will be the utilization of this machine?
A. 0%
B. 75%
C. 83%
D. 90%
E. 100%

82. If this new blood analysis machine has design and effective capacities of 6,000 and 5,000 blood analyses per year, respectively, and Dr. J. expects to be 80% efficient in his use of this machine, how many HIV blood analyses does he plan to perform each year?
A. 3,200
B. 4,800
C. 4,000
D. 1,000
E. 5,000