Answers

1 **(a)** Benefits of a budgeting system.

Budgeting systems are useful in the planning and control of a business.

In planning they help to
–   Coordinate the activities of various functional areas, for example by ensuring that the production department is making the products that the sales department are trying to sell.
–   Ensure the best uses of scarce resources.
–   Communicate the organisation's plan to managers and employees.
–   Force managers to plan for the coming period.

In the control area they
–   Allocate responsibility for various aspects of the business to budget holders.
–   Authorise expenditure by managers.
–   Provide targets that can help in the motivation of managers and staff.
–   Allow the evaluation of managerial performance by comparing actual performance against budget.
–   Provide useful control information, in the form of variances, calculated by comparing actual performance with budget.
–   Prompt corrective action when actual results deviate from budgeted results.

(b) Production plan

	£ per unit	
	Shirts	Shorts
	£	£
Selling price	30	22
Variable cost	19	10
Contribution	£11	£12
Labour hours	0·5	0·25
Contribution per labour hour	£22/hour	£48/hour
Rank	2nd	1st

Shorts give most contribution per unit of the limiting factor. The sales constraint requires us to make at least one shirt for every four shorts. We can therefore think of production being in 'packages' of four shorts and one shirt. Each package would require 4 x 0·25 hours + 1 x 0·5 hours = 1·5 hours

In 6,000 labour hours the company could produce

$$\frac{6,000}{1·5 \text{ hours}} = 4,000 \text{ 'packages'}$$

In 6,000 labour hours the company could therefore produce

$$\frac{6,000 \text{ hours x } 4}{1·5 \text{ hours}} = 16,000 \text{ shorts}$$

and

$$\frac{6,000 \text{ x } 1}{1·5 \text{ hours}} = 4,000 \text{ shirts}$$

(c) Functional budgets

(i) Sales Budgets

		Shirts			Shorts		
	Units	Price	Revenue	Units	Price	Revenue	Total Revenue
		£	£		£	£	£
April	15,000	30	450,000	20,000	22	440,000	890,000
May	15,300	30	459,000	20,400	22	448,800	907,800
June	15,606	30	468,180	20,808	22	457,776	925,956
Total	45,906		£1,377,180	61,208		£1,346,576	£2,723,756

(ii) Production Budgets

Shirts	units		
	April	May	June
Closing stock (w1)	6,120	6,242	6,367
Sales	15,000	15,300	15,606
	21,120	21,542	21,973
Less opening stock	(0)	(6,120)	(6,242)
Production	21,120	15,422	15,731

Working 1
Closing stock April = 15,300 x 40% = 6,120
Closing stock May = 15,606 x 40% = 6,242
Closing stock June = 15,606 x 1·02 x 40% = 6,367

Shorts	units		
	April	May	June
Closing stock (w2)	8,160	8,323	8,490
Sales	20,000	20,400	20,808
	28,160	28,723	29,298
Less opening stock	(0)	(8,160)	(8,323)
Production	28,160	20,563	20,975

Working 2
Closing stock April = 20,400 x 40% = 8,160
Closing stock May = 20,808 x 40% = 8,323
Closing stock June = 20,808 x 1·02 x 40% = 8,490

(iii) Purchases

	Fabric Purchases Square metres		
	April	May	June
Closing stock (w3)	25,704	26,219	26,743
Usage Shirts	21,120	15,422	15,731
Shorts	14,080	10,282	10,488
	60,904	51,923	52,962
Less opening stock	(0)	(25,704)	(26,219)
Purchases	60,904	26,219	26,743

Working 3
April closing stock = May usage = 15,422 + 10,282
May closing stock = June usage = 15,731 + 10,488
June closing stock = July usage = (15,731 + 10,488) x 1·02

(d) Top down and bottom up approaches to budgeting.

A top down approach to budgeting involves preparation of budgets by senior managers without giving the ultimate budget holder an opportunity to participate in the budgeting process. These budgets are then passed down to (imposed upon) budget holders. This approach has the following advantages:
– It gives senior management better control of the business.
– It should lead to tactical decisions that are in line with the overall strategic plan (goal congruence).
– It reduces the opportunity for junior managers to build 'slack' (padding) into budgets.
– Depending upon the abilities and experience of senior and junior managers it could be argued to produce better quality decisions.
– Budgets should be prepared more quickly than under other approaches.

A bottom up approach to budgeting is an approach which gives all budget holders an opportunity to participate in the setting of their own budgets. This approach has the following advantages:
– Budgets are based upon information from employees most familiar with the department and therefore should be more accurate.
– Budget holders are likely to have more commitment to budgets they have been involved in designing.
– Because of the above motivation and morale should improve.
– Because of the above less budget padding should occur.

2 Minimum price to be quoted.

	£	
Direct materials		
Bricks	48,000	note 1
Other materials	5,000	note 2
Direct labour		
Skilled 2,400 hours at £12 per hour + £12,000	40,800	note 3
Unskilled	–	note 4
Scaffolding hire	3,500	note 5
Depreciation of general purpose machinery	–	note 6
General overheads	10,000	note 7
Plans	–	note 8
Total cost	107,300	
Profit	–	note 9
Minimum price	£107,300	

Notes
1. All bricks are charged at replacement cost as they are regularly used in the business and those in stock will need to be replaced at £120 per 1,000.
2. Charged at their incremental purchase price.
3. John's labour is charged at its value in its best alternative use (its opportunity cost). If not working on the project he could earn 800 hours x £12 = £9,600 working for other builders or save £12,000 by repairing his own house. The latter is the best alternative use of his time. The remainder of the skilled labour is charged at its incremental cost of £12 per hour.
4. There is no incremental cost of using the unskilled labour on this project.
5. This is the incremental hire cost.
6. Depreciation is not an incremental cash flow. The value of the asset is not affected by the project, therefore there is no cost attached to using it.
7. The value of the yard in its best alternative use is £500 x 20 weeks = £10,000.
8. This work has already been done and its cost is sunk, therefore irrelevant.
9. As we are considering the minimum price John can quote, no profit figure is included.

3 (a) ABC cost estimate

	£ per unit	
Direct material	4·50	
Direct labour	0·50	
Production overheads		
Components 10 x £2,500 ÷ 10,000 units	2·50	(working 1)
Production set ups 6 x £300 ÷ 10,000 units	0·18	(working 1)
Dispatches 500 x £50 ÷ 10,000	2·50	(working 1)
Other 2·5 minutes ÷ 60 mins x £30 per hour	1·25	(working 2)
Production cost	£11·43	

Workings
1. Cost per unit of driver activity

Cost pool		
Stores administration	£5,000,000 ÷ 2,000 components	= £2,500 per component
Production line set ups	£3,000,000 ÷ 10,000 set ups	= £300 per set up
Dispatches	£1,000,000 ÷ 20,000 dispatches	= £50 per dispatch
Other overheads	£3,000,000 ÷ 100,000 labour hours	= £30 per hour

2. £5 per unit ÷ £120 per hour x 60 = 2·5 minutes per unit.

(b) Selling price

	£
Total costs over a two year period	
Production cost (as estimated above) 20,000 x £11·43	228,600
Research and development costs	30,000
Marketing cost	5,000
Total cost	263,600
Required profit (£263,600 ÷ 80 x 20)	65,900
Total revenue	£329,500

If first year selling price = p

Then total revenue = 10,000p + (10,000 x 0·6p).

Then $p = \dfrac{£329{,}500}{10{,}000 + (10{,}000 \times 0\cdot6)} = £20\cdot59$

(c) Life-cycle costing

No product will last forever; in time sales of all products will decline. Different costs are incurred at different stages of a product's life. Early stages will involve research and development costs, buying in technical data, and the training of staff. Later come marketing, production, stock holding and distribution costs. Eventually retirement and disposal costs may be involved.

Traditional cost accounting systems do not accumulate costs over a product's entire life but focus instead on (normally) twelve month accounting periods. As a result the total profitability of a product over its entire life becomes difficult to determine.

Life-cycle costing involves accumulating costs and revenues over a product's entire life and hence allows the total profitability of a product to be determined.

Value to Birtles plc

Birtles plc operates in a market where new product innovation is a major competitive factor and product life cycles are short. As a result research and development costs are likely to represent a large proportion of total cost. A life-cycle costing approach offers the following advantages:
1.   All costs (production and non production) will be traced to individual products over their complete life cycles and hence individual product profitability can be more accurately measured.
2.   Non production costs will become more visible and the potential for their control is increased.
3.   More accurate feedback on the success or failure of new products will be available.

4   **(a)**   Calculating variances
When calculating variances it is important to compare like with like. For example, in calculating a direct materials variance it is not sensible to compare the actual cost for making 5,500 units with the budgeted cost for making 5,000 units. Direct material is a variable cost; if more units are made we would expect more material to be consumed. In order to obtain a fair comparison budget figures should be adjusted for changes in volume.

Flexed budgets recognise different cost behaviour patterns and figures are adjusted for volume changes allowing fair comparisons of actual and budgeted figures.

(b)   Flexed budget and variances

	Flexed Budget	Actual	Variance
Sales units	5,500	5,500	
	£000	£000	£000
Sales revenue (w1)	1,100	1,078	22 A
Direct material (w2)	(275)	(286)	11 A
Direct labour (w3)	(160)	(176)	16 A
Other manufacturing costs (w4)	(320)	(308)	12 F
Divisional fixed overhead (w5)	(200)	(190)	10 F
Profit	145	118	27 A

Workings
(1)   £1,000,000 ÷ 5,000 units x 5,500 units   = £1,100,000
(2)   £250,000 ÷ 5,000 units x 5,500 units   = £275,000
(3)   £50,000 + (£100,000 ÷ 5,000 units x 5,500 units)   = £160,000

(alternatively in workings 1–3 all variable costs could be simply increased by 10% in line with sales volume)

(4) Using the high low approach

$$\text{Variable cost per unit} = \frac{\text{Change in cost}}{\text{Change in volume}} = \frac{£(210,000 - 170,000)}{(4,000 - 3,000)}$$

$$= £40 \text{ per unit}$$

Fixed cost (before the step up) can be calculated by substituting variable cost into either of the observations of total cost. Using 4,000 units

Total cost   = fixed cost + variable cost
£210,000   = fixed cost + (4,000 units x £40)
Fixed cost   = £210,000 – £160,000
             = £50,000.

Budgeted cost at 5,500 units = £50,000 + £50,000 step + (5,500 x £40)
                             = £320,000

(c) Variance investigation

Several factors should be considered before deciding whether to investigate a variance.

1. Reliability of the figures. Firstly we need to be certain that the figures are accurate. Mistakes in calculating budget figures or in recording actual costs and revenues could lead to variances being reported where no problem actually occurs.
2. Materiality. The size of the variance might indicate the scale of the problem and the potential benefits from correcting the problem.
3. Possible interdependence of variances. Sometimes a variance in one area will be related to a variance in another. For example, a favourable raw material price variance from buying lower grade material may cause an adverse labour variance because of difficulties in working the lower grade material. These two variances would need to be considered jointly before making an investigation decision.
4. The inherent variability of the cost or revenue. Some costs are by nature quite volatile (for example oil prices) and variances would not be surprising. Other costs such as labour are far more stable and even a small variance may indicate a problem.
5. Adverse or favourable. Adverse variances tend to attract most attention as they indicate problems; however, there is an argument for investigating favourable variances so that we can learn from our successes.
6. Trends in variances. One adverse variance may be caused by a random event. A series of adverse variances usually indicates that the process is out of control.
7. Controllability/probability of being able to correct. If a cost or revenue is outside our control (e.g. world market price of a raw material) then there is little point in investigating its cause.
8. Costs and benefits of correction. If the cost of correcting the problem is likely to be higher than the benefit then there is little point in investigating.

				Marks
1	**(a)**	2 marks per sensible advantage maximum		8
	(b)	Contribution per limiting factor approach	2	
		Contributions per unit	2	
		Contributions per labour hour	2	
		Dealing with >25% constraint	1	
		Correct solution	1	
				8
	(c) **(i)**	Shirts	2	
		Shorts	2	
				4
	(ii)	Closing stock shirts	2	
		Closing stock shorts	2	
		Opening stock shirts	1	
		Opening stock shorts	1	
		Sales	1	
		Production	1	
				8
	(iii)	Closing stock	1	
		Opening stock	1	
		Usage	1	
		Purchases	1	
				4
	(d)	2 marks per each approach defined	4	
		1 per each advantages max	4	
				8
				40

		Marks
2	numbers	
	bricks	2
	other material	1
	skilled labour	2
	unskilled	1
	scaffolding	1
	depreciation	1
	general overhead	1
	plans	1
	profit	1
		11
	explanations	
	bricks	1
	other material	1
	skilled labour	1
	unskilled	1
	scaffolding	1
	depreciation	1
	general overhead	1
	plans	1
	profit	1
		9
		20

				Marks
3	**(a)**	Stores administration per unit	2	
		Production set ups per unit	2	
		Dispatches per unit	2	
		Other overhead per unit	2	
				8
	(b)	Reward method		
		Inclusion of production cost	1	
		R&D cost	1	
		Marketing cost	1	
		Required revenue	2	
		First year price	3	
				8
	(c)	Life-cycle costing explained	2	
		1 mark per reason, max	2	
				4
				20
4	**(a)**	Comparing like with like	2	
		Flexed budgets explained	1	
				3
	(b)	Flexed budget figures		
		Sales revenue	1	
		Direct material	1	
		Direct labour	1	
		Other manufacturing costs	3	
		Fixed overhead	1	
		Variances 1/2 each max	2	
				9
	(c)	2 marks per explained factor, max		8
				20