

# Mark Scheme (Results) Summer 2010

Principal Learning

## Manufacturing and Product Design MP301 Manufacturing Business Principles

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Summer 2010

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## General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

Question Number	Answer	Mark						
1	1 mark for each correct answer <table border="1"> <thead> <tr> <th>Activity</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>Ensuring goods are delivered on time and in a cost-effective way</td> <td>Logistics and Distribution (no mark for logistics on its own, or distribution on its own)</td> </tr> <tr> <td>Testing the acceptance of new products with potential customers</td> <td>Sales and Marketing (no mark for sales on its own, or marketing on its own)</td> </tr> </tbody> </table>	Activity	Function	Ensuring goods are delivered on time and in a cost-effective way	Logistics and Distribution (no mark for logistics on its own, or distribution on its own)	Testing the acceptance of new products with potential customers	Sales and Marketing (no mark for sales on its own, or marketing on its own)	(2)
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Ensuring goods are delivered on time and in a cost-effective way	Logistics and Distribution (no mark for logistics on its own, or distribution on its own)							
Testing the acceptance of new products with potential customers	Sales and Marketing (no mark for sales on its own, or marketing on its own)							

Question Number	Answer	Mark
2	Individual/family led enterprise Less than 10 employees Small business Accept any other suitable answer  <u>Model Answer</u> A micro-enterprise is a small business/enterprise (1). Typically a family business (1) It would normally employ less than 10 people (1)  1 mark for each correct answer to a maximum of 2 marks (2x1)	(2)

Question Number	Answer	Mark
3(a)(i)	1 mark for one of the following: Production (1) Research (1) Design/development (1) Accept any other suitable answer	(1)

Question Number	Answer	Mark
3(a)(ii)	1 mark for one of the following: Marketing (1) Sales (1) Customer service (1) Maintenance (1) Servicing (1) Accept any other suitable answer	(1)

Question Number	Indicative Content	
3(b)	<p>Training of production operatives            New machines            New processes            Reallocation of staff            New QA/QC requirements            Logistics issues            Requirement for new staff            Increased number of line managers</p> <p><u>Model Answer</u>            Introducing a new product line (1)            will require a new production facility either in the existing premises            or in new premises (1)            New machines and processes may need to be introduced (1)            staff will need to be reallocated (1)            and trained (1)            as well as the potential for new staff to be employed (1)            There will be logistical issues in terms of raw material supply to the            line (1)            and shipping of finished products (1)            Quality processes will need to be introduced (1)            including QA/QC procedures (1),            and new managers (1)            to implement the process and project manage the implementation            of the line (1)</p>	
Level	Mark	Descriptor
	0	No rewardable material
1	1-2	Limited understanding of production issues demonstrated with one or two implications described
2	3-4	Clear understanding of production issues demonstrated with three or four implications described
3	5-6	Comprehensive understanding of production issues demonstrated with five or more implications described

Question Number	Indicative Content	
4	<p><u>Marketing director responsibilities</u>  Ability to focus on:  Market research  Advertising  Public relations  Brand and product promotion  Direct mail  Long term profit strategy</p> <p><u>Sales Director responsibilities</u>  Ability to focus on:  Short and medium term profits  Negotiating contracts with customers  Customer liaison</p> <p><u>Small sized enterprise</u>  Ability to have an overview of both sales and marketing because:  Smaller range of products  Less money to spend on promotion  Small scale confectioners would probably be in niche markets  May have less competition  May not operate in a global marketplace against global brands</p> <p><u>Model Answer</u>  A large scale manufacturer of confectionery will have a large range of products (1)  across worldwide markets (1).  The role of the sales manager is to secure short term profits (1)  by negotiating/liasing with customers (1)  to agree prices and product volumes (1).  The role of the marketing director is related to long term profits (1)  and involves developing strategies (1)  to secure the future business of the company (1).  This involves direct mail shots (1)  public relations (1)  market research (1)  advertising (1)  and product promotion (1).  Where a small size company has a small range of products (1)  or a niche market (1).  There is likely to be less direct competition from large scale manufacturers (1)  and less money to spend on promotion and branding (1).  Because the product is probably not a global brand (1)  the two roles can be comfortably accommodated by one person (1).</p>	
Level	Mark	Descriptor
	0	No rewardable material
1	1-2	Limited understanding of differences between sales and marketing roles with poor description of the different sales/marketing needs of large scale manufacture compared with small size enterprises
2	3-4	Clear understanding of differences between sales and marketing roles with satisfactory description of the different sales/marketing

		needs of large scale manufacture compared with small size enterprises
3	5-6	Comprehensive understanding of differences between sales and marketing roles with a thorough description of the different sales/marketing needs of large scale manufacture compared with small size enterprises

Question Number	Indicative Content	
5	Promotion of new/modern technologies to increase productivity Income generation/growth Increased competitiveness Long term sustainability Security of employment Negate the effects of globalisation Innovation in products/processes To develop high value added products Minimise environmental impact <u>Model answer</u> Effective entrepreneurs seek to secure the long term future of a company (1) as well as the sustainability (1) and increased competitiveness of the business (1). They will consider the effects of globalisation (1) and support innovation (1) and leadership (1). An entrepreneur is prepared to take risks (1) to generate income/growth (1) by developing new technologies (1) and high value added products (1). They will often be interested in reducing environmental impact (1).	
Level	Mark	Descriptor
	0	No rewardable material
1	1-2	Limited understanding of requirements for entrepreneurship
2	3-4	Clear understanding of requirements for entrepreneurship
3	5-6	Comprehensive understanding of requirements for entrepreneurship

Question Number	Answer	Mark
6	<p>1 mark for each of the following to a maximum of 2 marks</p> <p><u>Increase in interest rates:</u></p> <ul style="list-style-type: none"> <li>• More expensive to borrow money (1)</li> <li>• Bank repayments increase (1)</li> <li>• Could improve competitive advantage (1)</li> </ul> <p><u>Decrease in interest rates:</u></p> <ul style="list-style-type: none"> <li>• Cheaper to borrow money (1)</li> <li>• Bank repayments decrease (1)</li> <li>• More competition due to new business start-ups (1)</li> </ul> <p>No repetition of answers. Accept any other suitable answer</p>	(2x1) (2)

Question Number	Answer	Mark
7	<p>1 mark for identification, 1 mark for expansion (2x2) or one point thoroughly explained (1x4) (up to 4 marks).</p> <ul style="list-style-type: none"> <li>• To prevent the loss of a large employer (1) which has an effect on the supply chain (1)</li> <li>• To maintain competitiveness (1) with foreign manufacturers who may also receive government subsidies (1)</li> <li>• Car manufacturers are often situated in areas of potential social deprivation (1) and their loss would have a detrimental effect on the local economy (1)</li> <li>• Psychological effect of losing a traditional mass employer(1)</li> <li>• Future skills requirements (1) and the effects on the supply chain (1)</li> </ul> <p>Any other suitable answer</p>	(4)



Question Number	Answer	Mark
8	<p>1 mark for identification, 1 mark for expansion to a maximum of 6 marks</p> <ul style="list-style-type: none"> <li>• Reduce CO<sub>2</sub> emissions (1) thus reducing the use of ozone depleting/polluting chemicals and products (1)</li> <li>• Increase use of recycled material in its products (1) to preserve natural resources (1)</li> <li>• Use sustainable fuels in its processes (1) to reduce it's carbon footprint (1)</li> <li>• Improve process efficiency (1) thus eliminating waste (1)</li> </ul> <p>Any other suitable answer</p>	(6)
	(3x2)	(6)

Question Number	Indicative Content	
9	<p>Lower wage bill            Availability of local labour            Current difficulties in recruitment/availability of skilled labour            Current recruitment/retention issues            Government grants/subsidies            EU grants subsidies            Availability of local suppliers            Tax concessions            Opportunity to expand operations            Company image            Logistical reasons  <u>Model Answer</u>            An area of high unemployment should mean an abundant supply of local labour(1)            which can be paid low wages (1)            and allow the enterprise to overcome possible difficulties in recruitment (1)            and retention (1)            Government (1)            and EU grant and subsidies are often available (1)            as well as tax concessions (1)            and opportunities to expand operations (1)            The company image will be improved (1)            as well as opportunities to support local suppliers (1)            and improve logistics (1)</p>	
Level	Mark	Descriptor
	0	No rewardable material
1	1-3	Limited understanding demonstrated with up to three valid reasons cited
2	4-6	Clear understanding demonstrated with four to six valid reasons cited
3	7-8	Comprehensive understanding demonstrated with seven or more reasons cited

Question Number	Answer	Mark
10 (a)	1 mark for identification, 1 mark for expansion to a maximum of 2 marks. A manufacturing enterprise forecasts (1) what its business objectives will be 3-5 years in the future (1) It provides vision (1) setting goals (1) for maintaining competitiveness (1)	(2)

Question Number	Indicative Content	
10 (b)	<p>Business goals Markets Cost/revenue Business improvement R&amp;D - new product development Staff training - new skill/techniques Facilities - increased or decreased space requirements Competition - SWOT analysis, effects of competitors, globalisation Marketing, sales strategy Sales/cash flow forecasts Profit/loss and balance sheet</p> <p><u>Model Answer</u> A strategic business plan sets business goals (1) which explores potential and existing markets (1) and investigates costs in comparison to revenues (1) The plan will include business improvement opportunities (1) and the issues of staff training (1) research and development (1) and sales/cash flow forecasts (1) which are related to the balance sheet and profit/loss (1) The plan will consider whether to increase/decrease facilities (1) and the impact on the business of competition/globalisation (1) In addition it will inform the marketing/sales strategy (1) usually by considering a SWOT analysis (1)</p>	
Level	Mark	Descriptor
	0	No rewardable material
1	1-2	Limited knowledge demonstrated of the elements of a business plan with one or two elements highlighted/discussed
2	3-4	At least two points made with expansion, or one fully developed response demonstrating sound knowledge of the elements of a business plan
3	5-6	At least three points made with expansion. If only two points are made these must be fully expanded with comprehensive knowledge demonstrated of the elements of a business plan

Question Number	Answer	Mark
11	<p>1 mark for each of the following to a maximum of 3 marks</p> <ul style="list-style-type: none"> <li>• Increased sales (1)</li> <li>• Increased product recognition (1)</li> <li>• Maintain/increase customer base (1)</li> <li>• Brand recognition to maintain sales (1)</li> <li>• Introduction of new products (1)</li> <li>• Speculate to accumulate (1)</li> <li>• Cost benefit (1)</li> <li>• Forward planning (1)</li> </ul> <p>Any other suitable answer (3x1)</p>	(3)

Question Number	Answer	Mark
12(a)	<p>A cost which depends upon sales volumes (1) such as materials or labour (1)</p> <p>1 mark for identification, 1 mark for expansion to a maximum of 2 marks (2x1)</p>	(2)

Question Number	Answer	Mark
12(b)	<p>More than one example with 1 mark for each example and 1 mark for the explanation (2x2) or 1 mark for an example and 3 for a thorough explanation (4)</p> <p>Although each of the following can be considered indirect costs they support the whole organisation, for a large enterprise they can be budgeted for as a fixed cost. (1)</p> <p>Examples include:            Advertising (1)            IT support (1)            Security (1)            Maintenance (1)</p> <p><u>Model Answer</u>            Maintenance can be considered an indirect cost (1) as maintaining the facility is not directly associated with an individual kitchen appliance (1). However this budget can be considered fixed (1) as the amount of money can be predicted regardless of the number of units manufactured (1).</p> <p>Any other suitable answer</p>	(4)

Question Number	Indicative Content	
13	<p>Elements of lean manufacturing can include:</p> <ul style="list-style-type: none"> <li>• Continuous improvement/Kaizan</li> <li>• Customer focused</li> <li>• JIT principles</li> <li>• Customer demand/Pull system</li> <li>• Identification of waste</li> <li>• Elimination of waste</li> <li>• Identification of value and non-value added activities</li> <li>• Right first time</li> <li>• Elimination of waiting time</li> <li>• Balanced work loads/workflow</li> <li>• Maximise efficiency of workforce and machines</li> <li>• Minimise or eliminate transportation</li> <li>• Recording time and motion of workers</li> <li>• Principle of seven wastes</li> <li>• 5S/5C</li> </ul> <p><u>Model Answer</u>  Lean manufacturing techniques can reduce costs (1) by focusing on what the customer wants/will pay for (1).  Consequently by removing waste (1) and non-value added input (1) to a process that process becomes more efficient (1) Other forms of waste include inventory (1) which can be reduced using pull systems (1), balancing the worker inputs on a production line (1) and JIT procedures (1) similarly rework (1) which can be reduced by implementing “right first time” principles (1) and giving responsibility for quality to the operators (1).  Other strategies such as introducing 5S/5C (1) Six Sigma (1) and mistake proofing (Poke Yoke) also improve efficiency (1)</p> <p>Up to a maximum of 9 marks</p>	
	<b>Level</b>	<b>Mark</b>
		<b>Descriptor</b>
		0
	1	1-3
	2	4-6
	3	7-9
		No rewardable material
		Limited understanding of lean manufacturing with one or two concepts identified
		Clear understanding of lean manufacturing with three or four concepts identified
		Comprehensive understanding of lean manufacturing with five or more concepts identified

Question Number	Answer	Mark
14	<p>1 mark for identification up to a maximum of 3 marks (3x1), or 1 mark for identification and up to 2 marks for expansion to a maximum of 3 marks (1x3). Comparing the total costs of a project (1) against the total benefits (1).  The costs and benefits can be used to determine payback time/viability (1).  It gives numeric values to different investment strategies (1).  e.g.  Cost v benefit (1)  Return on investment [ROI] (1)  Throughput analysis (1)  Payback period (1)</p>	(3)

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15(a)	<table border="1"> <thead> <tr> <th colspan="4">PROFIT AND LOSS ACCOUNT</th> </tr> <tr> <th></th> <th>£000</th> <th>£000</th> <th>£000</th> </tr> </thead> <tbody> <tr> <td colspan="4"><b>Income</b></td> </tr> <tr> <td>Total sales</td> <td></td> <td></td> <td>390</td> </tr> <tr> <td colspan="4"><b>Cost of Sales</b></td> </tr> <tr> <td>Materials</td> <td>111</td> <td></td> <td></td> </tr> <tr> <td>Wages</td> <td>148</td> <td></td> <td></td> </tr> <tr> <td>Total</td> <td></td> <td>(259)</td> <td></td> </tr> <tr> <td><b>GROSS PROFIT/LOSS</b></td> <td></td> <td></td> <td>131</td> </tr> <tr> <td colspan="4"><b>Promotions</b></td> </tr> <tr> <td>Advertising</td> <td>37</td> <td></td> <td></td> </tr> <tr> <td>Total</td> <td></td> <td>(37)</td> <td></td> </tr> <tr> <td colspan="4"><b>Expenses</b></td> </tr> <tr> <td>Rent/Rates</td> <td>37</td> <td></td> <td></td> </tr> <tr> <td>Utilities</td> <td>37</td> <td></td> <td></td> </tr> <tr> <td>Total</td> <td></td> <td>(74)</td> <td></td> </tr> <tr> <td><b>NET PROFIT/LOSS BEFORE TAX</b></td> <td></td> <td></td> <td>20</td> </tr> </tbody> </table> <ul style="list-style-type: none"> <li>• 1 mark for Rent/Rates or Utilities under the correct heading. (1)</li> <li>• Advertising under the correct heading (1)</li> <li>• Use of brackets to signify debits in middle column (1)</li> <li>• Correct answer for net profit/loss (allow follow through for '000' errors) (1)</li> <li>• 1 mark for correct calculation of figures (1)</li> </ul>	PROFIT AND LOSS ACCOUNT					£000	£000	£000	<b>Income</b>				Total sales			390	<b>Cost of Sales</b>				Materials	111			Wages	148			Total		(259)		<b>GROSS PROFIT/LOSS</b>			131	<b>Promotions</b>				Advertising	37			Total		(37)		<b>Expenses</b>				Rent/Rates	37			Utilities	37			Total		(74)		<b>NET PROFIT/LOSS BEFORE TAX</b>			20	(5x1) (5)
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Question Number	Answer	Mark
15(b)	$\frac{\text{Net profit } 20\,000}{\text{Total sales } 390\,000} \times 100$ $= 5.13\% \text{ (1)}$ <p>Allow for error carried forward from (a)</p> <p>1 mark for showing working 1 mark for correct answer (up to two marks) (2x1)</p>	(2)

Question Number	Answer	Mark
16(a)(i)	$\text{ROI} = (\text{benefits/costs}) \times 100 \text{ (1)}$ <p>Product X = <math>(76\,900/96\,000) \times 100 = 80.1\% \text{ (1)}</math>  Product Y = <math>(63\,400/80\,900) \times 100 = 78.4\% \text{ (1)}</math></p> <p>1 mark correct working, 1 mark per correct answers (3x1)</p>	(3)

Question Number	Answer	Mark
16(a)(ii)	Product X should be developed as it has the higher ROI (1)	(1)

Question Number	Answer	Mark
16(b)(i)	<p>Payback periods = costs/monthly benefits (1)</p> <p>Product X: Monthly benefits = <math>76\,900/18 = 4272</math>  Payback period = <math>96\,000/4\,272 = 23 \text{ months (1)}</math></p> <p>Product Y: Monthly benefits = <math>63400/12 = 5283</math>  Payback period = <math>80\,900/5\,283 = 16 \text{ months (1)}</math></p> <p>1 mark correct working, 1 mark per correct answer (3x1)</p>	(3)

Question Number	Answer	Mark
16(b)(ii)	Product Y should be selected (since it has the lower payback period) (1)	(1)

Question Number	Answer	Mark
16(c)	<p>Product Y should be selected because it has significantly less payback time (1) and almost the same ROI (1)</p> <p>1 mark for each point noted (2x1)</p>	(2)

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