

Complete, fold and seal
(see note 2 below)

SURNAME: STANDING

FORENAME(S): LIAM

Instructions to Candidates

1. Please give the information requested in the boxes below.
2. Enter your name in the space provided to the right, fold over the flap and seal down (using the label provided) to hide your name.
3. The answers must be legibly written. The Examiners cannot read answers in illegible script or have it typed and the expense of typing will be charged to the candidate.
4. Write your answers in ink.
5. Begin each answer on a fresh page. Do all rough work in the answer book and cross it through.
6. No part of this book is to be torn out; it must be handed in complete.
7. If more books than one are used, fasten them together using the tags available from the invigilator(s).
8. **Every book must be handed in. In no circumstances may answer books, used or unused, be taken out of the examination venue.**

List the numbers of the questions you have attempted	Office Use
1	23
3	8 1/2
4	16
	47 1/2
Total	63 3/4



1) a) $C = 500000$
 $r = 7$
 $S = 20$

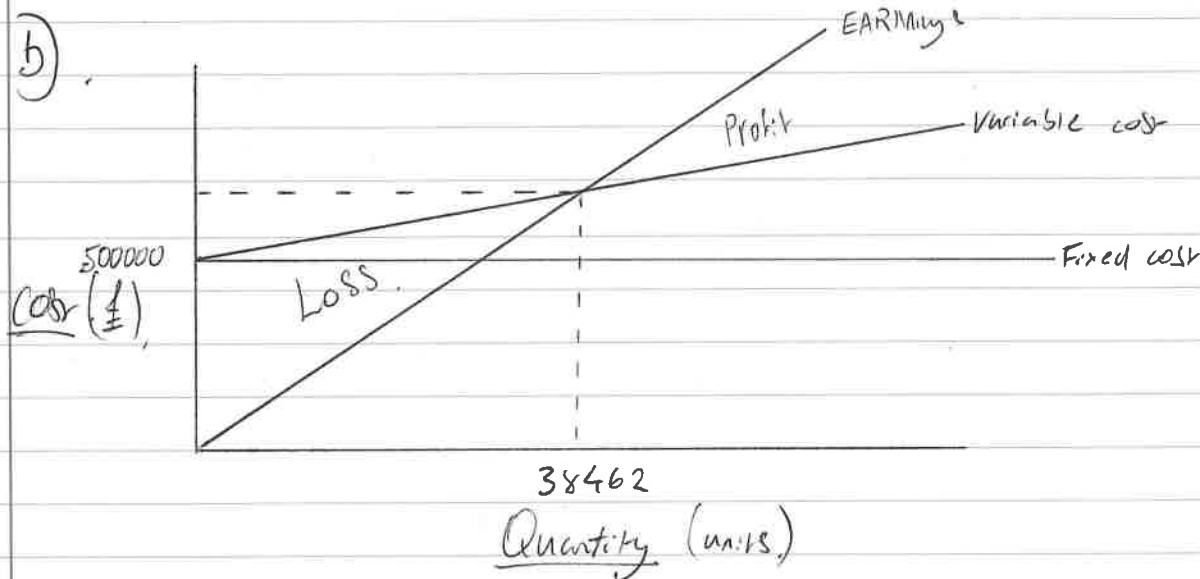
Break even = ~~WAV~~

$$BE = \frac{C}{S - R}$$

$$BE = \frac{500000}{20 - 7}$$

$$BE = 38461.538461$$

$$\therefore BE = \underline{\underline{38462 \text{ units}}}$$



c) $45,000 - 38462 = 6538 \text{ units}$

$$S - r = 13$$

$$6538 \times 13 = \underline{\underline{84994}}$$

$$\frac{84994}{500000} = 0.169988 \therefore \underline{\underline{16.9\% \text{ MOS}}}$$

d) $60000 \times 0.75 = 45000 \text{ units}$
 $45000 - 38462 = 6538 \text{ units}$
 $6538 \times 13 = \underline{\underline{84994 \text{ profit}}}$

1). e). Limitations of breakeven analysis include not taking in to account future issues such as cost of equipment failure or additional training. ✓

Competitive companies can reduce the number of units sold where as breakeven only accounts for unit production. ✓

depreciation value of the unit over time is not used. As units can not be sold causing extra cost such as storage or Scraping. ✓

Variable costs can vary between supply and demand throughout the year without a contract in place. ✓

Profit does not include cost of promotion, licensing, Discounting (under many competitors) and market research. ✓

3/
5

23
25

- 3) a) Total Quality management (TQM) is where a product meets a set of requirements such as Function, Safety, Cost, Wear, Environment and Use based on a customer and market research and feedback.

1 1/2 / 5

b)

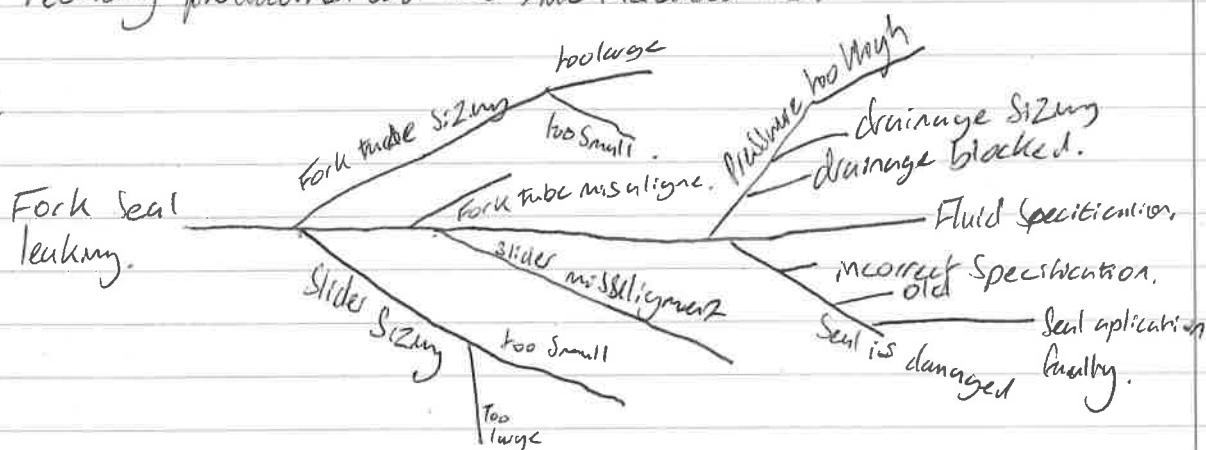
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- c) A System without robust engineering quality would suffer from issues. These include parts not fitting either being too large or too small based on specification. This would only become an issue during assembly meaning components are scrapped due to not fitting. This would reduce output of units and increase cost of production.

1 / 3

eg boring engine cylinder. - As the drill bores the engine cylinders the drill bit gets smaller. over time this would result in cylinders becoming too small to fit pistons. Therefore reducing production and the time increased.

D).



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Possible design errors listed above including sizing, alignment and issues with components. External factors such as environment (temperature) would cause all specified parts to change. Manufacturing of damper could be different to design due to cost/manufacturing constraints. Age of parts and storage could cause failure such as corrosion due to lack of protection or storage incorrectly.

8 1/2 / 25

4) i) It would demonstrate a interest in green energy in the area. ✓
 reduces CO_2 and NO_x (other emissions) in the town and area, improving health and public opinion, cost of fueling reduced - more capacity of users become available. 3/4

ii) Political - The Green impact would benefit operations view of government. ✓
 - investment in area would improve job prospects. ✓
 - Party in government would benefit from news and publications at use. ✓ 3/4

Economical - operations would receive training at a cost to government. ✓
 - implementation of green energy vehicles supports more investment. ✓
 - increased use of services from public interest ✓
 - benefits of extra use due to interest go to company improving profit. ✓ 2/4

Social - Health benefits to driver and public. ✓
 - Public approval of green energy with positive views. ✓
 - Hybrid would benefit quiet areas in town reducing noise. ✓
 - Promotes use of public transport (green) therefore reducing emissions. ✓ 4/4

Technological - advantages of CO_2 and NO_x improve operations health. ✓
 - increases opportunity to enhance hybrid technology. ✓
 - infrastructure difficulties are avoided ~~being~~ with hybrid. ✓ 2/4

iii) Hybrid and electric buses would benefit the Sumner area in terms of Politics, economy, Social and technology. 2/5

16

23