**Question 3**

**Breakeven — Limiting factors**

Stewart plc produces three products. The following total figures relate to Year 1.

|  |  |  |  |
| --- | --- | --- | --- |
| **Product** | **Sales Revenue** | **Variable Costs** | **Labour Hours** |
| A | £180,000 | £72,000 | 36,000 |
| B | £216,000 | £88,000 | 32,000 |
| C | £250,000 | £100,000 | 25,000 |

Total fixed costs of £186,000 are charged to products on the basis of labour hours.

1. i) **Calculate** for each product and in total for Year 1:
   * + 1. Contribution (2) Profit

ii) **Calculate** the contribution per labour hour for each product. **7**

In Year 1 sales in units were:

A 6,000

B 8,000

C 5,000

In Year 2 the Directors anticipate a shortage of labour that will reduce total labour hours to 75,000.

1. **Calculate** the effect of this labour shortage on the estimated maximum Profit for the  
   Year 2, assuming sales demand for each product is maintained and fixed costs are unchanged. **4**

In an attempt to avoid the expected labour shortage and to meet existing sales demand, the Directors are considering whether production for Year 2 should be mechanised. This would result in the following changes:

|  |  |  |  |
| --- | --- | --- | --- |
| **Product** | **A** | **B** | **C** |
| Machine hours needed to meet sales demand | 12,000 | 24,000 | 30,000 |
| Reduction in labour cost **per unit** | £4 | £2 | £4 |
| Additional special component requirements **per unit** | - | - | £10 |

Fixed costs would increase by one-third.

Calculate the estimated Profit for the Year 2 assuming the machine hours are limited to 60,000 and advise the Directors whether or not to mechanise.

Give a **reason** for your answer.

**Total marks (20)**

**Question 3 — solution**

(a) (i)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Working: | Fixed Overhead | £186,000/93,000 | A = £2 x 36,000 | = | £72,000 |
|  | Recovery Rate: | = £2 per hour | B = £2 x 32,000 | = | £64,000 |
|  |  | **(1)** | C = £2 x 25,000 | = | £50,000 |

**Profit for the Year 1**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | **A** | **B** | **C** | **TOTAL** |  |
|  | Sales | £180,000 | £216,000 | £250,000 | £646,000 |  |
| Less: | Variable Costs | £72,000 | £88,000 | £100,000 | £260,000 |  |
|  | Contribution | £108,000 | £128,000 | £150,000 | £386,000 | **(1)** |
| Less: | Fixed Costs | £72,000 | £64,000 | £50,000 | £186,000 | **(1)** |
|  | Profit | £36,000 | £64,000 | £100,000 | £200,000 | **(1)** |

(a) (ii)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | **A** | **B** | **C** |  |
| Working:  **7**  **(1)**  **(1)**  **(1)** | Contribution per Labour Hour | £108,000/36,000 = £3 | £128,000/32,000 = £4 | £150,000/25,000  = £6 |  |

(b) **Profit for the Year 2**

|  |  |  |  |
| --- | --- | --- | --- |
| **Order of Production** | **Contribution per labour hour** | **Labour Hours used max = 75,000** | **Total Contribution** |
| C  **(1)** | £6 | 25,000 | £150,000 |
| B  **(1)** | £4 | 32,000 | £128,000 |
| A | £3 | 18,000 | £54,000 |
|  |  | 75,000 |  |
|  | Total Contribution |  | £332,000 |
| **(1)** | Less: Fixed Costs |  | £186,000 |
| **(1)** | Estimated Profit |  | £146,000 |
| **4** | Effect = Decrease | (146,000-200,000) | -£54,000 |

(c) **Working:**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **A** | **B** | **C** |
| Selling Price  **(1)** | £180,000/6,000 = £30 | £216,000/8,000 = £27 | £250,000/5,000 = £50 |
| Year 1 Variable Costs  **(1)** | £72,000/6,000 = £12 | £880,000/8,000 = £110 | £100,000/5,000 = £20 |
| Reduction | £4 | £2 | £4 |
| Special Component | - | - | £10 |
| Year 2 Variable  **(1)** | £8 | £9 | £26 |
| Contribution per Unit  **(1)** | £22 | £18 | £24 |
| Machine Hours per Unit  **(1)** | 12,000/6,000 = 2 hrs | 24,000/8,000 = 3 hrs | 30,000/5,000 = 6 hrs |
| Contribution per Machine Hour | £22/2 = £11 | £18/3 = £6 | £24/6 = £4 |

**Profit for the Year 2**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Order of Production** | **Contribution per Machine Hour** | **Machine Hours used max = 60,000** | **Total Contribution** | |
| A  **(1)** | £11 | 12,000 | £132,000 | |
| B  **(1)** | £6 | 24,000 | £144,000 | |
| C | £4 | 24,000 | £96,000 | |
|  |  | 60,000 |  | |
|  | Total Contribution |  | £372,000 | |
| **(1)** | Less: Fixed Costs | (186,000+62,000) | £248,000 | |
| ½  ½  ½  ½ | Estimated Profit |  | £124,000 | |
|  | Advice = NO | Reason = Decrease | (124,000-146,000) | -£22,000 | |

**Total marks (20)**

**(1)**

**9**