

Mark Scheme (Results)

June 2012

Principal Learning

Manufacturing & Product Design
MP301 Paper 01

Manufacturing Business Principles

Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications come from Pearson, the world's leading learning company. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information, please visit our website at www.edexcel.com.

Our website subject pages hold useful resources, support material and live feeds from our subject advisors giving you access to a portal of information. If you have any subject specific questions about this specification that require the help of a subject specialist, you may find our Ask The Expert email service helpful.

www.edexcel.com/contactus

Pearson: helping people progress, everywhere

Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: www.pearson.com/uk

June 2012

Publications Code DP032613

All the material in this publication is copyright

© Pearson Education Ltd 2012

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	<p>1 mark for each correct answer</p> <table border="1"> <thead> <tr> <th>Activity</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>Asking the opinions of potential customers regarding new products</td> <td>Sales and marketing (but accept sales or marketing on its own)</td> </tr> <tr> <td>Ensuring goods are delivered efficiently to customers</td> <td>Logistics and distribution (but accept logistics or distribution on its own)</td> </tr> </tbody> </table>	Activity	Function	Asking the opinions of potential customers regarding new products	Sales and marketing (but accept sales or marketing on its own)	Ensuring goods are delivered efficiently to customers	Logistics and distribution (but accept logistics or distribution on its own)	(2)
Activity	Function							
Asking the opinions of potential customers regarding new products	Sales and marketing (but accept sales or marketing on its own)							
Ensuring goods are delivered efficiently to customers	Logistics and distribution (but accept logistics or distribution on its own)							

Question Number	Answer	Mark
2	<p>1 mark for identification and 1 mark for description (x2)</p> <ul style="list-style-type: none"> • Family business (1) with no board of directors (1) • Small business (smaller than a medium size business) (1), with less than 10 employees (1) • Often an Individual/sole trader (1) with a small customer base (1) • Typically a partnership (1) with relatively low assets/liabilities (1) • Often having short lines of communication (1) and operates in a niche market (1) • Normally privately owned with no shareholders or a small number of shareholders (1) and a very simple management structure (1) • Very specialist skills (1) serving a particular need (1) • Small scale facility, often working from home (1) with a small number of suppliers/range of products (1) <p>Accept any other suitable answer</p>	<p>(2 x 2) (4)</p>

Question Number		Indicative Content
3		<p>Research into new materials/processes Designing/developing new products (prototypes) Improving the design/performance of existing products Meeting customer needs Response to market research Improve production efficiencies Ensuring long term sustainability Developing products in response to competitors Using advanced technologies Designing products to meet specifications / briefs</p> <p><u>Model Answer</u> Design and development is a function that carries out research into the use of new materials (1) and processes (1) in order to develop new or innovative products (1). These can be due to the emergence of new technologies (1), in response to competitors (1), because of customer needs (1) or in response to market research (1). Design and development is critical to the long term sustainability (1) of an enterprise. In addition to new product development other functions can include improving production efficiencies (1) by improving the design/performance of existing products (1).</p>
Level	Mark	
	0	No rewardable material
1	1-2	Limited understanding of the role of design and development is demonstrated with one or two implications described
2	3-4	Clear understanding of the role of design and development is demonstrated with three or four implications described
3	5-6	Comprehensive understanding of the role of design and development is demonstrated with five or more implications described

Question Number		Indicative Content
4		<p>Ensuring goods are delivered on time Ensuring goods are delivered to the correct place Ensuring goods are delivered efficiently – from the facilities Ensure that delivery quantities are correct Minimising cost Planning Scheduling Meeting deadlines Managing staff appraisals Managing budgets Maintaining a safe working environment Responsible to senior management Legal obligations</p> <p><u>Model Answer</u> The logistics manager is responsible for ensuring that the right amount of a company's products are delivered on time (1) to the right place (1) as efficiently as possible (1). He/she is responsible for liaising with other transport agencies (1) and ensuring that deliveries are on time (1) and do not affect the efficient running of the facility (1). They are also responsible for liaising with production (1) and other managers (1) to ensure efficiency is maximised (1).</p>
Level	Mark	
	0	No rewardable material
1	1-2	Limited understanding the role of the logistics manager is demonstrated with one or two implications described
2	3-4	Clear understanding of the role of the logistics manager is demonstrated with three or four implications described
3	5-6	Comprehensive understanding of the role of the logistics manager is demonstrated with five or more implications described

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 Accept negative responses associated with entrepreneurship or lack of entrepreneurship Be prepared to take risks Exploit gaps in the market Be self motivated <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	
	0	No rewardable material
1	1-2	Limited understanding of requirements for entrepreneurship with one or two points highlighted
2	3-4	Clear understanding of requirements for entrepreneurship with three or four points highlighted
3	5-6	Comprehensive understanding of requirements for entrepreneurship with five or six points highlighted

Question Number	Answer	Mark
6(a)	<p>1 mark for each of the following to a maximum of 4 marks:</p> <ul style="list-style-type: none"> • Buy when raw material costs are low • Stockpile materials when raw material costs are low • Establish supply contracts when raw material costs are low • Use an increase in raw material cost to justify an increase in price • Disguise a disproportionate increase in product price • Justify reducing the quality/size of product • Maintain prices when raw material costs decrease in order to increase profits • Reduce prices in line with reducing raw material costs in order to promote growth <p>Any other suitable answer</p> <p style="text-align: right;">(1 x 4) (4 x 1)</p> <p>1 mark per low response and up to 4 marks for a detailed response</p>	(4)

Question Number	Answer	Mark
6(b)	<p>1 mark for definition and 1 mark for an example (x 2)</p> <p><u>Direct cost</u> A cost which can be directly traced to a product (1) such as materials or labour (1)</p> <p><u>Indirect cost</u> A cost which does not vary with changes in production volume (1) such as rent, insurance, rates etc. (1)</p> <p>Any other suitable answer</p> <p style="text-align: right;">(2 x 2)</p>	(4)

Question Number		Indicative Content
7		<p><u>Model answer</u></p> <p>Manufacturers would apply carbon offsetting to reduce emissions of greenhouse gases (1) by supporting non-polluting technologies (1). This would be achieved by:</p> <p>Completing a carbon footprint appraisal (1)</p> <p>Calculating the emissions the business produces, this is known as the 'carbon footprint'(1)</p> <p>Choosing to offset some or all of the unavoidable emissions (1)</p> <p>Buying an equivalent amount of 'carbon credits' (1) from projects that have saved carbon dioxide (1)</p> <p>Using carbon credits to pay for developing renewable energy supplies (1)</p> <p>Supporting non-polluting technologies that would otherwise be non-viable (1)</p>
Level	Mark	
	0	No rewardable material
1	1-2	Limited understanding of the application of carbon offsetting demonstrated with one or two carbon offsetting techniques described
2	3-4	Clear understanding of the application of carbon offsetting demonstrated with three or four carbon offsetting techniques described
3	5-6	Comprehensive understanding of the application of carbon offsetting demonstrated with five or more carbon offsetting techniques described

Question Number	Answer	Mark
8(a)	<p>1 mark for identification, and 1 mark for expansion to a maximum of 2 marks</p> <ul style="list-style-type: none"> • Allows the free movement of goods across the world (1) allowing an increase in markets (1) • Increases competition (1) which affects profit margins (1) <p>Any other suitable answer</p>	<p>(1 x 2) (2)</p>

Question Number		Indicative Content
8(b)		<p>Weak currency = increase in the price of imported goods Reduction in profitability at home if imported raw materials are used Increase in profitability abroad</p> <p>Strong currency = reduction in the price of finished goods Reduction in profitability abroad Increase in profitability at home if imported raw materials are required</p> <p>Exchange rates only affect a manufacturing business if it is operating across borders</p> <p><u>Model Answer</u> Changes in exchange rates affect imports because a weak currency means the price of imported goods is high (1), which reduces the profitability of the finished goods (1). A strong currency would reduce the price of imported goods allowing greater profitability (1). Exchange rate changes affect exports (1); a strong currency means it will be more expensive to sell the completed product abroad (1); which makes it less attractive to buyers (1) than competitors' products (1) reducing market share/profits (1). A weak currency would reduce the sale price abroad (1) making a product more attractive to customers and increasing market share (1).</p>
Level	Mark	
	0	No rewardable material
1	1-2	Limited knowledge demonstrated of the effect of exchange rate changes with one or two elements highlighted/discussed
2	3-4	Clear knowledge and understanding demonstrated of effect of exchange rate changes with three or four elements highlighted/discussed
3	5-6	Comprehensive knowledge and understanding demonstrated of effect of exchange rate changes with five or more elements highlighted/discussed

Question Number	Answer	Mark
9	<p>1 mark for identification, 1 mark for expansion (x3)</p> <ul style="list-style-type: none"> • The manufacturer may need to expand its premises (1), but the existing site may not accommodate this (1) • The current traffic infrastructure may be causing the manufacturer difficulties (1) thus requiring a move to allow better road/rail links (1) • Lack of local labour force availability and/or skills (1) requiring a move to an area where appropriate skills are available (1) • High rents for property (1) may necessitate a move to a property where rates are cheaper (1) • To take advantage of Government subsidies (1) which support manufacturers moving to deprived areas (1) <p>Any other suitable answer</p>	<p>(3 x 2) (6)</p>

Question Number	Answer	Mark
10(a)	<p>1 mark for low response, 2 marks for two low responses, 2 marks for a detailed response</p> <p>Any two of the following:</p> <ul style="list-style-type: none"> • An indication of the direction/strategy a company is taking (1) • Where a company wants to be in 3-5 years time (1) • Would include the products it wants to develop (1) • Would include the investments it intends to make (1) • Would identify target markets for new/existing products (1) • Would identify key competitors and the strategy to win market share from them (1) <p>Any other suitable answer</p> <p style="text-align: right;">(1 x 2) (2 x 1)</p>	(2)

Question Number	Answer	Mark
10(b)	<p>1 mark for identification and 1 mark for expansion (x2)</p> <ul style="list-style-type: none"> • Staff training is vital to prepare staff for new technology (1) which will allow the company to remain sustainable (1) • Staff training allows staff to progress within the company (1) which promotes loyalty and goodwill (1) • Required to ensure staff safety (1) to conform to legal requirements/avoid litigation (1) • As key members of staff leave/retire (1) other staff need to be appropriately trained/skilled to take over if required (1) • Train staff to be multi skilled (1) to allow better flexibility/implementation of lean manufacturing philosophy (1) <p>Any other suitable answer</p> <p style="text-align: right;">(2 x 2)</p>	(4)

Question Number	Answer	Mark
11(a)	<p>1 mark for each of the following to a maximum of 3 marks</p> <ul style="list-style-type: none"> • Part of a JIT system • Items are sent to production in a crate/box • When the crate is almost empty a card is sent to stores • A full box is then sent back to replace the empty one • New parts are not made until a Kanban card is received • System to reduce work in progress (WIP) • Minimise in process costs <p>1 mark per low response and up to 3 marks for a detailed response</p> <p style="text-align: right;">(1 x 3) (3 x 1)</p>	(3)

Question Number	Indicative Content	
11(b)	<p>Continuous improvement Process improvement Efficiency Worker led Charts, diagrams statistics Organisational approach Reducing waste Reducing scrap/rework</p> <p><u>Model Answer</u> Because Kaizen principles lead to the continuous measurement (1) and recording (1) of the performance of products and processes (1), this results in the identification of opportunities (1) which can help to reduce waste (1). As it is a worker led approach (1) it can impact on the whole organisation (1).</p>	
Level	Mark	
	0	No rewardable material
1	1-2	Limited knowledge demonstrated of the impact of Kaizen principles with one or two elements highlighted/discussed
2	3-4	Clear knowledge of the impact of Kaizen principles demonstrated with three or four elements highlighted/discussed
3	5-6	Comprehensive knowledge demonstrated of the impact of Kaizen principles with three or four elements highlighted/discussed

Question Number		Indicative Content
12		<p>To reduce the financial risks of product failure To maintain the profile and sales of the product To research new markets with a view to investing in new products To maximise sales of existing products To maintain competitive advantage To carry out market research in order to test the acceptance of products Used to create demand</p> <p>Model Answer Marketing is used as a financial tool to maintain or increase sales of existing products (1). It is also used to maintain the profile of the company (1) and its products (1). By using market research (1) a manufacturer can maintain competitive advantage (1) by developing/testing new products (1) and comparing its products with competitors (1). It is also useful to test customer acceptance of new products (1) preventing expensive mistakes if a product is not favourably received (1).</p>
Level	Mark	
	0	No rewardable material
1	1-2	Limited knowledge demonstrated of the importance of marketing to the sustainability of the manufacturing enterprise with one or two elements highlighted/discussed
2	3-4	Clear knowledge and understanding demonstrated of the importance of marketing to the sustainability of the manufacturing enterprise with three or four elements highlighted/discussed
3	5-6	Comprehensive knowledge and understanding demonstrated of the importance of marketing to the sustainability of the manufacturing enterprise with five or six elements highlighted/discussed

Question Number	Answer	Mark
13(a)	<p>1 mark for each of the following to a maximum of 4 marks</p> <p><u>Model Answer</u> Cash flow is important to a business as it measures the amount of revenue (1) and outgoings (1) over a given period of time (1) and the lack of management of this (1) can cause a company to go bust (1) even though it may be a profitable enterprise (1). It is often measured using a cash flow forecast (1).</p> <p>Accept any other suitable answer 1 mark per low response and up to 4 marks for a detailed response</p> <p style="text-align: right;">(4 x 1) (1 x 4)</p>	(4)

Question Number	Answer	Mark
13(b)	<p>Monthly benefits = $50\,000/12$ (1) = £4166.67 (1)</p> <p>Payback period = $80\,000/4166.67$ = 19.2 months</p> <p>Only accept 20 months as the answer (1)</p> <p style="text-align: right;">(3 x 1)</p>	(3)

Question Number	Answer	Mark
14(a)	$(£160\ 000 - £40\ 000)/6$ (1) = £20 000 (1)	
	(2 x 1)	(2)

Question Number	Answer	Mark												
14(b)	Allow for carry through error from 14(a). <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>Liabilities (£)</th> <th>Assets (£)</th> </tr> </thead> <tbody> <tr> <td>Machine at cost</td> <td>160 000</td> <td></td> </tr> <tr> <td>Accumulated depreciation</td> <td>$(20\ 000 \times 4) =$ £80 000</td> <td style="background-color: #cccccc;"></td> </tr> <tr> <td>Machine at net book value</td> <td style="background-color: #cccccc;"></td> <td>$160\ 000 -$ $80\ 000 =$ £80 000</td> </tr> </tbody> </table> <p>One mark for each correct value in the correct cell (allowing for ecf)</p>		Liabilities (£)	Assets (£)	Machine at cost	160 000		Accumulated depreciation	$(20\ 000 \times 4) =$ £80 000		Machine at net book value		$160\ 000 -$ $80\ 000 =$ £80 000	
	Liabilities (£)	Assets (£)												
Machine at cost	160 000													
Accumulated depreciation	$(20\ 000 \times 4) =$ £80 000													
Machine at net book value		$160\ 000 -$ $80\ 000 =$ £80 000												
	(2 x 1)	(2)												

Question Number	Answer	Mark																																																																				
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">Income</td> </tr> <tr> <td>Turnover</td> <td></td> <td></td> <td>240</td> </tr> <tr> <td colspan="4">Cost of Sales</td> </tr> <tr> <td>Materials</td> <td>45</td> <td></td> <td></td> </tr> <tr> <td>Wages</td> <td>93</td> <td></td> <td></td> </tr> <tr> <td>Total</td> <td></td> <td>(138)</td> <td></td> </tr> <tr> <td>GROSS PROFIT/LOSS</td> <td></td> <td></td> <td>102</td> </tr> <tr> <td colspan="4">Promotions</td> </tr> <tr> <td>Advertising</td> <td>12</td> <td></td> <td></td> </tr> <tr> <td>Total</td> <td></td> <td>(12)</td> <td></td> </tr> <tr> <td colspan="4">Expenses</td> </tr> <tr> <td>Rent/Rates</td> <td>32</td> <td></td> <td></td> </tr> <tr> <td>Utilities</td> <td>29</td> <td></td> <td></td> </tr> <tr> <td>Total</td> <td></td> <td>(61)</td> <td></td> </tr> <tr> <td>NET PROFIT/LOSS BEFORE TAX</td> <td></td> <td></td> <td>29</td> </tr> </tbody> </table> <ul style="list-style-type: none"> • 1 mark for Rent/Rates or Utilities under the correct heading (1) • Advertising under the correct heading (1) • Use of brackets to signify debits in middle column (1) • Correct answer for net profit/loss (allow follow through for '000' errors) (1) 	PROFIT AND LOSS ACCOUNT					(£000)	(£000)	(£000)	Income				Turnover			240	Cost of Sales				Materials	45			Wages	93			Total		(138)		GROSS PROFIT/LOSS			102	Promotions				Advertising	12			Total		(12)		Expenses				Rent/Rates	32			Utilities	29			Total		(61)		NET PROFIT/LOSS BEFORE TAX			29	(4)
PROFIT AND LOSS ACCOUNT																																																																						
	(£000)	(£000)	(£000)																																																																			
Income																																																																						
Turnover			240																																																																			
Cost of Sales																																																																						
Materials	45																																																																					
Wages	93																																																																					
Total		(138)																																																																				
GROSS PROFIT/LOSS			102																																																																			
Promotions																																																																						
Advertising	12																																																																					
Total		(12)																																																																				
Expenses																																																																						
Rent/Rates	32																																																																					
Utilities	29																																																																					
Total		(61)																																																																				
NET PROFIT/LOSS BEFORE TAX			29																																																																			

Question Number	Answer	Mark
15(b)	<p>Allow for carry through error from 15(a).</p> <p><u>Net profit 29 000</u> (1) Total sales 240 000</p> <p>= 12.1% (1)</p> <p>One mark for each correct value (allowing for ecf)</p> <p style="text-align: right;">(2 x 1)</p>	(2)

Further copies of this publication are available from
Edexcel Publications, Adamsway, Mansfield, Notts, NG18 4FN

Telephone 01623 467467

Fax 01623 450481

Email publication.orders@edexcel.com

Order Code DP032613 June 2012

For more information on Edexcel qualifications, please visit our website
www.edexcel.com

Pearson Education Limited. Registered company number 872828
with its registered office at Edinburgh Gate, Harlow, Essex CM20 2JE

Ofqual




Llywodraeth Cynulliad Cymru
Welsh Assembly Government

