P1 May 2010 Exam Solutions

SECTION A – 20 MARKS

Question One

1.1 The answer is D

Overtrading occurs when a company has inadequate finance for working capital to support its level of trading. The company is growing rapidly and is trying to take on more business that its financial resources permit i.e. it is õunder-capitalisedö. Overtrading is a short term financing issue.

Answers A, B and C are all symptoms of overtrading whereas answer D is not as it deals with long term financing issues.

1.2 The answer is C

Average time raw materials are in stock	**46**
+	+
Time taken to produce goods (WIP and FG)	**(32 + 43)**
+	+
Time taken by customers to pay for goods	**54**
-	-
Period of credit taken from suppliers	**67**
=	=
Working capital cycle (in days)	**108**

1.3 The answer is A

Sensitivity measures the percentage change in a key input (for example initial outlay, direct material, direct labour, residual value) needed to make a project break even, in other words to have a project with a zero NPV. Whatever key factor we are looking at we always need to work out its PV when comparing it to the projects NPV.

Sensitivity = NPV / PV of key input

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In this question we are looking at the sensitivity of initial outlay which is $250,000.

Therefore:

Sensitivity = ($46,000 / $250,000) x 100% = 18.4%

1.4 The answer is A

The maximin rule states that we should consider the worst consequence of each possible course of action and choose the one that has the least bad consequence.

Therefore in the scenario the worst consequence is having bad weather and the least bad consequence would be to purchase 1,000 burgers as this gives the most profit being $1,000.

1.5 The answer is C

The key point to understand here is that you need to find the solution that will minimise the maximum opportunity cost or if you like regret.

We work out how much contribution we would lose for those burgers we did not sell. For example if we have actual bad weather then we would sell 1,000 burgers and had we purchased 1,000 burgers then the profit earned would be $1,000 (according to the table in question) with no regret or cost of unsold burgers, net regret being $0.

If however the actual weather was bad then again we would sell 1,000 burgers but this time we had purchased 2,000 burgers then the profit earned would be $0 but regret or cost would $1,000, net regret being $1,000.

We can apply the same logic if we had purchased 3,000 or 4,000 burgers. See table below:

No of burgers purchased

If actual weather is:	1,000	2,000	3,000	4,000
Bad	$0	($1,000)	(£2,000)	($4,000)
Average	($4,000)	($1,000)	$0	($1,000)
Good	($9,000)	($6,000)	($3,000)	$0

The maximum regret for:
- 1,000 burgers is $9,000
- 2,000 burgers is $6,000
- 3,000 burgers is $3,000
- 4,000 burgers is $4,000

Therefore to minimise the maximum regret he should purchase 3,000 burgers.

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1.6 The answer is 20.3%

Compound formula for cost of early settlement discount (APR) – normally used

$$\left(\frac{100}{100-D}\right)^{\frac{365}{N-S}} - 1 \quad \text{x } 100\%$$

Where:

D = is discount offered in %
S = number of days credit allowed with settlement discount
N = the number of days credit offered net, for no discount

$$
\begin{array}{llll}
\{100 / (100-2.5)\}^{365/(65-15)} & -1 & \text{x} & 100\% \\
= (1.025641026)^{7.3} & -1 & \text{x} & 100\% \\
= 1.203 & -1 & \text{x} & 100\% \\
= 20.3\%
\end{array}
$$

1.7 The answer is 36.25%

We need to work out the probability of earning net cash flows $90,000 or more. Therefore we need to select those outcomes which will yield this and select their respective probabilities.

The combinations which will comply are:

Cash inflows	Probability	Cash outflows	Probability	Combined probability
$140,000	0.45	$50,000	0.25	0.45 x 0.25 = 0.1125
$160,000	0.25	$50,000	0.25	0.25 x 0.25 = 0.0625
$160,000	0.25	$60,000	0.35	0.25 x 0.35 = 0.0875
$160,000	0.25	$70,000	0.40	0.25 x 0.40 = 0.1
Total				0.3625

P(earning net cash flows of $90,000 or more) = 0.3625 or 36.25%

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1.8 The answer is 11.74%

Year	Cash flow	$	DF 5%	PV	DF 15%	PV
0	MV	(900)	1.000	(900)	1.000	(900)
1-4	Interest	80	3.546	283.68	2.855	228.4
4	Capital repayment	1,000	0.823	<u>823</u>	0.572	<u>572</u>
				<u>206.68</u>		<u>(99.6)</u>

Apply the interpolation formula to find the IRR or yield to maturity:

$$A + \left[\frac{a}{a\ \acute{o}\ b} \quad x \quad (B\text{-}A) \right]$$

Where:

A = lower discount factor

B = higher discount factor

a = NPV at A

b = NPV at B

5 + (206.68 / (206.68 - -99.6) x (15-5)

= 11.74% yield to maturity.

SECTION B – 30 MARKS

Some of the answers that follow in Section B are more comprehensive than expected for a well-prepared candidate.

Question Two – Part (a)

(i) Prepare an age analysis of trade receivables, for customer J, at 30 April 2010 showing the outstanding balance analysed by month. (3 marks)

J	Due on 30/04/10	Current less than 1 month	Between 1 and 2 months	Between 2 and 3 months	Greater than 3 months
	$701	$145 (W1)	$438 (W2)	0 (W3)	$118 (W4)

Workings

W1 ó Apr 2010 = $145
W2 ó Mar 2010 = $135 + $232 + $71 = $438
W3 ó Feb 2010 = $294 - $294 = $0
W4 - Jan 2010 = $181 - $63 = $118

(ii) State two benefits of preparing an age analysis of trade receivables. (2 marks)

You only need to mention 2 of these points to get all the marks in this part:

- It is useful to the management in controlling debtors.
- It highlights slow payers and therefore action can be taken to reduce the amount of credit to these customers.
- It can be used to set credit limits to customers.
- Effective and appropriate action can be taken to collect debts.
- It can be used to estimate a provision for bad debts for the year end accounts.

Question Two – Part (b)

(i) The total annual cost of holding and ordering inventory. (3 marks)

The formula for EOQ

$$EOQ = \sqrt{\frac{2 \times C_O \times D}{C_H}}$$

Where

D = Annual demand (units)

C_O = Fixed cost for each order placed

C_H = Cost of holding one unit in stock for one year (this may include a cost of capital for money¢tied up¢in the value inventory)

EOQ = sq root of $\dfrac{2 \times CO \times D}{CH}$ = sq root of $\dfrac{2 \times \$150 \times 64{,}000}{\$1.20}$ = 4,000 units

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Annual ordering costs = {D x Co}/EOQ

Annual holding costs = {1/2 x EOQ x Ch}

Annual ordering costs = {D x Co}/EOQ = (64,000 x $150) / 4,000 = £2,400

Annual holding costs = {1/2 x EOQ x Ch} = ½ x 4,000 x $1.20   = $2,400

Total cost   = $4,800

(ii) The lowest inventory level at which raw material should be reordered. (2 marks)

Weekly demand = 64,000 / 52 weeks = 1,231 units

So the lowest inventory level to hold = 3 x 1,231 units = 3,693 units

Question Two – Part (c)

Explain how a manufacturing resource planning system would improve the planning of purchases and production for the company. (5 marks)

Materials requirement planning (MRP) is an inventory control system which provides an automated list of components and materials required for the type and number of products entered. This allows better production planning and accuracy of inventory management.

It enables purchasing and production managers to track the levels of material being purchased and going into production, thus ensuring there is enough to fulfil the completion of all orders.

The EOQ model they use makes the assumption that demand is known and constant, however this may not be the case in the company. MRP starts by creating a master production budget which states the amount of material needed and time required to manufacture the required production level. This can be then used to determine materials needed at each stage of the production process. The EOQ can be used in conjunction with MRP as long as the assumption of constant demand applies.

Question Two – Part (d)

Explain the benefits for the company that could occur following the introduction of an activity based budgeting system. (5 marks)

Traditional absorption costing takes the total budgeted fixed overhead for a period and divides by a budgeted (or normal) activity level in order to find the overhead absorption rate ABB looks in more detail about what causes fixed overhead to be incurred and works out many ÷cost driversø rather than just labour or machine hours or products produced, all driving overhead to be incurred. It is used in order to obtain a more accurate way of looking at how fixed overhead is driven and should give a more accurate picture when costing products, budgeting or valuing stock.

The modern business produces a wide product range, for example multi-products all consuming different amounts of resources. Fixed overheads are now a large percentage of total cost and it is more important to know how it should be shared, and also the complex and diverse nature of modern production has resulted in many fixed overheads to be incurred.

The following benefits can be had if using ABB:

- ✓ More efficient management of resources by understanding what drives fixed production overheads.
- ✓ Better costing information for planning and control e.g. how different products consume different resources or the production of flexed budgets based upon ABB.
- ✓ More realistic pricing to customers in future, to cover overheads being incurred by them.
- ✓ Better profitability analysis of different customers and their orders.
- ✓ Better comparisons made between budgeted and actual figures and therefore more meaningful variances.

In conclusion superior information for performance evaluation can be gained from using ABB rather than traditional absorption. ABB will give better explanations of cost behaviour and allow better responsibility accounting.

Question Two – Part (e)

Prepare the production cost budget for quarter 3. (5 marks)

Direct materials is entirely a variable cost therefore $180,000/15,000 = $12 per unit

Production labour costs and production overheads both have contain variable and fixed costs which we must split to understand the cost behaviour of the variable element.

Production labour costs

Units produced	Production labour ($)
20,000	195,000
15,000	155,000
5,000	40,000

$40,000 / 5,000 units = $8 production labour cost per unit

Use either 20,000 or 15,000 units to work out fixed cost as the balancing figure.

TC = FC + (VC per unit x units produced)

155,000 = FC + (8 x 15,000)
155,000 = FC + 120,000
FC = 155,000 - 120,000
FC = $35,000

Production overheads

Units produced	Production overheads ($)
20,000	240,000
15,000	210,000
5,000	30,000

$30,000 / 5,000 units = $6 production labour cost per unit

Use either 20,000 or 15,000 units to work out fixed cost as the balancing figure.

TC = FC + (VC per unit x units produced)

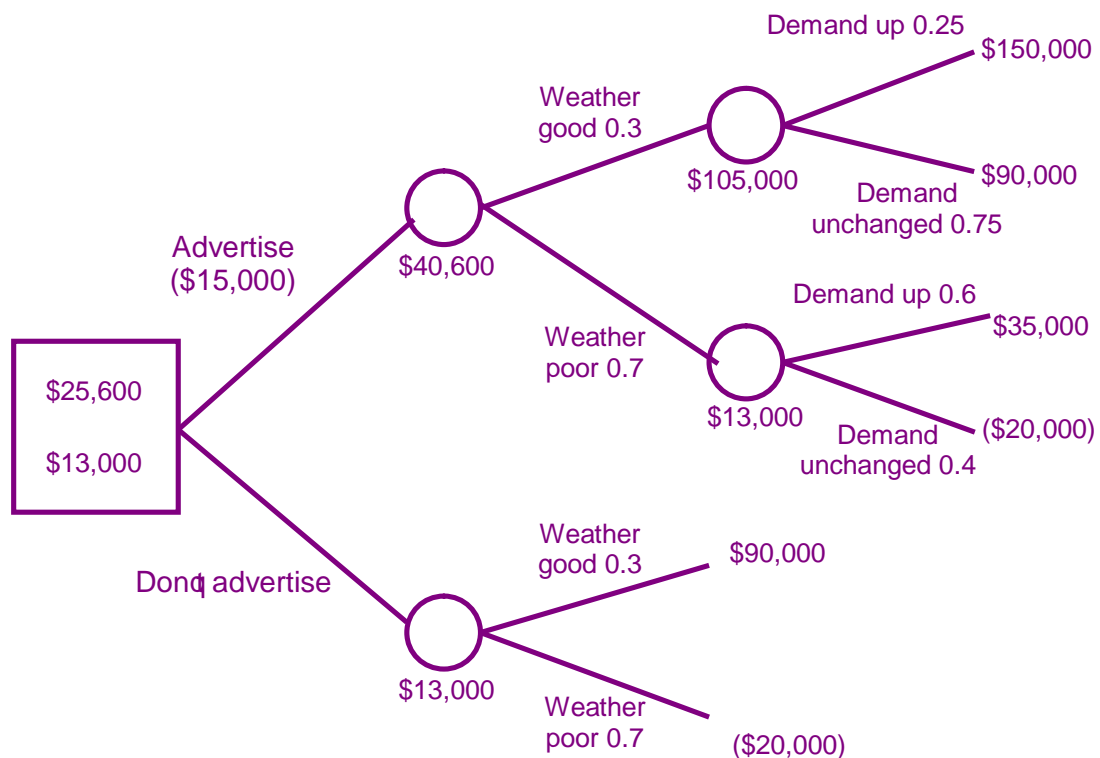210,000 = FC + (6 x 15,000)
210,000 = FC + 90,000
FC = 210,000 - 90,000
FC = $120,000

Total cost for quarter 3 for 23,000 units:

Direct material   = 23,000 x $12 x 95%   = $262,200
Production labour   = (23,000 x $8) + $35,000   = $219,000
Production overheads = (23,000 x $6) + $20,000   = <u>$278,000</u>
Total cost   = <u>$759,200</u>

Question Two – Part (f)

If the concert is advertised the expected profit will be $25,600 as opposed to not advertising the expected profit will only be $13,000, therefore the concert should be advertised.

SECTION C – 50 MARKS

Question Three

(a) Produce a statement that reconciles the budgeted and actual profit for CP1 for April showing the variances in as much detail as possible. (19 marks)

Reconciliation statement	$	$	$
Budgeted profit (W1)			432,000
Sales volume variance (W2)			6,000 (A)
Flexed budget			426,000
Sales price variance (W3)			21,300 (F)
			447,300
Cost variances	**Fav**	**Adv**	
Material price variance (W4)			
Material ETH 1		2,210	
Material RXY 2	9,580		
Material mix variance (W5)		13,200	
Material yield variance (W6)	18,000		
Fixed overhead expenditure variance ($280,000 - $278,000)	2,000		
Fixed overhead volume variance (W7)		4,000	
Total	29,580	19,410	10,170 (F)
Actual profit			457,470

(W1) - Budgeted profit

Budgeted profit = $20 - $14 x 72,000kg = $432,000

(W2) - Sales volume variance

	Units
Did sell (actual quantity sold)	71,000
Should sell (budget quantity sold)	72,000
Variance in units	1,000 (A)
x standard profit per unit ($20 - $14)	$6
Sales volume contribution variance	$6,000 (A)

(W3) - Sales price variance

	$
Did sell (actual quantity sold x actual price) 71,000 x $20.30	1,441,300
Should sell (actual quantity sold x standard price) 71,000 x $20	1,420,000
Sales price variance	21,300 (F)

(W4) - Material price variance

	ETH 1	RXY 2
	$	$
Did spend (actual quantity purchased x actual price)	400,010	277,820
Should spend (actual quantity purchased x std price)	397,800	287,400
Material price variance	2,210 (A)	9,580 (F)

Should spend (actual quantity purchased x standard price)

	£
Material ETH 1 = 22,100kg x $18	397,800
Material RXY 2 = 47,900kg x $6	287,400

Alternative working can be based on price per unit.

For example:

Material ETH 1	Budget price per unit	$18 per kilo
	Actual price per unit	$18.10 per kilo
	Price variance per kilo	$ 0.10 (A) per kilo
	X actual quantity purchased	22,100 kgs
	Material price variance in $	$2,210 (A)

(W5) - Material mix variance

A standard mix of a unit is 0.3kg ETH 1 and 0.7kg RXY 2 totalling 1kg

Material ETH 1	30%
Material RXY 2	70%

Standard mix of actual usage = fraction x 70,000kg

	Did use	Should use (Std mix of actual usage)	Variance in kilo	Standard price	Variance $
Material ETH 1	22,100	21,000	1,100 (A)	$18.00	19,800 (A)
Material RXY 2	47,900	49,000	1,100 (F)	$6.00	6,600 (F)
	70,000	70,000			13,200 (A)

(W6) - Material yield variance

	Units
Actual material used did produce	69,000
Actual material used should produce (70,000kg x 96%)	67,200
Over produced	1,800
x standard cost of one unit of output	x $10
Yield variance	$18,000 (F)

(W7) - Fixed overhead volume variance

	Units
Did produce	70,000
Should have produced	69,000
Variance in units	1,000 (A)
x fixed overhead absorption rate	$4
Fixed overhead volume variance	$4,000 (A)

(b) Discuss three reasons why the use of a standard costing system is considered inappropriate in a company that operates in an advanced manufacturing technology environment. (6 marks)

You only need to mention 3 of these points to get all the marks in this part:

- Sometimes it can be hard to define a ‑current‑ or ‑attainable standard‑ especially with the complexity and diversity of modern manufacturing. Traditionally manufacturers produced a small range of products using mass production techniques. Nowadays products have shorter lifecycles and different batches of many different products can be produced.

- With more automation of manufacturing operations today and less human intervention, labour standards are becoming less valuable as management information. Automation produces greater uniformity and consistency of products made, with less likelihood of material and labour variances actually occurring.

- Standard costing is an internal not external control measure e.g. too internally focused on maximising efficiency and minimising cost. Organisations need to consider other external factors such as competition, customers and other global environmental factors, not just internal cost and efficiency levels. Quality, innovation and customer satisfaction have become far more important to survive as an organisation today.

- The revision to standards may be too infrequent to guide or improve performance over time e.g. the life cycle of products are much shorter in a modern manufacturing environment and the environment more dynamic. Standards quickly become out of date due to frequent and continuous change.

- Modern manufacturing techniques such as TQM and quality circles mean as manufacturers aim for near perfection, the frequency and materiality of variances should not occur so often. Today focus is more on quality and customer satisfaction not the minimisation of cost.

Question Four – Part (b)

(a) Calculate the net present value (NPV) of the restaurant project. (16 marks)

Year	0	1	2	3	4	5
	$	$	$	$	$	$
Investment	(350,000)					
Restaurant contribution (W1)		720,000	792,000	871,200	958,320	
Fall in cold food outlet contribution (W2)		(432,000)	(475,200)	(522,720)	(574,992)	
Salaries		(80,000)	(80,000)	(100,000)	(100,000)	
Additional overheads		(70,000)	(70,000)	(70,000)	(70,000)	
Pre tax net cash flows	(350,000)	138,000	166,800	178,480	213,328	
Taxation (W3)		(20,700)	(45,720)	(51,792)	(58,771)	(31,999)
Post tax net cash flows	(350,000)	117,300	121,080	126,688	154,557	(31,999)
Tax savings on tax depreciation (W4)		13,125	22,969	17,227	25,031	17,649
Residual value					30,000	
Net cash flows	(350,000)	130,425	144,049	143,915	209,588	(14,350)
DF at 8%	x 1	x 0.926	x 0.857	x 0.794	x 0.735	x 0.681
PV	(350,000)	120,774	123,450	114,269	154,047	(9,772)

NPV $152,768

Workings

(W1) - Restaurant contribution

Sales will occur for 4 years and the demand for the restaurant will be in line with passenger numbers which will increase by 10% each year.

Year
1   500 customers per day x 360 days x $4 per meal = $720,000
2                  $720,000 x 1.10 = $792,000
3                   $792,000 x 1.10 = $871,200
4                   $871,200 x 1.10 = $958,320

(W2) - Fall in cold food outlet contribution

The contribution earned from cold foods will be fall due to the opening of the new restaurant. There will be a fall of 40% in the first year of the new restaurant being opened and then demand will increase in line with passenger numbers which will be 10% per year.

Year
1   (1,200 customers x 360 days x $2.50 per meal) x 40% = $432,000
2                     $432,000 x 1.10 = $475,200
3                     $475,000 x 1.10 = $522,750
4                     $522,750 x 1.10 = $574,992

(W3) - Taxation

Years when tax is paid	1	2	3	4	5
Year 1 tax	$20,700	$20,700			
= $138,000 x 30% = $41,400					
Year 2 tax		$25,020	$25,020		
= $166,800 x 30% = $50,040					
Year 3 tax			$26,772	$26,772	
= $178,480 x 30% = $53,544					
Year 4 tax				$31,999	$31,999
= $213,328 x 30% = $63,998					
Net cash flow	$20,700	$45,720	$51,792	$58,771	$31,999

(W4) - Tax savings on tax depreciation

	$	Tax savings 30% $	$	Total tax saved $
Investment	350,000			
Y1 tax dep at 25%	(87,500)	26,250	Y1 ó 13,125	Y1 ó 13,125
	262,500		Y2 ó 13,125	
Y2 tax dep at 25%	(65,625)	19,688	Y2 ó 9,844	Y2 ó 22,969
	196,875		Y3 ó 9,844	
Y3 tax dep at 25%	(49,219)	14,766	Y3 ó 7,383	Y3 ó 17,227
	147,656		Y4 ó 7,383	
Y4 scrap proceeds	(30,000)			
	117,656	35,297	Y4 ó 17,648	Y4 ó 25,031
			Y5 ó 17,649	Y5 ó 17,649

(b) Interpret the information for the Managing Director (your answer should include an explanation of the factors he should consider when deciding which project to undertake). (9 marks)

The expected net present value shows the overall benefit of each investment after discounting future cash flows to today's value and also using probabilities to determine the average or expected outcomes. The standard deviation measures the possible variation from the expected outcome. The greater the standard deviation the greater the risk of variation form the outcome.

Having information about NPV and standard deviation will allow the company to choose the investment which is suitable to them.

For example projects B and C have the same NPV of $180,0000 and so the company should be indifferent choosing between them, however the standard deviation shows that there is a greater chance of not achieving this NPV with project B rather than project C.

Equally so there is a greater chance of exceeding the NPV with project B rather than project C. Therefore a risk averse company would choose project C and a risk seeker company would choose project B. Therefore depending on your risk attitude you would make different selections.

Project A clearly has the lowest NPV of $150,000 and should not be chosen before projects B and C, however project A does carry a lower standard deviation than the other projects, and so is suitable for a risk averse company, again your choice would depend on your risk attitude.

The internal rate of return (IRR) is the cost of capital that if used would give a project a zero NPV, also understood as the ‑true return‑ of a project.

The decision criteria would be to accept all projects that give an IRR of more than or equal to the cost of capital for the company. In addition if you are selecting between projects then select the project which has the highest IRR as it would yield the greatest NPV.

Using the IRR criteria we should then consider choosing project B as it has the highest IRR of 12% and NPV of $180,000.