Solutions Manual

# Chapter 7: Capacity Planning

1.



The manager might schedule maintenance and changeovers during a different part of the day to increase effective capacity. The manager should balance output with demand; overproduction of a perishable product can be costly.

Cognitive Domain: Knowledge

Difficulty Level: Easy

2a.



2b. The machines are equivalent at an output volume of 10,000. At levels below 10,000, Vendor A is preferred and at volumes exceeding 10,000, Vendor B is preferred.



Cognitive Domain: Knowledge

Difficulty Level: Easy

3.



Cognitive Domain: Knowledge

Difficulty Level: Easy

4.



Cognitive Domain: Comprehension

Difficulty Level: Medium

5.



Cognitive Domain: Comprehension

Difficulty Level: Medium

6a. Station C is the bottleneck.

6b. Increasing Stations B and C to 12 min/unit will bring the effective capacity of the system from 8 min/unit to 12 min/unit.

Cognitive Domain: Comprehension

Difficulty Level: Medium

7a. Station B is the bottleneck.

7b.



7cd.

Increase capacity of Station B by 1.5 units/hour so it is of equal capacity with Stations A and C.



Cognitive Domain: Comprehension

Difficulty Level: Medium

8.



Cognitive Domain: Comprehension

Difficulty Level: Medium

9a.



Machine II is the least expensive to purchase.

9b.



Machine II is far less expensive; buy two for $80,000 and spend $64,400 to operate them for a total cost of $144,400.

Cognitive Domain: Comprehension

Difficulty Level: Medium

10. *Capacity Utilization* = 1,100/1,500 = 73%

*Capacity Efficiency* = 1,100/1,200 = 92%

Cognitive Domain: Knowledge

Difficulty Level: Easy

11.



Cognitive Domain: Knowledge

Difficulty Level: Easy

12.



Cognitive Domain: Knowledge

Difficulty Level: Easy

13.



Cognitive Domain: Knowledge

Difficulty Level: Easy

14a. Breakeven = 20,000/(15-9) = 3,333 units

14b. Indifference = (20,000 – 15,000)/(10 – 9) = 5,000 units

Cognitive Domain: Knowledge

Difficulty Level: Easy

15a. The bottleneck is Assembly at 3 units/hr.

15b.



Cognitive Domain: Knowledge

Difficulty Level: Easy

16.



Cognitive Domain: Comprehension

Difficulty Level: Medium

17. Increasing assembly by 10% is the only change that will increase process capacity, which will now by 3.3 units/hour

Cognitive Domain: Analysis

Difficulty Level: Medium

18. The production system has a capacity of 22 units/hr due to WC-7.

Cognitive Domain: Comprehension

Difficulty Level: Medium

19.



Cognitive Domain: Knowledge

Difficulty Level: Easy

20. The three branches from top to bottom contribute 17 units/hour, 17 units/hour, and 14 units/hour, for a total input to WC-11 of 48 units/hour. If either WC-7, WC-5, WC-8 or WC-10 is increased, then WC-11 must have an increase of the same quantity. Specifically, an increase in WC-7 of up to 3 units/hour should be matched at WC-11, increases in both WC-5 and WC-8 of up to 5 units per hour should be matched at WC-11, and an increase in WC-10 of up to 6 units/hour should be matched at WC-11.

Cognitive Domain: Analysis

Difficulty Level: Medium