

### 3P8 2022 Exam suggested solutions

1a)

Cost of sales at 31/3/2019	£
Opening stock	5,762
Purchases	113,034
Cost of delivery	272
less purchase returns	(6,452)
less closing stock	(3,793)
	108,823

b)

Depreciation charge for the year ending 31/3/2019	£
Plant and Machinery (52,000-30,700)x 0.2	4,260
Fixtures and fittings (34,800 x0.1)	3,480
	7,740

c) **Sanna Ltd**

#### **Trading Profit and Loss Account for the year ending 31 March 2019**

	£
Sales	163,740
Cost of goods sold	105,030
<b>Gross profit</b>	<b>58,710</b>
Expenses	
Salaries (11,124+834)	11,958
Electricity	520
Stationery	198
Rent (6,344- 453)	5,438
Depreciation	7,740
Bad debts (2988+215)	3,203
Interest	1,500
<b>Net Profit</b>	<b>30,557</b>
Dividend	10,000

**Transferred to reserves**

**18,153**

Sanna Ltd has made sufficient profit to pay the intended dividend, but should consider the balance between dividend and retained earnings depending on the expectations of the shareholders and the investment needs of the company.

d)

**Accruals:** The accruals basis of accounting recognises revenue when it is earned rather than when it is received and expenditure when it is incurred rather than when it is paid. The accruals method gives a more accurate long term picture of the health of the company, but is more complex to implement than cash accounting.

**Prudence:** This implies a cautious assessment of gains and losses in the financial accounts to ensure gains are not overstated and losses are not understated. This avoids taking account of profits before they are realised but ensures reporting of losses as soon as they are known.

**Consistency:**

For a firm's accounts to be consistent the firm must select a uniform and reliable accounting basis that gives the most reliable picture of the affairs of the business in which it is possible to compare one period with the next. Changing the basis of accounting may lead to a misleading impression of financial performance. It is possible for a firm to change methods when necessary, but this must be highlighted in the accounts and enough information about the change given, to facilitate comparison. Consistency enhances the comparability of financial information between years and between similar businesses.

2.

The **Gross profit margin ratio** is the relationship between the gross profit and the sales figures, expressed as a percentage. =  $\text{Gross Profit} / \text{Sales}$

The **Net profit margin ratio** is the relationship between the net profit and the sales figures, expressed as a percentage. =  $\text{Net profit} / \text{Sales}$

Gross and net profit margin are measures of profitability.

The **Current ratio** measures the relationship between the current assets and current liabilities, (Current assets divided by current liabilities). =  $\text{Current assets} / \text{current liabilities}$ . This ratio is further assessed for liquidity by eliminating stock from the formula, giving rise to the **Acid Test Ratio**, sometimes referred to as the Quick ratio, which explains how a firm's ability to meet its debts with its most liquid assets. =  $\text{Current assets} - \text{inventory} / \text{Current liabilities}$ . The current ratio and acid test ratio are measures of short term liquidity.

**Inventory days** is the total of stock (average stock if data is available) divided by the cost of goods sold, multiplied by 365 days. =  $365 * \text{Average inventory} / \text{cost of good sold}$

The **Receivables days** is calculated by dividing the trade receivables (debtors) by the sales (or by total credit sales), and multiplying by 365 days. =  $365 * \text{Average Receivables/Sales}$

The **Payables days** is calculated by dividing the trade payables (creditors) by the cost of goods sold (or credit purchases) and multiplying by 365 days. =  $365 * \text{Average Payables/Cost of goods sold.}$

Inventory, receivables and payables days are measures of efficiency.

**Debt to Equity ratio** is the relationship between the amount of debt financing and the amount of equity finance. =  $\text{Liabilities/ Equity}$  (where liabilities excludes payables) or =  $(\text{short and long term debt})/\text{equity}$ . Debt to equity ratio is an indicator of leverage or gearing.

b)

	e-Bike	Scooter
Gross profit margin	40%	16%
Net profit margin	10%	10%
Current ratio	2.9	1.4
Acid test ratio	1.9	0.7
Inventory days	46	43
Receivables days	56	20
Payables days	49	45
Debt to Equity	2	4

The period is not a complete year so could calculate all the “days” ratio on the number of days in the period.

c)

eBike and Scooter generate £40 and £16 respectively of gross profit for each £100 of sales, demonstrating eBike has much lower direct cost of sales. The net profit margin for both companies are the almost identical at 10%. Thus, it would appear that eBike has more operational expenses than Scooter. In both cases this deserves greater scrutiny, considering why the cost of sales is so high for one and the operational expenses are high for the other. This could perhaps be a sign that they use a different business model?

eBike has a better current ratio and acid test ratio than Scooter implying that it has better liquidity. Scooter should consider what actions could be taken to improve its short term liquidity.

eBike’s inventory remains in stock 3 days longer than Scooter who appear to sell goods quicker perhaps by lowering prices resulting in their lower profitability. The delay in

receiving payments from customers could explain why it takes eBike longer to pay its creditors. Scooter receives payments from customers three times faster than eBike again perhaps by offering prompt payment discounts.

#### **d) Limitations**

The use of different accounting periods by the two companies prevents like-for-like comparison of financial statement. For example, eBike has been trading since January 2017, while Scooter started in June 2017, which means the two companies are being compared at different stages of their business cycle. If Scooter had a period at the start of trading when they had not built up a strong customer base and were offering discounts to encourage new customers this could explain their lower profitability.

The companies are located in the same city, but may not be in the same location in terms of affluence causing them to apply different business strategies or encounter different operating environments.

Each company may apply different accounting policies or accounting treatment, which will give rise to different outcomes. For example one may have a different depreciation policy to the other or policy on capitalisation of assets. In the first year of trading, if one firm charged full depreciation in the first year of asset ownership and the other allocated depreciation according to the quarter in which the asset was purchased, this would make a substantial difference to net profit.

In general ratios are dependent on historic information from a snapshot in time and hence may be distorted by market conditions. They may also be affected by inflation. For those interested in the details of the management of the company, ratios generally provide information on which area to ask more questions about rather than providing a clear indication of the management performance.

e) Leverage refers to the amount of debt in a company's capital structure. Leverage is important because interest on debt is a fixed charge that has to be repaid. Companies borrow because: i) they may have insufficient funds; ii) debt financing is cheaper than equity financing; and iii) interest payments are tax-deductible. High leverage can increase the percentage return to shareholders but can also increase the risk as the fixed interest charge is paid before dividends are calculated.

Some companies will want to avoid high leverage because it exposes them to greater risk from uncontrollable factors such as adverse interest movements. With higher leverage the company may be perceived as a higher risk by lenders and hence the interest rate charged on further borrowing may be higher to reflect that risk. Companies also run the risk of being unable to meet their interest charges when they fall due leading to insolvency. High leverage may also make it difficult to arrange further borrowing as a company's debt service (interest) coverage ratio may appear unfavourable to lenders.

3

a)

1) Prove that machine hours are a limiting factor

Beta – 6 hours x 150 units = 900 hours

Gamma 9 hours x 120 units = 1080 hours

Total is 1980 hours ( 180 more than 1800 that are available)

2) Variable production costs per unit of component

Beta £36.50 per unit (18+15+3.5)

Gamma £ 52 per unit (26+22+4)

3) Extra cost of buying in from outside supplier

Beta £55.50- £36.50 = £19.00

Gamma £77.70 - £52.00 = £25.70

4) Extra cost of buying in/unit of scarce resource

Beta £19/unit divided 6 machine hours per unit = £3.70/machine hour

Gamma £25.70/unit divided by 9 machine hours per unit = £2.85/machine hour

5) Production priority should go to Beta as the cost per machine hour of buying in replacement components is highest.

6) Allocate the scarce resource

Beta 150 unit = 900 machine hours

Gamma uses remaining 900 machine hours to produce 100 units

Purchase the additional 20 units of Gamma from external supplier

Consider questions such as whether is any flexibility in the planned volume of sales.

a) Total Costs

£	Beta	Gamma	Total
Direct materials	2,700	2,600	5,300
Direct labour	2,250	2,200	4,450
Variable production overhead	525	400	925
Fixed production overhead	2,250	2,400	4,650
	7,725	7,600	15,325

Purchase price from outside supplier	-	1,540	1,540
Total	7,725	9,140	16,865
Income	10,500	9,120	19,620
	2,775	-20	2,755

Fixed production costs remain the same regardless of the drop in production volume of Gamma.

The units of Gamma which are purchased do not make a profit. The business should consider whether it is possible to change the production quantity for Gamma. If Gamma is a component which is in some way connected to Beta then it may not be possible to reduce the production. In which case, Alpha Ltd needs to consider the long term options for production of Gamma such as increasing the available machine hours by changing working practices or buying a new machine. Alternatively the suppliers might be prepared to produce Gamma at a lower cost in exchange for a longer term purchasing commitment.

b) Limiting factor analysis assumes that the limitation is a short term problem. Thus it does not, for example, consider the alternative of investing in a new machine to meet the sales demand. It also assumes that a single product or mix of products is fixed and cannot be varied and that all costs are fixed and linear. Fixed costs are assumed to remain constant despite changes in production/purchasing. While this is likely to be true in the short term it may not remain true for the long term. This form of analysis also assumes that pre-existing stocks (e.g. of Beta and Gamma) were insignificant and that production is sold immediately so that stock levels do not change.

Alpha may also wish to consider whether it is beneficial to be dependent on an outside supplier for its stocks and whether, for example, there is any likelihood of the wholesale supplier increasing its prices; failing to deliver stocks on time; or leaking information to competitors.

#### 4. NPV calculations

Year	0	1	2	3	4	5	NPV	Profitability
Discount factor	1	0.8929	0.7972	0.7118	0.6355	0.5674		Index
£							£	
A Cash flow	(264,000)	75,000	75,000	75,000	75,000	75,000		
PV	(264,000)	66,964	59,790	53,384	47,664	42,557	6,358	0.0241
B Cash flow	(195,000)	77,000	89,500	81,000				
PV	(195,000)	68,750	71,349	57,654	-	-	2,753	0.0141
C Cash flow	(170,000)	38,000	50,000	50,000	50,000	50,000		
PV	(170,000)	33,929	39,860	35,589	31,776	28,371	(475)	(0.0028)
D Cash flow	(180,000)	62,000	60,000	62,000	60,000			
PV	(180,000)	55,357	47,832	44,130	38,131	-	5,450	0.0303
E Cash flow	(170,000)	50,000	60,000	62,000	60,000			
PV	(170,000)	44,643	47,832	44,130	38,131	-	4,736	0.0279
F Cash flow	(160,000)	82,000	60,000	62,000	-			
PV	(160,000)	73,214	47,832	44,130	-	-	5,176	0.0324

Ranking of projects: by NPV

	NPV £	Cash investment £	Total cash investment £
A	6,358	(264,000)	264,000
D	5,450	(180,000)	444,000
F	5,176	(160,000)	604,000
E	4,736	(170,000)	
B	2,753	(195,000)	
C	(475)	(170,000)	

Thus Hamptons would invest in A, D and F. Within the funds available it would also be possible to do A, D and E but this leads to a lower overall NPV.

**(b) Profitability index is: NPV/Outlay**

Ranking of projects: by Profitability index is

	Profitability index	Cash investment	Total cash investment
F	0.0324	(160,000)	160,000
D	0.0303	(180,000)	340,000
E	0.0279	(170,000)	510,000
A	0.0241	(264,000)	
B	0.0141	(195,000)	
C	(0.0028)	(170,000)	

Thus Hamptons would invest in F, D and E. The profitability index puts more value on the projects which have a low initial investment, which can be a useful measure of value. If the remaining funds of £110,000 could be invested in an interest bearing account it would add to the return generated with this approach (or alternatively this could reduce the overall level of borrowing).

c) Payback period will show which projects will yield most of the investment back by year 3

	Payback period	Cash investment	Total cash investment
F	2.30	(160,000)	160,000
B	2.32	(195,000)	355,000
D	2.97	(180,000)	535,000
E	3.00	(170,000)	
A	3.52	(264,000)	
C	3.64	(170,000)	

Thus Hamptons would invest in F, B and D to minimise the payback period. However project E also has a payback period of 3 years or less. The combination of F,D and E would yield a higher NPV but still have a payback period of less than 3 years.

Payback method

Advantages:

- Bias towards liquidity useful when cash flow constraints
- Easy to understand and communicate

Disadvantages:



- Ignores cash flows after the payback period
- Biased against long-term projects
- Arbitrary acceptance criterion (is simply regaining the investment the only objective)
- Accepted project may not have a positive NPV

An alternative would be to consider the discounted payback period. This has the advantage of taking account of the time value of money. However, over a relatively short period of time it may simply add complexity to the problem and make decision making more difficult.

d) To consider risk and uncertainty: -

A premium may be added to the usual discount rate to provide a safety margin, in which case marginally profitable projects (perhaps the riskiest) are less likely to have a positive NPV. The premium may vary from project to project to reflect the different levels of risk. However, this also runs the risk of not investing in a potentially viable project because of an arbitrary assumption about risk.

Estimates of cash flows in the later years of a project are likely to be inaccurate and unreliable. Risk may be limited by selecting projects with short payback periods. The time value of money can be considered by using discounted payback period.

Sensitivity analysis considers the extent to which an assumption could be varied without it changing the decision. For example, if cash flows fell by 20%. This can also be carried out by considering the maximum possible change in one of the assumptions before the project is no longer viable.

It is possible to assign a probability distribution to the expected cash flows, and hence the expected NPV for the most likely outcomes or outcomes for a particular scenario. Alternatively, Monte Carlo simulations can be run to find all the potential scenarios in which the outcomes are positive.

A real options approach can also allow the incorporation of a range of possibilities around one project or a combination of projects, such as delaying the start date of one project to allow another to get started first.

## 3P9 Crib 2021/22

### Section C

5a) the answer will give one or a combined definitions out of the lecture material.

*Strategy*: a plan, method or series of actions designed to achieve a specific goal or effect

*Wordsmythe Dictionary* (<http://www.wordsmyth.net>)

- *Strategy* is the pattern of objectives, purposes or goals and the major policies and plans for achieving these goals, stated in such a way as to define what business the company is in or is to be in and the kind of company it is or is to be.

*Kenneth Andrews - The Concept of Strategy* (Irwin, 1971)

- The determination of the long-run goals and objectives of an enterprise and the adoption of courses of action and the allocation of resources necessary for carrying out these goals.

*Alfred Chandler - Strategy and Structure* (MIT Press, 1962)

A strategic strategy is defined in three parts in the lecture material, pointing at effective implementation.

- a) Long term, simple and agreed objectives
- b) Profound understanding of the competitive environment
- c) Objective appraisal of resources

b) for the positioning a average answer would use one of either Porters five forces or PESTAL analysis and define a simple industry example. For example a car company re-positioning themselves as a premium brand or Hilfiger being positioned as a brand in the premium environment in Europe, but at the mid to lower end market in the US.

6

(a) Low quality answers are expected to write basic knowledge about patents and loosely connect this to process and product innovation. A high quality answer would recognise that unless a new process is revolutionary (e.g. Pilkington's float glass process), new processes are typically incremental improvements or reconfigurations of existing processes. In such cases, patents can be circumvented, especially challenged in court or looked up in detail as they are published and reproduced for incremental innovation. Alternative mechanisms for protecting innovations—e.g. secrecy, lead time, and manufacturing capabilities—tend to be more effective for process innovations than product innovations. In particular, since processes cannot be easily viewed by competitors, secrecy is highly effective in protecting process innovations. Product innovations are more visible and hence can be copied more easily by competitors. Therefore, product innovations require patents more than process innovations in order to protect intellectual property and make superior returns for firms.

(b) a lower quality answer is expected to give loose details about outsourcing and crises. A high quality answer is expected to define what type of turbulence is meant and that firms would

for example in supply chain turbulence more lean to inhouse business. However the answer would as well discuss that vertically and horizontally integrated firms with high complexity could externalise

a) capability

b) resources

which may be less critical for survival in a turbulent business environment.

Examples could include the production of combustion engines could be outsourced in a turbulent environment, when it is clear that there is an end to their production.

products / sub products / design on the contrary (example Zara given in the lecture)—a firm may find it can adapt more swiftly to changing design preferences by being vertically integrated rather than continually negotiating new market contracts i.e., contracts are invariably incomplete and hence, firms will try to internalise such external costs of renegotiating contracts when there is a turbulent external environment.

7

a) A good quality answer will discuss multiple segmentation options from product or customers e.g. product type, demographics or psychographics. The answer should add alternative forms of segmentation is 'job-based' or attribute based segmentation. 'Job-based' segmentation involves segmentation by understanding the jobs that customers need to get done and then hiring the product or services to get that job done. Attribute based segmentation can reveal correlations between attributes and outcomes but does not necessarily explain causality. 'Job-based' segmentation offers a plausible statement of causality built on the circumstances that cause the customer to buy a product or service.

(b) For example, if job based segmentation is chosen. A good description of the jobs that low income communities need to get done. Description of the possible efficiency and timing of when the generators would fulfil certain jobs. What are the features of the high quality generator that would serve these jobs better than alternatives e.g., solar or battery backup. Discussion of

- alternative power generation methods to get that job done.
- attributes of people that are likely to use power generation.
- market size based on demographics, community activities (e.g., schools) and personal/professional use (e.g., home, farming, small scale manufacturing etc).
- how the market could expand as a result of introducing the specific types of power generation in South America.

Similar description needs to be discussed of any chosen method of segmentation.

(c) a good answer would discuss challenges such as:

- availability of data might be limited in terms of product attributes, demographics or psychographics
- changes on how power is used e.g., due to changing industrial need, make up of population and jobs in the villages. (e.g. computers or servers may need continuous power, cooking and washing as jobs, could live with voltage change or disruption )
- difficult to assess potential competitive response of other electricity generation methods.

8)

a) answers given in the lecture:

#### Competition

- ▶ If one firm's strategic choice adversely affects the performance of another they are competitors
- ▶ A firm may have competitors in several input markets and output markets at the same time
- ▶ Competition can be either
  - *Direct competitors*: Strategic choice of one firm directly affects the performance of the other
  - *Indirect competitors*: Strategic choice of one firm affects the performance of the other because of a strategic reaction by a third firm

A good answer would differentiate between direct and indirect competition.

#### Identifying competitors

- ▶ In practice anyone who produces a substitute product is a competitor
- ▶ Two products tend to be close substitutes when
  - they have similar performance characteristics
  - they have similar occasion for use and
  - they are sold in the same geographic area
- ▶ Many concentration indices are biased because of inadequate market definitions
  - Supply versus demand orientated e.g., most studies use the Standard Industrial Classification (SIC) which is based on similarity on the production side and not the demand side
  - Technology developments blurring industry borders

b)

a good answer would explore direct and indirect competition in the light of substitution and similar outcomes of the competitive product. This may include competition through:

public transport, e-scooters, e-bikes, better infrastructure, but then as well revolution through software platforms like UBER or potentially self driving cars.

A average answer would define that the company would have to build electric cars in the future and give a lower level analysis of regulations disrupting the sales of cars in the near future.