Solution

CADET _____ SECTION _____ TIME OF DEPARTURE _____

DEPARTMENT OF CHEMISTRY & LIFE SCIENCE

QUIZ 2 – CH402 2023-2024
10 Minutes, 25 Points
26 February 2024

TEXT: Peters, Timmerhaus, & West
SCOPE: Chapter 6

References Permitted: FE Reference Manual online.

INSTRUCTIONS

1. You will have 10 minutes for the quiz.
2. Do not mark this quiz until "begin work" is given.
3. Circle the correct answer to receive full credit.
4. There are 6 problems on 2 pages in this writ (not including the cover page).

(TOTAL WEIGHT: 25 POINTS)

DO NOT WRITE IN THIS SPACE

PROBLEM	VALUE	CUT
A	5	c
B	5	b
C	5	c
D	5	d
E	5	a
CUT		
BONUS	5	a
GRADE	25	

Cadet: Solution

Problems A-E refer to the same plant. The annual gross earnings are $560,000, the annual variable production costs are $280,000, the fixed costs are $270,000, the product sells for $6/kg (market price), and the plant is operating at 70% capacity.

Problem:	Weight:
A	5

What is the production rate in kilograms of product per year?

(a) 46,667
(b) 90,000
(c) 93,333
(d) 133,333

$$\frac{\$560{,}000/yr}{\$6/kg} = 93{,}333\ \frac{kg}{yr}$$ ANS

Problem:	Weight:
B	5

What is the variable production cost in dollars per kilogram of product?

(a) 4
(b) 3
(c) 2
(d) 1

$$\frac{\$280{,}000/yr}{93{,}333\ kg/yr} = \frac{\$3}{kg}$$ ANS

Problem:	Weight:
C	5

What is the production rate in kilograms of product per year at the breakeven point?

(a) 133,333
(b) 92,333
(c) 90,000
(d) 66,667

$$\left(x\ \frac{kg}{yr}\right)\cdot\left(\frac{\$6}{kg}\right) - \left(x\ \frac{kg}{yr}\right)\cdot\left(\frac{\$3}{kg}\right) - \$270{,}000/yr = 0$$

$$x = 90{,}000\ \frac{kg}{yr}$$ ANS

Problem:	Weight:
D	5

What are the production rates in kilograms of product per year when the plant is operating at 50% and 100% capacity?

(a) 33,333 and 66,666
(b) 45,000 and 90,000
(c) 46,667 and 93,333
(d) 66,666 and 133,333

$$\frac{93{,}333\ kg/yr}{.7} = 133{,}333\ \frac{kg}{yr}$$ ANS

Cadet:_____

Problem:	Weight:
E	5

What are the annual gross earnings in dollars per year for this plant at 100% capacity?

(a) 130,000
(b) 10,000
(c) 0
(d) -70,000

$(133,333\ \frac{lbs}{yr}) \cdot (\frac{\$6}{lbs}) - (133,333\ \frac{lbs}{yr}) \cdot (\frac{\$3}{lbs}) - \frac{\$270,000}{yr} =$

$\$129,999/yr$ ans

BONUS - 5 Points

The delivered equipment cost for a plant processing mostly solids is $142,900. What is the working capital for this plant?

(a) $100,000
(b) $140,000
(c) $200,000
(d) $130,000

$\$142,900 \cdot (4.7 - 4.0) = \$100,030$ ans