

# Mark Scheme (Results)

Summer 2014

Pearson Edexcel  
GCSE in Principal Learning  
Engineering  
EG301 01  
(Paper 01: Business and Environment)

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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.

## SECTION A

Question Number	Answer	Mark
<b>1</b>	C	<b>(1)</b>

Question Number	Answer	Mark
<b>2</b>	B	<b>(1)</b>

Question Number	Answer	Mark
<b>3</b>	C	<b>(1)</b>

Question Number	Answer	Mark
<b>4</b>	B	<b>(1)</b>

Question Number	Answer	Mark
<b>5</b>	C	<b>(1)</b>

Question Number	Answer	Mark
<b>6</b>	A	<b>(1)</b>

Question Number	Answer	Mark
<b>7</b>	C	<b>(1)</b>

Question Number	Answer	Mark
<b>8</b>	D	<b>(1)</b>

Question Number	Answer	Mark
<b>9</b>	A	<b>(1)</b>

Question Number	Answer	Mark
<b>10</b>	B	<b>(1)</b>

Question Number	Answer	Mark
<b>11</b>	A	<b>(1)</b>

Question Number	Answer	Mark
<b>12</b>	D	<b>(1)</b>

Question Number	Answer	Mark
<b>13</b>	A	<b>(1)</b>

Question Number	Answer	Mark
<b>14</b>	C	<b>(1)</b>

Question Number	Answer	Mark
<b>15</b>	A	<b>(1)</b>

Question Number	Answer	Mark
<b>16</b>	A	<b>(1)</b>

Question Number	Answer	Mark
<b>17</b>	D	<b>(1)</b>

Question Number	Answer	Mark
<b>18</b>	B	<b>(1)</b>

Question Number	Answer	Mark
<b>19</b>	A	<b>(1)</b>

Question Number	Answer	Mark
<b>20</b>	C	<b>(1)</b>

## SECTION B

Question Number	Answer	Mark
<b>21</b>	1 mark each for up to three valid points <ul style="list-style-type: none"><li>• Classroom based/College / day release courses (1)</li><li>• Evening classes (1)</li><li>• Opportunity to gain work-based / vocational qualifications (1)</li><li>• Complete a technical certificate qualification (1)</li><li>• Study for a foundation degree / level 4 qualification (1)</li><li>• Online mentoring and coaching services (1)</li><li>• Workplace mentor / coach / trainer (1)</li><li>• Communication/online course (1)</li><li>• 'On the job' training (1)</li></ul>	<b>(3)</b>

Question Number	Answer	Mark
<b>22</b>	1 mark for each valid point <ul style="list-style-type: none"><li>• Can be stored electronically (1)</li><li>• Can be transmitted electronically (1)</li><li>• Can be adapted/alterd/revise easily (1)</li><li>• Can be adjusted depending on conditions (1)</li><li>• Can be used to simulate different staffing levels (1)</li><li>• Can save time over other methods (1)</li><li>• Schedules can be modelled (1)</li><li>• Calculations are done by computer, reducing human error (1)</li></ul>	<b>(4)</b>

Question Number	Answer	Mark
<b>23(a)</b>	<p>1 mark for each valid point</p> <ul style="list-style-type: none"> <li>• Provide PPE (1) (<i>1 mark max. for multi PPE statements</i>)</li> <li>• Provide training for staff (1)</li> <li>• Ensure equipment is safe to use (1)</li> <li>• Display appropriate signage (1)</li> <li>• Access to relevant legislation (1)</li> <li>• Provide first aid facilities (1)</li> <li>• Implement safe working procedures (1)</li> <li>• Ensure fire exits/extinguishers/first aid are provided (1)</li> <li>• Ensure a clean/uncluttered working environment (1)</li> </ul> <p>DO NOT ACCEPT RISK ASSESSMENT</p>	<b>(2)</b>

Question Number	Answer	Mark
<b>23(b)</b>	<p>1 mark for each stage identified</p> <ul style="list-style-type: none"> <li>• Identify the hazards (1) (DO NOT ACCEPT RISK)</li> <li>• Decide who might be harmed / injured / property which could be damaged (1)</li> <li>• Evaluate risks AND decide on precautions / identify PPE (1)</li> <li>• Record findings and apply them / write down results and follow guidance (1)</li> <li>• Review and update as needed (1)</li> </ul>	<b>(5)</b>

Question Number	Answer	Mark
<b>24</b>	<p>Any three valid points for 1 mark each (max 3 marks)</p> <ul style="list-style-type: none"> <li>• considering cost of production (1)</li> <li>• capacity to produce (staffing/equipment/machinery etc)(1)</li> <li>• cost to buy from a supplier (1)</li> <li>• availability from suppliers (1)</li> <li>• is the part made elsewhere? (1)</li> <li>• ability of supplier to meet demand (1)</li> <li>• experience to produce in-house (1)</li> <li>• reputation of supplier (1)</li> <li>• effect on ongoing production (1)</li> <li>• can the tooling be used for other projects (1)</li> <li>• how long will it take to produce the product (1)</li> <li>• can suppliers provide products of the desired quality (1)</li> </ul>	<b>(3)</b>

Question Number	Answer	Mark
<b>25</b>	Any three valid points for 1 mark each (max 3 marks) <ul style="list-style-type: none"><li>• set the quality criteria (1)</li><li>• decide on quality checks needed (1)</li><li>• checking/testing (of products) against quality standards (1)</li><li>• collate results of quality checks (1)</li><li>• analyse results (1)</li><li>• identify corrective measures which might be needed (1)</li><li>• carry out training on quality issues (1)</li><li>• publish quality performance / data (1)</li></ul>	<b>(3)</b>

## SECTION C

Question Number	Answer	Mark
<p><b>26(a)</b></p>	<p>1 mark for each valid point for what a standing plan is (max 3) 1 mark for appropriate benefits (max 3)</p> <p>Marks awarded for:</p> <ul style="list-style-type: none"> <li>• ongoing plans used frequently (1)</li> <li>• used for repeated activities (1)</li> <li>• used when activities are similar (1)</li> <li>• they focus on processes and activities (1)</li> <li>• examples could be SOPs and fire evacuation procedures (1)</li> <li>• reduces time needed for producing plans (1)</li> <li>• processes/procedures can often be repeated (1)</li> <li>• can be used over and over again (1)</li> <li>• broad guidelines can be adapted for individual situations (1)</li> </ul> <p>Model answer:</p> <p><i>This is used when activities are similar (1). They benefit an engineering company by reducing the time needed to create plans (1). They are often used for fire evacuation procedures (1) as they can be used over and over again (1).</i></p> <p style="text-align: center;">---</p> <p><i>A standing plan is a company document (1) possibly in the form of guidance (1) that sets out a range of actions that are likely to be acceptable (1) and used over and over again as needed (1).</i></p> <p><i>Benefits of using a standing plan include a management time reduction in writing plans (1) and ensures procedures are followed in an approved company manner (1).</i></p>	<p><b>(4)</b></p>

Question Number	Indicative Content
26(b)	<p><b>Advantages</b></p> <p>Issue</p> <ul style="list-style-type: none"> <li>• Allows company to concentrate on focus activities</li> </ul> <p>Development</p> <ul style="list-style-type: none"> <li>• Saves time and money</li> <li>• Reduces overheads</li> <li>• Allows poorly managed operations to be controlled</li> </ul> <p>Issue</p> <ul style="list-style-type: none"> <li>• Allows company to have more flexibility with staffing</li> </ul> <p>Development</p> <ul style="list-style-type: none"> <li>• Skills can be brought to the company from outside companies</li> <li>• Staff have skills to be used where they are needed</li> <li>• Core staff have the skills needed for production</li> </ul> <p>Issue</p> <ul style="list-style-type: none"> <li>• Allows company to have more flexibility with staffing</li> </ul> <p>Development</p> <ul style="list-style-type: none"> <li>• Skills can be brought to the company from outside companies</li> <li>• Staff have skills to be used where they are needed</li> <li>• Core staff have the skills needed for production</li> </ul> <p>Issue</p> <ul style="list-style-type: none"> <li>• Can be more cost effective for the company</li> </ul> <p>Development</p> <ul style="list-style-type: none"> <li>• Reduces staffing requirements for non-core activities</li> <li>• Reduces the need to have large premises</li> <li>• Reduced overheads allows the company to be more competitive</li> </ul> <p><b>Disadvantages</b></p> <p>Issue</p> <ul style="list-style-type: none"> <li>• Loss of internal /direct control</li> </ul> <p>Development</p> <ul style="list-style-type: none"> <li>• Quality could be lower than expected</li> <li>• Security/confidentiality could be breached</li> <li>• Trends may not be noticed early</li> </ul> <p>Issue</p> <ul style="list-style-type: none"> <li>• Can be expensive for the business</li> </ul> <p>Development</p> <ul style="list-style-type: none"> <li>• Contracted service could cost more than work being done in-house over time</li> <li>• Any failure of the contracted company will impact the business</li> <li>• Existing staff may feel demotivated</li> </ul>

<b>Level</b>	<b>Mark</b>	<b>Descriptor</b>
	<b>0</b>	No rewardable material
<b>1</b>	<b>1-2</b>	Learner identifies the issue(s) with no development OR identifies and develops one issue. Shows limited understanding of the issues.
<b>2</b>	<b>3-4</b>	Learner identifies some issues with associated developments showing some understanding of the issues. The learner uses some technological terms and shows some focus and organisation.
<b>3</b>	<b>5-6</b>	Learner identifies a range of issues with associated developments showing a detailed understanding of the issues, including those associated with the conflict between benefits and disadvantages. The learner uses a range of appropriate technological terms and shows good focus and organisation.

Question Number	Answer	Mark
27	<p>1 mark for valid point made</p> <ul style="list-style-type: none"> <li>• Protect workers from accidents (1) by stopping access to the risk area (1)</li> <li>• Preventing crushing/amputations/ burns/blindness (1) by isolating the machinery when the guard is in place (1)</li> <li>• Stops the machine if the guard is removed (1) by activating a sensor (1)</li> <li>• Guard features interlocks (1) and disables the power if not closed (1)</li> <li>• Prevents excessive damage/injuries from flying objects (1) by creating an enclosed workspace envelope (1)</li> <li>• Prevents entanglement/trapping of limbs (1) by restricting access to moving parts (1)</li> </ul> <p>Model answer:  <i>Guard should be fitted to protect workers from rotating and moving parts (1) or items being ejected (1). Interlocks should be included (1) to stop the movement when guard is opened (1).</i></p>	(4)

Question Number	Indicative Content
28	<p><b>Batch</b></p> <p>Issue</p> <ul style="list-style-type: none"> <li>• A set/specified number of products are made</li> </ul> <p>Development</p> <ul style="list-style-type: none"> <li>• Batches are made as required</li> <li>• Usually a relatively low number made</li> <li>• Often used where product trends change</li> </ul> <p>Issue</p> <ul style="list-style-type: none"> <li>• Products are made on a production line</li> </ul> <p>Development</p> <ul style="list-style-type: none"> <li>• Workers tend to be semi-skilled</li> <li>• Components are bought in</li> <li>• Manufacture combines manual and automated equipment</li> <li>• Tends to use general equipment</li> <li>• Jigs and fixtures can be effectively deployed</li> </ul> <p>Issue</p> <ul style="list-style-type: none"> <li>• Production is flexible</li> </ul> <p>Development</p> <ul style="list-style-type: none"> <li>• Staff/equipment can be switched from one job to another</li> <li>• Production can adapt to changes in demand/customer need</li> <li>• Batches can be made for specific customers</li> </ul> <p>Issue</p> <ul style="list-style-type: none"> <li>• Production is linked to customer demand</li> </ul> <p>Development</p> <ul style="list-style-type: none"> <li>• Products are only produced when there is demand for them/orders are placed</li> <li>• This reduces the need to hold extensive stocks of materials/end products</li> <li>• Reduces the financial risk of over production.</li> </ul> <p><b>Continuous Flow</b></p> <p>Issue</p> <ul style="list-style-type: none"> <li>• Production tends to run 24/7/quantities are not specified</li> </ul> <p>Development</p> <ul style="list-style-type: none"> <li>• Changes are not made during production</li> <li>• Production uses expensive machinery</li> <li>• Production line is often semi-automated</li> </ul> <p>Issue</p> <ul style="list-style-type: none"> <li>• Labour costs are low</li> </ul> <p>Development</p> <ul style="list-style-type: none"> <li>• Staff tend to be low skilled or unskilled</li> </ul>

	<ul style="list-style-type: none"> <li>• More investment in equipment than staff</li> <li>• Often low staff morale</li> </ul> <p>Issue</p> <ul style="list-style-type: none"> <li>• Automated production lines</li> </ul> <p>Development</p> <ul style="list-style-type: none"> <li>• CNC equipment is used for manufacturing</li> <li>• Quality control checks throughout production</li> <li>• Staff tend to look after machines rather than operate them</li> </ul>
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<b>2</b>	<b>3-4</b>	Learner identifies some issues with associated developments showing some understanding of the issues. The learner uses some technological terms and shows some focus and organisation.
<b>3</b>	<b>5-6</b>	Learner identifies a range of issues with associated developments showing a detailed understanding of the issues, including those associated with the both batch and continuous flow. The learner uses a range of appropriate technological terms and shows good focus and organisation.

