2.6 Quality Management: Total Quality Management and Cost of Quality

Total Marks

AQA 7132 · Calculators not allowed · about 50 minutes · Write-in edition

Name: _____ Date: ____ / ____ / _____

Answer ALL questions in the spaces provided. Show working for any calculation. Use the BrightBrew Ltd case details given in question 3 where required. Write full sentences for questions worth 3 marks or more.

1 Identify one example of an external failure cost for a business that sells consumer goods in the UK.

(Total for Question 1 is 1 mark)

2 Which one of the following best distinguishes TQM from basic quality checking at the end of production in a UK manufacturer?

- ☐ A) TQM is only about inspection of finished goods
- ☐ B) TQM focuses on preventing defects and continuous improvement across the whole business
- ☐ C) Basic checking uses employee suggestions while TQM does not
- ☐ D) TQM ignores customer feedback

(Total for Question 2 is 1 mark)

3 BrightBrew Ltd is a small UK maker of single-use coffee pods. Production is 50,000 pods per month. Recently the factory found 1,200 faulty pods discovered before dispatch and 300 customer returns per month due to pod failures. BrightBrew currently spends £1,500 per month on staff training and £2,000 per month on inspection equipment. Customer refunds and replacements cost the business £4,500 per month. Using these BrightBrew Ltd figures, explain how quality circles could reduce the cost of quality at BrightBrew Ltd.

(Total for Question 3 is 6 marks)

4 Identify one example of an appraisal cost in the cost of quality framework for a factory like BrightBrew Ltd.

(Total for Question 4 is 1 mark)

5 Using the BrightBrew Ltd figures (50,000 pods produced, 1,200 faulty pods discovered before dispatch), calculate the internal failure rate as a percentage of production. Show your working.

(Total for Question 5 is 2 marks)

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6 Using the BrightBrew Ltd figures (50,000 pods produced, 300 customer returns due to pod failures), calculate the external failure rate as a percentage of production. Show your working.

(Total for Question 6 is 2 marks)

7 Using the BrightBrew Ltd cost figures given (training £1,500, inspection equipment £2,000, customer refunds and replacements £4,500 per month), calculate BrightBrew's current total monthly cost of quality as the sum of these three items. Show your working.

(Total for Question 7 is 2 marks)

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8 Explain how improving product quality can raise both customer satisfaction and cost efficiency for a business such as BrightBrew Ltd.

(Total for Question 8 is 3 marks)

9 Analyse how the pattern of internal faults (1,200 per month) and customer returns (300 per month) at BrightBrew Ltd, together with the cost information (training £1,500, inspection equipment £2,000, refunds/replacements £4,500), affects BrightBrew's priorities when deciding where to focus quality improvement efforts.

(Total for Question 9 is 8 marks)

10 BrightBrew Ltd is considering whether to introduce full TQM across the business. Recommend whether BrightBrew should introduce TQM. Justify your answer using the BrightBrew Ltd figures given in this pack and considering both benefits and drawbacks.

(Total for Question 10 is 9 marks)

Mark scheme · 2.6 Quality Management: Total Quality Management and Cost of Quality

Question 1

a named external failure cost, e.g. customer refunds and replacements, warranty repairs, or compensation **B1**

Answer: Customer refunds and replacements for faulty goods.

Question 2

B cao **B1**

Answer: B

Question 3

identifies that quality circles involve employees meeting to identify and solve quality problems **B1**

applies to BrightBrew by referring to the 1,200 internal faults and the 300 customer returns **B1**

explains how staff suggestions could change processes or machine settings to reduce internal faults, reducing the 1,200 figure **B1**

explains how reducing internal faults is likely to reduce customer returns and the £4,500 external failure cost **B1**

explains how fewer faults could lower inspection and rework time, improving efficiency and possibly reducing appraisal costs long term **B1**

offers a justified outcome for BrightBrew, e.g. lower total monthly quality costs and higher customer satisfaction **B1**

Answer: Quality circles bring together operators and supervisors to spot causes of the 1,200 internal faults and the 300 returns. Staff can propose changes to production routines or machine settings that cut internal rejects, which will reduce the number of customer returns and the £4,500 monthly external failure cost. Fewer faults also reduce time spent on inspection and rework, improving efficiency and potentially lowering ongoing appraisal costs. Overall BrightBrew would expect lower total monthly quality costs and improved customer satisfaction.

Question 4

a named appraisal cost, e.g. inspection equipment, final product inspection, or quality audits **B1**

Answer: Inspection equipment or final product inspection.

Question 5

1,200 / 50,000 seen **M1**

2.4% cao **A1**

Answer: 2.4%.

Question 6

300 / 50,000 seen **M1**

0.6% cao **A1**

Answer: 0.6%.

Question 7

1,500 + 2,000 + 4,500 seen **M1**

£8,000 cao **A1**

Answer: £8,000 per month.

Question 8

identifies effect on customer satisfaction, e.g. fewer returns, happier customers **B1**

develops the point on costs, e.g. fewer defects reduce rework and external failure costs **B1**

links both effects, e.g. satisfied customers lead to repeat sales while lower failure costs improve margins **B1**

Answer: Higher quality leads to fewer returns and defects, increasing customer satisfaction and loyalty; at the same time fewer defects reduce rework and external failure costs, improving cost efficiency and profit margins.

Question 9

identifies relevant facts from the data, e.g. there are many more internal faults (1,200) than returns (300), and external failure costs are large (£4,500) **B1**

explains that internal faults indicate production problems that, if fixed, can reduce both appraisal and external failure costs **B1**

explains that external returns cost BrightBrew directly £4,500 and risk harming reputation, so reducing returns has high priority **B1**

applies cost figures to argue where marginal gains are larger, e.g. cutting returns saves external failure costs directly whereas reducing internal faults can also lower inspection/rework **B1**

analyses trade-offs, e.g. investing more in training or process changes (prevention) may increase prevention costs but reduce larger external failure costs over time **B1**

analyses short-term vs long-term priorities, e.g. quick wins might be improved inspection or targeted fixes to reduce immediate returns, while TQM style prevention is a longer term investment **B1**

considers capacity and cost-effectiveness, e.g. given training is 1,500 and inspection 2,000, reallocating some of that to prevention actions could be justified if it reduces the 4,500 external cost **B1**

draws a reasoned conclusion about priorities, e.g. focus first on causes of returns while planning prevention measures to reduce internal faults and long-term external costs **B1**

Answer: The data show many more internal faults (1,200) than customer returns (300), but external failure costs are high at £4,500 per month. This suggests BrightBrew should prioritise actions that reduce returns because each return creates direct cost and reputational risk, giving an immediate benefit. However internal faults are the root cause and fixing them through prevention (training or process changes) can reduce both appraisal costs and external failure costs over time. Investment in prevention increases short-term prevention costs but can be justified if it reduces the larger external costs. A balanced approach is sensible: short-term targeted fixes to cut returns quickly while implementing prevention measures, such as quality circles, to reduce internal faults and lower total monthly quality costs in the longer term.

Question 10

Level 1 Makes simple, undeveloped comments about TQM and BrightBrew, with little or no use of the pack's figures and no clear recommendation. **1-3**

Level 2 Gives a developed argument for or against introducing TQM, using some of the BrightBrew figures, but does not fully weigh both costs and benefits or reach a clearly justified recommendation. **4-6**

Level 3 Weighs the evidence for and against introducing TQM using the BrightBrew figures, analyses trade-offs and longer term effects, and reaches a justified recommendation supported by that analysis. **7-9**

Indicative content:

- Possible benefits: reduction in internal faults (1,200) and customer returns (300) which would lower external failure costs currently £4,500 per month and reduce rework and appraisal time, improving cost efficiency.
- Possible benefits continued: employee involvement through TQM and quality circles could yield practical low-cost fixes, improved morale and continuous improvement across production, strengthening brand and reducing volatility in quality.
- Costs and drawbacks: implementing TQM may require upfront investment in training beyond the existing £1,500, time spent in meetings and potential temporary disruption while new processes are embedded, increasing short-term prevention costs.
- Trade-offs: short-term prevention and implementation costs should be compared with likely reductions in external failure costs and improved sales from higher customer satisfaction; figures such as a potential £1,800 saving from reduced returns should be used to judge payback.
- Longer term view: TQM is strategic and reduces total cost of quality over time, but may not be the fastest way to cut an immediate spike in returns; a combined approach of short-term corrective actions and long-term TQM is often best.
- Judgement: a balanced conclusion that either recommends TQM because its long-term reductions in the £4,500 external cost and in internal failures justify the investment, or recommends a staged approach starting with targeted fixes and piloting TQM in one area before full rollout, with reasons supported by the BrightBrew figures.