Answers

Section A

1 A

Division A: Profit = $14·4m x 30% = $4·32m
Imputed interest charge = $32·6m x 10% = $3·26m
Residual income = $1·06m

Division B: Profit = 8·8m x 24% = $2·112m
Imputed interest charge = $22·2m x 10% = $2·22m
Residual income = $(0·108)m

2 D

3 A

4 B

5 C

Number of units required to make target profit = fixed costs + target profit/contribution per unit of P1.
Fixed costs = ($1·2 x 10,000) + ($1 x 12,500) – $2,500 = $22,000.
Contribution per unit of P = $3·20 + $1·20 = $4·40.

($22,000 + $60,000)/$4·40 = 18,636 units.

6 A

Product	A	B	C	D
Selling price per unit	$160	$214	$100	$140
Raw material cost	$24	$56	$22	$40
Direct labour cost at $11 per hour	$66	$88	$33	$22
Variable overhead cost	$24	$18	$24	$18
Contribution per unit	$46	$52	$21	$60
Direct labour hours per unit	6	8	3	2
Contribution per labour hour	$7·67	$6·50	$7	$30
Rank	2	4	3	1
Normal monthly hours (total units x hours per unit)	1,800	1,000	720	800

If the strike goes ahead, only 2,160 labour hours will be available.
Therefore make all of D, then 1,360 hours' worth of A (2,160 – 800 hrs).

7 B

460 – 400 = 60 clients
$40,000 – $36,880 = $3,120
VC per unit = $3,120/60 = $52
Therefore FC = $40,000 – (460 x $52) = $16,080

8 B

Increase in variable costs from buying in (2,200 units x $40 ($140 – $100)) = $88,000
Less the specific fixed costs saved if A is shut down = ($10,000)
Decrease in profit = $78,000

9 A

10 B

By definition, a shadow price is the amount by which contribution will increase if an extra kg of material becomes available. 20 x $2·80 = $56.

11 C

12 A

13 D

14 B

15 C

16 A

17 A

New profit figures before salary paid:
Good manager: $180,000 x 1·3 = $234,000
Average manager: $180,000 x 1·2 = $216,000
Poor: $180,000 x 1·1 = $198,000

EV of profits = (0·35 x $234,000) + (0·45 x $216,000) + (0·2 x $198,000) = $81,900 + $97,200 + $39,600 = $218,700
Deduct salary cost and EV with manager = $178,700
Therefore do not employ manager as profits will fall by $1,300.

18 B

Set-up costs per production run = $140,000/28 = $5,000
Cost per inspection = $80,000/8 = $10,000
Other overhead costs per labour hour = $96,000/48,000 = $2

Overheads costs of product D:

	$
Set-up costs (15 x $5,000)	75,000
Inspection costs (3 x $10,000)	30,000
Other overheads (40,000 x $2)	80,000
	185,000

Overhead cost per unit = 185,000/4,000 = $46·25

19 A

20 A

Section B

1 Chair Co

(a) Learning curve formula = $y = ax^b$

Cumulative average time per unit for 8 units:
$Y = 12 \times 8^{-.415}$
= 5·0628948 hours.
Therefore cumulative total time for 8 units = 40·503158 hours.

Cumulative average time per unit for 7 units:
$Y = 12 \times 7^{-.415}$
= 5·3513771 hours.
Therefore cumulative total time for 7 units = 37·45964 hours.

Therefore incremental time for 8th unit = 40·503158 hours – 37·45964 hours = 3·043518 hours.

Total labour cost for 8th unit =3·043518 x $15 = $45·65277
Material and overheads cost per unit = $230
Therefore total cost per unit = $275·65277
Therefore price per unit = $413·47915

(b) (i) Actual learning rate

Cumulative number of seats produced	Cumulative total hours	Cumulative average hours per unit
1	12·5	12·5
2	?	12·5 x r
4	?	12·5 x r^2
8	34·3	12·5 x r^3

Using algebra: $34·3 = 8 \times (12·5 \times r^3)$
$4·2875 = (12·5 \times r^3)$
$0·343 = r^3$
r = 0·70

The learning effect was 70% as compared to the forecast rate of 75%, meaning that the labour force learnt more quickly than anticipated.

(ii) Adjusted price

The adjusted price charged will be lower than the original price calculated in part (a). This is because the incremental cost of the 8th unit will be lower given the 70% learning rate, even though the first unit took 12·5 hours. We know this because we are told that the cumulative time for 8 units was actually 34·3 hours. This is lower than the estimated cumulative time in part (a) for 8 units of 40·503158 hours and therefore, logically, the actual incremental time for the 8th unit must be lower than the estimated 3·043518 hours calculated in part (a). Consequently, total cost will be lower and price will be lower, given that this is based on cost.

2 Glam Co

(a) Bottleneck activity

The bottleneck may have been worked out as follows:

Total salon hours = 8 x 6 x 50 = 2,400 each year. The capacity for each senior stylist must be 2,400 hours, which equates to 2,400 cuts each year (2,400/1). Since there are three senior stylists, the total capacity is 7,200 hours or 7,200 cuts each year. Using this method, the capacity for each activity is as follows:

	Cut	Treatment
Assistants	48,000	16,000
Senior stylists	7,200	4,800
Junior stylists	9,600	9,600

The bottleneck activity is clearly the work performed by the senior stylists.

The senior stylists' time is called a bottleneck activity because it is the activity which prevents the salon's throughput from being higher than it is. The total number of cuts or treatments which can be completed by the salon's senior stylists is less than the number which can be completed by other staff members, considering the number of each type of staff available and the time required by each type of staff for each client.

(b) TPAR

	Cut	Treatment
	$	$
Selling price	60	110
Materials	0·60	8 (7·40+0·6)
Throughput	59·40	102
Throughput per bottleneck hour	59·40	68
Total salon costs per BN hour (w1)	42·56	42·56
TPAR	1·4	1·6

Working 1: Total salon costs
(3 x $40,000) + (2 x $28,000) + (2 x $12,000) + $106,400 = $306,400
Therefore cost for each bottleneck hour = $306,400/7,200 = $42·56

Note: *Answers based on total salary costs were $80,000 were also equally acceptable since the wording of question was open to interpretation.*

3 Hi Life Co

		Note	$
Direct materials:			
Fabric	200 m^2 at $17·50 per m^2	1	3,500
Wood	20 m at $8·20 per m	2	164
	30 m at $8·50 per m	2	255
Direct labour:			
Skilled	50 hours at $24 per hour	3	1,200
Semi-skilled	300 hours at $14 per hour	4	4,200
Factory overheads	20 hours at $15 per hour	5	300
Administration overheads		6	–
Total cost			9,619

1 Since the material is in regular use by HL Co, it is replacement cost which is the relevant cost for the contract.

2 30 m will have to be ordered from the alternative supplier for immediate delivery but the remaining 20 m can be used from inventory and replaced by an order from the usual supplier at a cost of $8·20 per m.

3 There is no cost for the first 150 hours of labour because there is spare capacity. The remaining 50 hours will be paid at time and a half, which is $16 x 1·5, i.e. $24 per hour.

4 HL Co will choose to use the agency workers, who will cost $14 per hour, since this is cheaper than paying existing semi-skilled workers at $18 per hour ($12 x 1·5) to work overtime.

5 None of the general factory costs are incremental, so they have all been excluded. However, the supervisor's overtime pay is incremental, so has been included. The supervisor's normal salary, on the other hand, has been excluded because it is not incremental.

6 These are general overheads and are not incremental, so no value should be included for them.

4 Jamair

(a) The four perspectives

Financial perspective – this perspective is concerned with how a company looks to its shareholders. How can it create value for them? Kaplan and Norton identified three core financial themes which will drive the business strategy: revenue growth and mix, cost reduction and asset utilisation.

Customer perspective – this considers how the organisation appears to customers. The organisation should ask itself: 'to achieve our vision, how should we appear to our customers?' The customer perspective should identify the customer and market segments in which the business will compete. There is a strong link between the customer perspective and the revenue objectives in the financial perspective. If customer objectives are achieved, revenue objectives should be too.

Internal perspective – this requires the organisation to ask itself: 'what must we excel at to achieve our financial and customer objectives?' It must identify the internal business processes which are critical to the implementation of the organisation's strategy. These will include the innovation process, the operations process and the post-sales process.

Learning and growth perspective – this requires the organisation to ask itself whether it can continue to improve and create value. The organisation must continue to invest in its infrastructure – i.e. people, systems and organisational procedures – in order to improve the capabilities which will help the other three perspectives to be achieved.

(b) Goals and measures

Financial perspective

Goal	Performance measure
To use fewer planes to transport customers	Lease costs of plane per customer

Explanation – operating efficiency will be driven by getting more customers on fewer planes. This goal and measure cover the cost side of this.

Goal	Performance measure
To increase seat revenue per plane	Revenue per available passenger mile

Explanation – this covers the first part of achieving operating efficiency – by having fewer empty seats on planes.

Customer perspective

Goal	Performance measure
To ensure that flights are on time	'On time arrival' ranking from the aviation authority

Explanation – Jamair is currently number 7 in the rankings. If it becomes known as a particularly reliable airline, customers are more likely to use it, which will ultimately increase revenue.

Goal	Performance measure
To reduce the number of flights cancelled	The number of flights cancelled

Explanation – again, if flights are seen to be cancelled frequently by Jamair, customers will not want to use it. It needs to be perceived as reliable by its customers.

Internal perspective

Goal	Performance measure
To improve turnaround time on the ground	'On the ground' time

Explanation – less time spent on the ground means fewer planes are needed, which will reduce plane leasing costs. However, it is important not to compromise the quality of cleaning or make errors in refuelling as a consequence of reducing on the ground time.

Goal	Performance measure
To improve the cleanliness of Jamair's planes	The percentage of customers happy with the standard of the planes, as reported in the customer satisfaction surveys.

Explanation – at present, only 85% of customers are happy with the standard of cleanliness on Jamair's planes. This could be causing loss of revenue.

Goal	Performance measure
To develop the online booking system	Percentage downtime.

Explanation – since the company relies entirely on the booking system for customer booking of flights and check-in, it is critical that it can deal with the growing number of customers.

Learning perspective

Goal	Performance measure
To reduce the employee absentee rate	The number of days absent per employee

Explanation – it is critical to Jamair that its workforce is reliable as, at worse, absent staff lead to cancelled flights.

Goal	Performance measure
To increase ground crew training on cleaning and refuelling procedures	Number of days' training per ground crew member

Explanation – if ground crew are better trained, they can reduce the number of minutes that the plane stays on the ground, which will result in fewer planes being required and therefore lower costs. Also, if their cleaning is better, customer satisfaction and retention will increase.

Note: *Only one goal and measure were required for each perspective. In order to gain full marks, answers had to be specific to Jamair as stated in the requirements.*

5 Safe Soap Co

(a) Variance calculations

Mix variance

Total kg of materials per standard batch = 0·25 + 0·6 + 0·5 = 1·35 kg
Therefore standard quantity to produce 136,000 batches = 136,000 x 1·35 kg = 183,600 kg
Actual total kg of materials used to produce 136,000 batches = 34,080 + 83,232 + 64,200 = 181,512 kg

Material	Actual quantity Standard mix kgs		Actual quantity Actual mix kgs	Variance kgs	Standard cost per kg $	Variance $
Lye	181,512 x 0·25/1·35 =	33,613·33	34,080	(466·67)	10	(4,666·70)
Coconut oil	181,512 x 0·6/1·35 =	80,672	83,232	(2,560)	4	(10,240)
Shea butter	181,512 x 0·5/1·35 =	67,226·67	64,200	3,026·67	3	9,080·01
		181,512	181,512			(5,826·69)A

Yield variance

Material	Standard quantity Standard mix		Actual quantity Standard mix kgs	Variance kgs	Standard cost per kg $	Variance $
Lye	0·25 x 136,000 =	34,000	33,613·33	386·67	10	3,866·70
Coconut oil	0·6 x 136,000 =	81,600	80,672	928	4	3,712
Shea butter	0·5 x 136,000 =	68,000	67,226·67	773·33	3	2,319·99
		183,600	181,512			9,898·69F

(b) **(i)** A materials mix variance will occur when the actual mix of materials used in production is different from the standard mix. So, it is inputs which are being considered. Since the total mix variance is adverse for the Safe Soap Co, this means that the actual mix used in September and October was more expensive than the standard mix.

A material yield variance arises because the output which was achieved is different from the output which would have been expected from the inputs. So, whereas the mix variance focuses on inputs, the yield variance focuses on outputs. In both September and October, the yield variance was favourable, meaning that the inputs produced a higher level of output than one would have expected.

(ii) Whilst the mix and yield variances provide Safe Soap Co with a certain level of information, they do not necessarily explain any quality issues which arise because of the change in mix. The consequences of the change may well have an impact on sales volumes. In Safe Soap Co's case, the sales volume variance is adverse, meaning that sales volumes have fallen in October. It is not known whether they also fell in September but it would be usual for the effects on sales of the change in mix to be slightly delayed, in this case by one month, given that it is only once the customers start receiving the slightly altered soap that they may start expressing their dissatisfaction with the product.

There may also be other reasons for the adverse sales volume variance but given the customer complaints which have been received, the sales manager's views should be taken on board.

Fundamentals Level – Skills Module, Paper F5
Performance Management **December 2014 Marking Scheme**

Section A *Marks*

2 marks per question **40**

Section B

1	**(a)**	Price		
		Cumulative average time per unit for 8 units		1
		Total time for 8 units		0·5
		Cumulative average time per unit for 7 units		1
		Total time for 7 units		0·5
		Incremental time for 8th unit		0·5
		Cost for 8th unit		0·5
		Total cost		0·5
		Price		0·5
				5
	(b)	**(i)** Learning rate		
		Calculating learning rate		2·5
		Saying whether better or worse		0·5
				3
		(ii) Effect on price		2
		Total marks		**10**
2	**(a)**	Calculation and justification of bottleneck		3
		Explanation of bottleneck		1
				4
	(b)	TPAR		
		Throughput		1
		Throughput per bottleneck hour		1
		Total salon costs		1
		Cost per hour		1
		TPAR		2
				6
		Total marks		**10**
3	Fabric calculation			1
	Fabric reason			0·5
	Wood calculation			2
	Wood reason			0·5
	Skilled labour calculation			1
	Skilled labour reason			0·5
	Semi-skilled labour calculation			1
	Semi-skilled labour reason			0·5
	Factory overheads calculation			1
	Factory overheads reason			0·5
	Administration overheads calculation			1
	Administration overheads reason			0·5
	Total marks			**10**

			Marks
4	**(a)**	Perspectives	
		Explanation for each perspective	1·5
			6
	(b)	Goals and measures	
		Each goal/measure/explanation	2
		Presentation and structure	1
			9
		Total marks	**15**
5	**(a)**	Variance calculations	
		Mix variance	4
		Quantity variance	4
			8
	(b) **(i)**	Variances	
		Marks per variance explained	2
			4
	(ii)	Discussion	
		Per valid point	1
			3
		Total marks	**15**