**Question 16**

**Overhead absorption make/buy**

The following relate to Year 1 for the firm of Sanjur Ltd, which manufactures three products — X, Y and Z. The factory is currently working at 80% capacity.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **X** | **Y** | **Z** |
| Selling Price per Unit | £25 | £82 | £80 |
| Material Cost per Unit | £5 | £8 | £22 |
| Labour Cost per Machine Hour | £6 | £6 | £6 |
| Variable Overheads per Unit | £4 | £2 | £6 |
| Machine Hours per Unit | 2 | 6 | 4 |
| Sales and Production (Units) | 11,000 | 5,000 | 7,000 |

Annual fixed costs are £240,000, recovered on the basis of machine hours.

1. **Calculate:**
2. total machine hours worked in Year 1 **2**
3. fixed overhead recovery rate per machine hour **1**
4. **Calculate** for each product:
5. unit contribution **3**
6. unit profit or loss **3**
7. **Calculate** the total profit for Year 1 **3**

The Production Manager has considered halting the production of any product showing a loss in your answer to b) ii.

1. **Calculate** the effect this would have had on your answer to c) if he had done so. **2**

In Year 2, it is planned that the factory will work at full capacity producing all three   
products. The extra hours are to be used to increase production of the most profitable product. Annual fixed costs will increase by 10%.

1. **Calculate:**
2. the extra hours of production **1**
3. the increase in profit in Year 2 **8**

The production of Z requires a special component which is currently bought for £18. For Year 2, the Production Manager is considering the manufacture of this component. The material cost of the component will be £5 and its production will take 2 machine hours.

1. **Calculate** and **advise** whether to make or buy the component. **4**

In Year 3, it is estimated that demand for unit sales of each product will continue at the   
same level as Year 2. However, a special order for an additional 1,500 units of Y at a reduced price of £64 per unit has been received. All other costs and prices remain unchanged.

1. **Calculate** and **advise** whether to accept or reject the special order. **5**

**Total marks (32)**

**Question 16 — solution**

|  |  |  |  |  |  |  |  |  |  |  |
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| (a) | (i) |  | **x** |  | **y** |  | **z** |  |  |  |
|  |  | Machine Hours per Unit | 2 |  | 6 |  | 4 |  |  |  |
|  |  | Sales | 11,000 | 5,000 | 7,000 | Total |  |
|  |  | Total Machine Hours | 22,000 |  | 30,000 |  | 28,000 |  | 80,000 | **2** |
|  |  |  |  |  |  |  |  |  |  |  |
|  | (ii) | Fixed Overhead Recovery Rate | £240,000 | = | £3 per hour | |  |  |  | **1** |
|  |  |  | 80,000 |  |  |  |  |  |  |  |

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| (b) | | (i) | Unit Contribution | |  | **x** | |  | **y** | |  | **z** | |  |  |  | | |
|  | |  | Selling Price | |  | £25 | |  | £82 | |  | £80 | |  |  |  | | |
|  | | Less | Variable Costs: | |  |  | |  |  | |  |  | |  |  |  | | |
|  | |  | Material | | £5 |  | | £8 |  | | £22 |  | |  |  |  | | |
|  | |  | Labour | | £12 |  | | £36 |  | | £24 |  | |  |  |  | | |
|  | |  | Variable O/Head | | £4 | £21 | | £2 | £46 | | £6 | £52 | |  |  |  | | |
|  | |  | Contribution per Unit | |  | **£4** | |  | **£36** | |  | **£28** | |  |  | **(one each) 3** | | |
|  | |  |  | |  |  | |  |  | |  |  | |  |  |  | | |
|  | | (ii) | Unit Profit/Loss | |  | **x** | | **(1)** | **y** | | **(1)** | **z** | |  |  |  | | |
|  | |  | Contribution per Unit | |  | £4 | |  | £36 | |  | £28 | | **(1)** |  |  | | |
|  | |  | Fixed Cost per Unit | | £3×2 | £6 | | £3×6 | £18 | | £3×4 | £12 | |  |  | **3** | | |
|  | |  | Profit or (Loss) | |  | **-£2** | |  | **£18** | |  | **£16** | |  |  |  | | |
|  | |  |  | |  |  | |  |  | |  |  | |  |  |  | | |
|  |  |  |  | |  |  | |  |  | |  |  | | | |  |  | |
| (c) |  |  | Total Profit Year 1 | |  | **x** | |  | **y** | |  | **z** | | | |  |  | |
|  |  |  | Unit Profit/Loss | |  | -£2 | | **(1)** | £18 | | **(1)** | £16 | | | | **(1)** |  | |
|  |  |  | Sales | |  | 11,000 | | 5,000 | | 7,000 | | | |  |  | |
|  |  |  | Total Profit | |  | -£22,000 | |  | £90,000 | |  | £112,000 | | | | **£180,000** | **3** | |
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| (d) | Effect on Profit of Halting X |  | |  |  | | |
|  |  |  | |  |  | | |
|  | Profit Year 1 | £180,000 | | | |  |  |
|  | Less: Contribution of X = £4 × 11,000 = | | £44,000 | | | **(1)** |  |
|  | New Profit | **£136,000** | | | | **(1)** | **2** |
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| (e) | (i) | Extra Hours of Production |  | | | |  | | | | | | |  |  | | |
|  |  | Year 2 hours = 80,000 | Extra Hours | | | | = 80,000/4 | | | | | | |  |  | | |
|  |  | = 80% |  | | | | = 20,000 hours | | | | | | |  | **1** | | |
|  |  |  |  | | | |  | | | | | | |  |  | | |
|  | (ii) | Most Profitable Product |  | **x** | |  | | **y** | | |  | **z** | |  | |  |
|  |  | Contribution per Unit |  | £4 | |  | | £36 | | |  | £28 | | **(1) line** | |  |
|  |  | Machine Hours |  | 2 | | 6 | | | 4 | | **(1) line** | |  |
|  |  | Contribution per Hour |  | £2 | |  | | £6 | | |  | £7 | | **(1) line** | |  |
|  |  | Most Profitable is Z with £7 | **(1)** |  | |  | |  | | |  |  | |  | |  |
|  |  |  |  |  | |  | |  | | |  |  | |  | |  |
|  |  | Increase in No. Units of Z |  | |  | | | | | |  |  | |  | |  |
|  |  | Extra Hours | 20,000 | | No of Units = 5,000 | | | | | | **(1)** |  | |  | |  |
|  |  | Machine Hours for Z | 4 | |  |  | |  | |  |
|  |  |  |  | |  |  | | | | |  |  | |  | |  |
|  |  | Increase in Profit Year 2 | | | | | |  |  | | |  | | | | |
|  |  | Increase in Contribution from Z = 5000 × £28 | | | | | | £140,000 | | **(1)** | |  |  | | | |
|  |  | Less: Increase in Fixed Costs = 10% × £240,000 | | | | | | £24,000 | **(1)** | | |  | | | | |
|  |  | Increase in Profit Year 2 | | | | | | £116,000 | **(1)** | | | **8** | | | | |
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**1**

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| (f) | Cost of Component (£5 + £12) = £17 | £17 |  | Loss in production of X |  |  |
|  | Opportunity Cost | £4 | **(2)** | = £2 × 2 hours = £4 |  |  |
|  | Actual Cost of Component | £21 |  | = Do not make |  | **4** |
|  |  |  |  | **(1)** |  |  |

**(1)**

|  |  |  |  |
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| (g) | Special Order: 1,500 units more of Y new contribution £18 = £27,000 Gain  **(1)** |  |  |
|  | Machine hours required = 1,500 × 6 = 9,000 hours from production of X  **(1)**  **(1)** |  |  |
|  | Loss in production of X = 9,000/2 = 4,500 units × £4 = £18,000 Loss |  |  |
|  | Overall Profit from special order = £27,000 - £18,000 = £9,000 = **Accept**  **(1)** |  |  |
|  |  |  |  |
|  | **OR** |  |  |
|  | **(1)**  **(1)** |  |  |
|  | 1500 units of Y = 9,000 hours × £3 new contribution per hour = £27,000 Gain | **(1)** |  |
|  | 9000 hours from X = 9,000 hours × £2 contribution per hour = £18,000 Loss  **(1)**  **(1)** |  |  |
|  | **Accept** overall Gain = £9,000 |  | **5** |

**Total marks (32)**