

Mark Scheme (Results)

| Summer 2013

Principal Learning
Manufacturing and Product Design
(MP301/01)

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| Question Number | Answer | Mark |
|-----------------|---|------------|
| 1 | <p>1 mark for identification, 1 mark for expansion</p> <p>Maintenance/servicing is responsible for maintaining plant and equipment (1) to ensure continued production/safety/efficiency (1)</p> <p>Accept any other suitable answer</p> <p style="text-align: right;">(1 x 2)</p> | (2) |

| Question Number | Answer | Mark |
|-----------------|--|------------|
| 2 | <p>1 mark for one of the following to a maximum of 2 marks:</p> <p>Greater than 250 employees (1) Large production facility (1) Large business (1) Global brand/business (1) Extensive product range (1)</p> <p>Accept any other suitable answer</p> <p style="text-align: right;">(2 x 1)</p> | (2) |

| Question Number | | Indicative Content |
|-----------------|------------|---|
| 3 | | <p>Developing a long term business plan/strategy/goals Being accountable to shareholders Being accountable to the board of directors Legal responsibility for the enterprise Managing staff Managing overall budgets Managing resources Managing assets Maintain operational performance/sustainability</p> <p><u>Model Answer</u> The Managing Director is responsible for developing a long term business plan/strategy/goal (1), by being accountable to shareholders (1) and the board of directors (1). He/she has legal responsibility for the enterprise (1) and is the public face of the business (1). The managing director has overall responsibility for managing staff (1) and overall budgets (1) as well as managing resources (1) and assets to maintain operational performance and maintain business sustainability (1).</p> |
| Level | Mark | Descriptor |
| | 0 | No rewardable material |
| 1 | 1-2 | Limited understanding of the role of the Managing Director with one or two implications described. |
| 2 | 3-4 | Clear understanding of the role of the Managing Director with three or four implications described. |
| 3 | 5-6 | Comprehensive understanding of the role of the Managing Director with five or more implications described. |

| Question Number | | Indicative Content |
|-----------------|------|--|
| 4 | | <p>Promotion of new/modern technologies to increase productivity Income generation/growth Increased competitiveness Security of employment Negate the effects of globalisation Innovation in products/processes To develop high value added products Minimise environmental impact Short term opportunities</p> <p><u>Model answer</u> Effective entrepreneurship is important in that seeking profit and profitable ventures secures both the short-term and long-term future of a company (1) as well as its sustainability (1). Entrepreneurs take advantage of short-term marketing opportunities (1) exploiting gaps in the market (1) to produce and promote products (1). Entrepreneurship is key to increasing the competitiveness of existing businesses (1) even if this requires risky ventures (1); these ventures may prove unsuccessful in some cases (1) but by managing the risk sufficient ventures will be successful to ensure short term success (1). Entrepreneurs are prepared to take risks (1) to generate income/growth (1) by developing new technologies (1) and high value added products (1). This is important as it allows companies to develop and/or take new directions they would not normally have considered (1). In some instances entrepreneurship can require the risking of short-term success (1) to ensure long-term sustainability (1).</p> |
| Level | Mark | Descriptor |
| | 0 | No rewardable material |
| 1 | 1-2 | Limited understanding of why short term success and long term sustainability are encouraged by entrepreneurial practice |
| 2 | 3-4 | Clear understanding of why short term success and long term sustainability are encouraged by entrepreneurial practice |
| 3 | 5-6 | Comprehensive understanding of why short term success and long term sustainability are encouraged by entrepreneurial practice |

| Question Number | Indicative Content | |
|-----------------|---|--|
| 5 | <p>Research into new materials/processes Designing/developing new products 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 Developing/testing prototypes</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 as competition and changing technology can adversely affect sustainability (1). In addition to new product development other functions can include improving production efficiencies (1) by improving the design/performance of existing products (1). This allows more competitive pricing of products (1).</p> | |
| Level | Mark | Descriptor |
| | 0 | No rewardable material |
| 1 | 1-2 | Limited understanding of the role of design and development demonstrated with one or two implications described. |
| 2 | 3-4 | Clear understanding of the role of design and development demonstrated with three or four implications described. |
| 3 | 5-6 | Comprehensive understanding of the role of design and development demonstrated with five or more implications described. |

| Question Number | Indicative content | |
|-----------------|---|--|
| 6 | World market economy Financial markets Globalisation Tax Inflation Exchange rates Interest rates Government policy Recession Legislation Any other appropriate economic measure <u>Model Answer</u> Manufacturers' business operations are affected by the world market economy (1) and the financial trading conditions/markets (1). Factors such as globalisation (1) can hinder or help manufacturing enterprises depending on trading conditions (1) and exchange rates (1). Economic issues such as taxes (1), inflation (1) and financial legislation (1) have an impact as does Government economic policy (1) and global issues such as economic recession (1). | |
| Level | Mark | Descriptor |
| | 0 | No rewardable material |
| 1 | 1-2 | Limited understanding of economic issues demonstrated with one or two examples given |
| 2 | 3-4 | Clear understanding of economic issues demonstrated with three or four examples given |
| 3 | 5-6 | Comprehensive understanding of economic issues demonstrated with five or more examples given |

| Question Number | Answer | Mark |
|-----------------|---|--------------------|
| 7(a) | 1 mark for identification, 1 mark for expansion In environmental terms waste management is: the collection (1) and processing (1) of waste materials the transportation(1) and recycling/disposal (1) of waste material managing (1) and monitoring (1) waste material Any other suitable answer, including reference to lean manufacture. | (1 x 2) (2) |

| Question Number | | Indicative content |
|-----------------|------------|---|
| 7(b) | | <p>To protect the environment To reduce global warming (marketing) To reduce its dependency on fossil fuels To improve its carbon footprint To improve its environmental credibility In order to meet legislation To improve efficiency To reduce its fuel bills To encourage environmental sustainability amongst its customers and suppliers As a marketing strategy</p> <p><u>Model Answer</u> Reducing CO₂ emissions can be seen as a marketing strategy (1) to improve the manufacturer's environmental credibility (1) by reducing its carbon footprint (1). It would also encourage environmental sustainability amongst its customers (1) and suppliers (1). This should also provide a reduction in fuel bills (1) by improving efficiency (1). Additional reasons might include meeting legislation (1) and reducing its dependency on fossil fuels (1).</p> |
| Level | Mark | Descriptor |
| | 0 | No rewardable material |
| 1 | 1-2 | Limited understanding of the reasons for reducing CO ₂ emissions demonstrated with one or two examples given. |
| 2 | 3-4 | Clear understanding of the reasons for reducing CO ₂ emissions demonstrated with three or four examples given. |
| 3 | 5-6 | Comprehensive understanding of the reasons for reducing CO ₂ emissions demonstrated with five or more examples given. |

| Question Number | | Indicative Content |
|-----------------|------------|---|
| 8 | | <p>Set up/tooling costs Economies of scale Viable products Resourcing Spreading financial investment (R and D) Utilising the skills base in specific sectors Increased capital flow Knowledge transfer Individual skills recognised Increased market competition Lack of USP Customer confusion</p> <p><u>Model Answer (car example or alternative)</u> Manufacturers can share the cost of expensive tooling (1) making the product produced more viable (1) for example two manufacturers sharing the same components/engine (1). By utilising economies of scale (1) car makers can ensure economic resourcing of materials (1). They can also focus on individual strengths (1), for example one company may have very reliable engines (1) another may have good chassis building technology (1). This shared resourcing (1) allows for better use of skills (1) and the sharing of specific functions (1) can reduce staffing (1). Collaboration can result in knowledge transfer (1) and increased flexibility (1) leading to shorter lead times (1) and to manufacturing efficiency (1). Business collaboration can allow access to international markets and customers (1). The downside includes customers becoming confused (1) as products look identical (1) with no USP (1) and direct competition from partners (1).</p> |
| Level | Mark | Descriptor |
| | 0 | No rewardable material |
| 1 | 1-3 | Limited understanding of the advantages/disadvantages demonstrated with one or two valid reasons cited |
| 2 | 4-6 | Clear understanding of the advantages/disadvantages demonstrated with three or four valid reasons cited |
| 3 | 7-8 | Comprehensive understanding of the advantages/disadvantages demonstrated with five or more valid reasons cited |

| Question Number | Answer | Mark |
|-----------------|---|------------|
| 9 | <p>1 mark for identification, 1 mark for expansion to a maximum of 2 marks:</p> <p>Local labour may have skills/knowledge (1) due to traditional manufacturing profile of the area (1)</p> <p>Targeting a stable local labour force (1) leads to good PR and loyalty of workforce (1)</p> <p>Reduced car use (1) leads to environment/social/ workplace effectiveness (1)</p> <p>Improved flexibility (1) as workforce may be able to react quickly to overtime/emergency requirements (1)</p> <p>Any other suitable answer</p> <p style="text-align: right;">(2 x 2)</p> | (4) |

| Question Number | Answer | Mark |
|-----------------|--|------------|
| 10 | <p>1 mark for each point to a maximum of 4 marks or one detailed response for 4 marks:</p> <p>To ensure specific maintenance schedules are maintained (1)</p> <p>To allow guarantees to be honoured if schedules complied with (1)</p> <p>Can ensure additional income (1)</p> <p>Customers can be charged (1)</p> <p>Can be seen as a promotional tool (1)</p> <p>Ensure customer loyalty (1)</p> <p>Maintain customer contact (1)</p> <p>Any other suitable answer</p> <p style="text-align: right;">(4 x 1) (1 x 4)</p> | (4) |

| Question Number | Indicative content |
|-----------------|--|
| 11 | <p>Recruitment</p> <p>Improved productivity</p> <p>Competitive advantage</p> <p>Staff confidence</p> <p>Motivation</p> <p>Improves employee retention rates</p> <p>Improved efficiency</p> <p>Investing in the future</p> <p>Maintaining competitiveness</p> <p>Apprenticeship</p> |

| | | <p>Encouraging internal promotion Developing staff to reach potential Supplier/customer training</p> <p><u>Model Answer</u> Skills training improves motivation (1), staff confidence (1) and improves the retention of staff (1), who recognise the investment in their development (1) and the opportunity for internal promotion (1). Updating skills provides business/production efficiencies (1). The up-skilling of staff provides competitive advantage (1) and increased productivity (1). In addition it is an aid to recruitment (1). Business improvements are made when manufacturers develop their supplier/customers staff through training and development (1) although the use of apprenticeships and training staff can lead to possible loss of well-trained staff to rival/other employers (1).</p> |
|----------|------------|--|
| Level | Mark | Descriptor |
| | 0 | No rewardable material |
| 1 | 1-2 | Limited understanding demonstrated with one or two valid reasons cited |
| 2 | 3-4 | Clear understanding demonstrated with three or four valid reasons cited |
| 3 | 5-6 | Comprehensive understanding demonstrated with five or more reasons cited |

| Question Number | Answer | Mark |
|-----------------|---|------------|
| 12(a) | <p>1 mark for identification, 1 mark for expansion to a maximum of 2 marks:</p> <p>Variable costs are those costs that: vary (1) with changes in production (1) Variable costs are affected by sales (1) examples include transportation, wages, materials etc. (1)</p> <p>Any other suitable answer</p> <p style="text-align: right;">(1 x 2)</p> | (2) |

| Question Number | Answer | Mark |
|-----------------|--|------------|
| 12(b) | <p>1 mark for identification, 1 mark for expansion to a maximum of 2 marks:</p> <p>Indirect costs are costs that cannot be attributed directly to the production of an item (1) such as rent /rates (1)</p> <p>Any other suitable answer</p> <p style="text-align: right;">(1 x 2)</p> | (2) |

| Question Number | Answer | Mark |
|-----------------|---|------------|
| 13(a) | <p>1 mark for each point to a maximum of 4 marks or one detailed response for 4 marks:</p> <p>Changing the product adds value to it (1) Only worth doing if customers respond to the improvement (1) This activity increases the value of the product (1) It is desirable to remove non-value adding processes (1) Reduce movement (1) Reduce storage/warehousing (JIT), inventory (1), reduce transportation (1) Reduce re-work (1) Do not add more value than is required by the customer (1) By ensuring all activities add value less waste occurs (1) Accept specific product/process examples</p> <p><u>Model Answer</u> A value adding activity is a process that changes the product (1) making it more desirable for the customer (1) and therefore adding value (1). By increasing value adding activities (1) and reducing non-value adding activities such as re-work or transportation (1) businesses become more efficient (1).</p> <p style="text-align: right;">(4 x 1) (1 x 4)</p> | (4) |

| Question Number | Answer | Mark |
|-----------------|---|------------|
| 13(b) | <p>1 mark for each point to a maximum of 4 marks or one detailed response for 4 marks:</p> <p>Just in time saves money by: reducing inventory (1) reducing the cost of storing raw materials (1) raw materials are supplied 'just in time' (1) finished goods are not stored (1) but delivered immediately to customers (1) JIT requires very careful logistical planning (1) danger of running out of stock if issues occur with suppliers (1) danger of not being able to meet customer expectation if a production problem occurs (1) Helps to ensure stock does not "spoil" or go to waste (1)</p> <p><u>Model Answer</u> JIT techniques save money for a manufacturer by reducing the amount of inventory (1) this includes raw materials (1) and finished goods (1) saving on cost tied up in maintaining stocks of either (1) and saves warehouse space (1) and the cost of heating, lighting and renting this space (1).</p> <p>(4 x 1) (1 x 4)</p> | (4) |

| Question Number | Answer | Mark |
|-----------------|--|------------|
| 14 | <p>1 mark for each point to a maximum of 4 marks or one detailed response for 4 marks:</p> <p>Cost benefit analysis is a decision making tool (1) It allows the total costs (1) For a given project/proposal (1) Measured against total financial benefits (1) To be compared against other projects or the existing scenario (1) To see whether benefits outweigh costs (1)</p> <p>(4 x 1) (1 x 4)</p> | (4) |

| Question Number | Answer | Mark |
|-----------------|---|------------|
| 15(a) | Dpn = $\frac{60\,000 - 15\,000}{5}$ (1) Dpn = £9 000 (1) | (2) |

| Question Number | Answer | Mark | | | | | | | | | | | | |
|---------------------------|---|------------|-----------------|------------|-----------------|--------|--|--------------------------|--------|--|---------------------------|--|--------|------------|
| 15(b) | <p>If Dpn answer (£9 000) is incorrect for 13(a), use answer given to follow through up to 2 marks</p> <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 style="text-align: center;">60 000</td> <td style="background-color: #cccccc;"></td> </tr> <tr> <td>Accumulated depreciation</td> <td style="text-align: center;">36 000</td> <td style="background-color: #cccccc;"></td> </tr> <tr> <td>Machine at net book value</td> <td style="background-color: #cccccc;"></td> <td style="text-align: center;">24 000</td> </tr> </tbody> </table> | | Liabilities (£) | Assets (£) | Machine at cost | 60 000 | | Accumulated depreciation | 36 000 | | Machine at net book value | | 24 000 | (2) |
| | Liabilities (£) | Assets (£) | | | | | | | | | | | | |
| Machine at cost | 60 000 | | | | | | | | | | | | | |
| Accumulated depreciation | 36 000 | | | | | | | | | | | | | |
| Machine at net book value | | 24 000 | | | | | | | | | | | | |

| Question Number | Answer | Mark |
|-----------------|--|------------|
| 15(c) | <p>1 mark for identification, 1 mark for expansion</p> <p>A manufacturer would use a balance sheet:</p> <p>As a financial accounting tool (1) in order to compare assets and liabilities (1)</p> <p>In order to determine the financial health of its business (1) at a specific date/point in time (1)</p> <p>To balance/compare assets and liabilities (1) allowing the profit or loss over the year to be measured (1)</p> <p>Because it can be an accounting requirement for certain types of company (1) to measure their position for one financial year (1)</p> <p style="text-align: right;">(1 x 2)</p> | (2) |

| Question Number | Answer | Mark |
|------------------|--|------------|
| 16(a)(i) | <p>ROI = (benefits/costs) x 100 (1)</p> <p>Product X = (3 000/4 800) x 100 = 62.5% (1)</p> <p>Product Y = (2 400/3 800) x 100 = 63.2 % (1)</p> <p>1 mark correct working, 1 mark per correct answers</p> <p style="text-align: right;">(3 x 1)</p> | (3) |
| Question Number | Answer | Mark |
| 16(a)(ii) | <p>Product Y should be developed as it has the higher ROI (1)</p> <p>If the answer in 16(a)(i) is incorrect, allow follow through if the answer to 16(a)(ii) is an appropriate interpretation</p> | (1) |

| Question Number | Answer | Mark |
|-----------------|--|------------|
| 16(b)(i) | <p>Payback period = costs/monthly benefits (1)</p> <p>Product X: Monthly benefits = 3 000/6 = 500 Payback period = 4 800/500 = 10 months (do not accept 9.6 months) (1)</p> <p>Product Y: Monthly benefits = 2 400/12 = 200 Payback period = 3 800/200 = 19 months (1)</p> <p>1 mark correct working, 1 mark per correct answers</p> <p style="text-align: right;">(3 x 1)</p> | (3) |

| Question Number | Answer | Mark |
|------------------|---|------------|
| 16(b)(ii) | <p>Product X should be selected (since it has the lower payback period)</p> <p>If the answer in 16(b)(i) is incorrect, allow follow through if the answer to 16(b)(ii) is an appropriate interpretation</p> | (1) |

| Question Number | Answer | Mark |
|-----------------|--|------------|
| 16(c) | <p>Product X should be selected because it has significantly shorter payback time (1) and a similar ROI (1) 1 mark for each point noted</p> <p style="text-align: right;">(2 x 1)</p> <p>Allow follow through i.e. if the incorrect selection is made for either 16(a)(ii) and 16(b)(ii) provided a response explaining the reasoning is appropriate marks should be awarded.</p> | (2) |

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