Hype Ltd produces four types of clothes with the use of a special machine. Each labor hour in the special machine costs £10. For the production of the four products the company has 6,800 special machine labor hours. There will be no shortage of any other factor of production. Costings and break-even quantities for the products are as follows:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Products | A (Jeans) | B (Shirts) | C (Jackets) | D (Coats) |
| Material cost per unit | £20 | £30 | £60 | £100 |
| Special machine labor hours per unit | 0.25 | 0.5 | 0.4 | 0.55 |
| Fixed costs | £40,000 | £50,000 | £70,000 | £120,000 |
| BEP (break-even point) quantity | 1,000 | 1,500 | 1,400 | 2,100 |

For each type of product the management of the firm aims at the following targeted profit levels:

|  |  |
| --- | --- |
| Product | Target Profit |
| A | £100,000 |
| B | £120,000 |
| C | £150,000 |
| D | £200,000 |

However, the marketing department has conducted a consumer survey and estimated that the actual demand for the products will be different from that corresponding to the targeted profits. The estimated quantity demanded for each product is given in the table below:

|  |  |
| --- | --- |
| Product | Estimated Quantity Demanded |
| A | 3,200 |
| B | 3,600 |
| C | 4,300 |
| D | 5,300 |

REQUIRED:

1. Calculate the volume of activity that the company will have to achieve in order to meet the targeted level of profit for each one of the four products.
2. Calculate the optimal production each of for the four products by taking into account the available labor hours and the estimates of the marketing department.
3. Propose ways that could help the company to solve the problem of special machine time shortage (around 300 words).