Solutions

Marking: **K** knowledge, **App** use of the case or data, **An** analysis (a chain of reasons: cause, then effect), **Ev** evaluation (a judgement with a reason). In calculations, **M1** is for the method and **A1** for the answer; **B1** is an independent mark.

Each answer shows the steps, then the **result**.

2.1

$\dfrac{3 \times 6}{\sqrt{4}} = 9$

lower limit **241** g

upper limit **259** g

2.2

261: above 259

stop and look for a cause (a new batch, a worn part); do not adjust after the other points

2.3

$\dfrac{80}{100} =$ **80**%

fix the causes of underweight and crushing first

2.4

(a) prevention; (b) appraisal

(c) internal failure; (d) external failure

3.1

(a) $\dfrac{3 \times 2.4}{\sqrt{4}} = 3.6$; **76.4** g and **83.6** g

(b) sample 4 (84.1)

(c) 81.8 is inside the limits: normal noise; adjusting after noise is tampering and makes the process vary more

(d) stop and find the cause, e.g. a new flour lot or a worn part, and fix it

3.2

(a) £14,000; **17.5**%

(b) $\dfrac{11{,}600}{14{,}000} =$ **82.9**%

(c) failures cost most, and a refund also loses the customer; stopping a defect at its cause removes many later failure costs at once

3.3

7–8: weighing every bun finds bad buns but does not stop them being made, and costs about £31,200 a year (App); scrap and rework still happen (internal failure) (An); the rebuild removes the main cause for £800, and the chart warns before buns go bad (An); inspection can also miss buns when staff are tired (K); but the rebuild may not fix every cause, so some checking is still needed at first (Ev); recommendation with a condition, e.g. rebuild the head now, run the chart, and keep sample weighing for a month to confirm (Ev). **4–6**: sound analysis with limited use of the data or a weak judgement. **1–3**: relevant points, mostly descriptive.

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