\[ TCI = \$1,500,000 \]

\[ \text{Annual Production} = 3 \times 10^6 \text{ kg} / \text{year}; \text{ Selling Price} = \$0.82 / \text{kg} \]

\[ \text{Working Capital} = 15\% \text{ of } TCI \]

\[ \text{No interest} \]

\[ \text{Raw materials (delivered)} = \$0.09 / \text{kg} \]

\[ \text{Labor (includes supervision)} = \$0.08 / \text{kg} \]

\[ \text{Utilities} = \$0.05 / \text{kg} \]

\[ \text{Packaging} = \$0.005 / \text{kg} \text{ (normally part of overhead)} \]

\[ \text{ Ignore distribution cost and depreciation. } \]

\[ \text{Plant overhead} = 10\% \text{ of total product cost} \]

\[ \text{MACR, Distribution} = 20\% \text{ of total product cost} \]

\[ \text{Fixed Capital Investment (FCI)} = TCI - \text{Working Capital (WC)} \]

\[ = TCI - 0.15 TCI \]

\[ = (0.85)(1,500,000) = \]

\[ = \$1,275,000 = 0.9425 / \text{kg} \]

\[ \text{(annualized)} \]

\[ \text{Manufacturing Costs} = \text{Variable production costs} + \]

\[ \text{(See Fig 6-7)} \]

\[ + \text{ Fixed charges} \]

\[ + \text{Plant overhead costs} \]

\[ \text{From Fig 6-8} \]

\[ \text{Maintenance Repairs} = (0.07)(FCI) = (0.07)(1,275,000) = \$89,250 / \text{yr} \]

\[ = \$0.030 / \text{kg} \]

\[ \text{Operating Supplies} = 0.15 \text{ (main & repair)} \]

\[ = (0.15)(0.030) = \$0.0045 / \text{kg} \]

\[ \text{Operating Labor} = \frac{\text{Total Labor} \times 1.15}{1.15} = \$0.05 / \text{kg} \]

\[ = \$0.043 / \text{kg} \]

\[ \text{Laboratory Charges} = (0.15)(\text{Operating Labor}) = \$0.006 / \text{kg} \]
Royalties = (0.04)TCP

Taxes (property) = (0.02)(P+5)
= (0.02)(1,275,000)
= $25,500
= $0.085/kg

Insurance = (0.01)(FCI)
= $12,750
= $0.004/kg

Variable Production Costs

- Raw Materials
- Labor
- Utilities
- Packaging
- Maint & Repair
- Raw Supplies
- Lab Charges
- Royalties

Sum

Fixed Charges

- Taxes (property)
- Insurance

Sum

* 0.09/kg
* 0.08/kg
* 0.05/kg
* 0.008/kg
* 0.03/kg
* 0.005/kg
* 0.006/kg
(0.04)TCP

* 0.025/kg
* 0.004/kg

* 0.025/kg
(a) Manufacturing Cost = Variable Production Cost \\
+ Fixed charges \\
+ Plant overhead charges \\
= \$0.269/\text{kg} + (0.04)(\text{TPC}) \\
+ \$0.0125/\text{kg} \\
+ (0.10)(\text{TPC}) \\
= \$0.2815/\text{kg} + (0.14)(\text{TPC}) \\

After we get TPC, we will add that component in and determine final answer.

(b) Total Product Cost = Manufacturing Costs \\
+ (Admin + Distrib + Market) + (R & D) Costs \\
Total Expenses - Overhead \\
= \$0.20(\text{TPC}) \\
= \$0.2815/\text{kg} + (0.14)(\text{TPC}) \\
+ (0.20)(\text{TPC}) \\
Solve for TPC \rightarrow TPC = \frac{\$0.2815}{0.70} = \$0.402/\text{kg}

(b) Total Product Cost per year = \$0.402(3 \times 10^6) = \$1,211,000/year

(c) Manufacturing cost/\text{kg} = \$0.2815/\text{kg} + (0.14)(\text{TPC}) \\
= \$0.2815 + 0.056 \\
= \$0.3375/\text{kg}

(c) Profit (before taxes) = Sale/\text{kg} - Costs/\text{kg} \\
= \$0.82/\text{kg} - \$0.402/\text{kg} = \$0.418/\text{kg}

GOOD PROFIT MARGIN - LOW VOLUME SPECIALTY