

## 1145-532 February 2018

Q	Acceptable answer(s)	Guidance	Max mks	Ref
1a)	<p>1 mark for <b>each</b> of the stated responsibilities and 1 mark for a reason for its importance, up to a <b>maximum</b> of 8 marks</p> <ul style="list-style-type: none"> <li>• Behave and work safely (1) so as not to harm self or anyone in the vicinity (1).</li> <li>• Not to attempt any work unless properly trained and authorised to do so (1) as this would significantly increase the risk of an accident when using a process (1).</li> <li>• Co-operate with the employer in the health and safety measures put in place (1) as this is a requirement of the Health and Safety at Work Act 1974 (1).</li> <li>• Not to remove machine guards (1), as this may increase the risk of injury when using a process <b>OR</b> would interfere with safety devices put in place to comply with the law (1).</li> <li>• Not to remove or inappropriately discharge fire extinguishers (1), as this may prevent action to stop a fire <b>OR</b> would interfere with safety devices put in place to comply with the law (1).</li> <li>• To report hazards (1), allowing action to be taken to reduce the risk to others (1).</li> <li>• Any other appropriate response.</li> </ul>		8	307 1.3 AO2
1b)	<p>1 mark for <b>each</b> of the following up to a <b>maximum</b> of 4 marks.</p> <ul style="list-style-type: none"> <li>• This means that the risk must be judged or evaluated against the trouble, time or money to control it.</li> <li>• Some hazards are managed rather than eliminated, so there may still be some risk to workers when carrying out an activity.</li> <li>• Multiple different actions may be required to carry out a single activity – machine guarding, safe working procedures, training etc.</li> </ul>	<b>Do not award marks for rewording the question.</b>	4	307 1.4 AO2

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	<ul style="list-style-type: none"> <li>Personal protective equipment may be needed as a last line of defence to reduce the risk of injury if a hazard is encountered.</li> <li>Any other relevant response.</li> </ul>			
<b>2a)</b>	1 mark for any of: oxy-fuel, plasma or laser cutting.		<b>1</b>	307 2.4 AO1
<b>2b)</b>	<p>Award 1 mark per step for <b>up to three</b> steps in the operation of the process named in a), for example for plasma cutting</p> <ul style="list-style-type: none"> <li>Return clamp is attached to the workpiece (to create a circuit).</li> <li>Electric arc is passed through a gas / a plasma of ionised gas is created.</li> <li>The plasma is moved along the cut line either using a manual torch <b>OR</b> by a CNC machine.</li> <li>The material being cut is allowed to cool. The material surface may be dressed or machined.</li> </ul>		<b>3</b>	307 2.4 AO1
<b>3a)</b>	<p>1 mark for <b>each</b> of the following up to a <b>maximum</b> of 4 marks.</p> <ul style="list-style-type: none"> <li>Developments in materials.</li> <li>Developments in processes.</li> <li>Market research.</li> <li>Assessment of competitors' products.</li> <li>The need for competitive advantage.</li> <li>Entrepreneurs.</li> <li>Desire for profit.</li> <li>Any other suitable point.</li> </ul>		<b>4</b>	308 1.2 AO1
<b>3b)</b>	<p>a) Award marks as indicated below, up to a <b>maximum</b> of 8 marks.</p> <ul style="list-style-type: none"> <li>Can reduce the time required to carry out domestic activities (1), facilitating a family member to have extra time to take up employment outside of the home (1).</li> <li>May improve levels of hygiene (1) reducing the risk of illnesses such as food poisoning (1).</li> <li>Can increase pressure to own the products as a social norm (1) requiring certain levels of income to be obtained (1).</li> </ul>	<p><b>They may have any number of the bullet points – each is split nominally by subject content, but if they cover any of the identified points they will get the marks.</b></p>	<b>8</b>	308 1.3 AO2

	<ul style="list-style-type: none"> <li>• Can increase time available for leisure activities (1), increasing demand on appropriate resources and facilities (1).</li> <li>• May reduce the opportunities for employment in service roles (for example, washing up or food preparation in cafes and restaurants) (1).</li> <li>• May increase demand for energy (1), pushing more people into energy poverty (1) and resulting in pollution from energy generation (1) which may affect health and well-being (1).</li> <li>• May result in changes in eating habits (for example, the availability of juicers leading to an increase in juice consumption) (1) with effects on health (1).</li> <li>• Any other suitable point.</li> </ul>			
<b>4</b>	<p>1 mark for <b>each</b> of the following objectives and 1 mark for a reason for its importance, up to a <b>maximum</b> of 8 marks.</p> <ul style="list-style-type: none"> <li>• Improving production processes or developing new processes (1) to increase output/reduce cost/improve product quality (1).</li> <li>• Improving materials or developing new materials (1) to improve product properties/reduce cost/improve product quality/reduce environmental impact (1).</li> <li>• Reducing product failure rates (1) to improve product quality/improve product life/reduce manufacturing costs (1).</li> <li>• Improving performance over existing products (1) to gain a competitive advantage (1).</li> <li>• Product testing in a user environment (1) to ensure that products meet the customer needs (1).</li> <li>• Any other appropriate response.</li> </ul>		<b>8</b>	308 2.1 AO2
<b>5a)</b>	<p>1 mark for <b>each</b> of the following up to a <b>maximum</b> of 4 marks.</p> <ul style="list-style-type: none"> <li>• Occurs at elevated temperatures.</li> <li>• Occurs in absence of oxygen (or removal from the process).</li> <li>• Thermo-chemical decomposition occurs.</li> </ul>		<b>4</b>	308 3.2 AO1

	<ul style="list-style-type: none"> <li>Physical phase is normally changed simultaneously (i.e. produces gas and/or liquids from solid material).</li> <li>Could also be carried out as a precursor to, or part of, the gasification process.</li> </ul>			
<b>5b)</b>	<p>Award marks as indicated below, up to a <b>maximum</b> of 8 marks.</p> <ul style="list-style-type: none"> <li>Increased production of fuel oil by pyrolysis could reduce demand on fossil fuel (1) which in a non-renewable/finite resource (1), also reducing the risk of pollution during oil production (1).</li> <li>Could be used to process biomass into biofuel (1), reducing the need to dispose of biological waste from other industries (1).</li> <li>Specific crops (such as switchgrass) could be grown to provide biomass for processing using this technology (1). This could result in changes to local ecology and habitats in the farming environment (1).</li> <li>Could allow the processing of plastic waste materials that would reduce the need for landfill (1) or even allow existing landfill to be used as a resource (1), freeing up land for other purposes (1) and reducing local pollution (1). Similarly, it could reduce the dumping of plastic waste at sea (1) which presents a significant risk to wildlife (1). The fuel oil produced from plastic may contain less sulphur and other adverse elements (1), causing less pollution at the point of use (1).</li> <li>Requires energy sources to be carried out (1), although these could be from sustainable or renewable sources (1).</li> <li>Any other suitable response.</li> </ul>	<p><b>They may have any number of the bullet points - each is split nominally by subject content, but if they cover any of the identified points they will get the marks.</b></p>	<b>8</b>	<p><b>308</b> <b>3.2</b> <b>AO2</b></p>
<b>6</b>	<p><b>Intention:</b> <i>To elicit responses that demonstrate how knowledge and understanding across a range of areas relate to the question context. For example, this may involve application of knowledge and understanding of the reasons for customer requirements and resultant manufacturing developments, and how each have influenced social and economic considerations.</i></p>	<p><b>Indicative content</b> Examples of points that may be included in the answer are:</p> <ul style="list-style-type: none"> <li>Stakeholders include the public, companies producing or using the technologies (and their competitors using established alternative processes), the government,</li> </ul>	<b>12</b>	<b>AO4</b>

<p><b>Band descriptors</b> Award marks as follows:</p> <p>No answer worthy of credit – e.g. insufficient work submitted, answer not relevant to the question, answer is factually incorrect.</p> <p style="text-align: right;"><b>(0 marks)</b></p> <p><b>Band 1 – basic</b> – largely descriptive response based on recall of knowledge, stating the influence of only one stakeholder on the implementation of one type of low carbon technology. Candidates at the top of this level may be characterised by showing some understanding of why stakeholders are affecting the implementation, either positively or negatively.</p> <p style="text-align: right;"><b>(1-4 marks)</b></p> <p><b>Band 2 – clear</b> – more detailed response, covering a variety of different stakeholders and low carbon technologies. Shows recall of knowledge about the low carbon technologies and understanding of most of the reasons why stakeholders may affect the implementation, with analysis of some reasons. Candidates at the top of this level may be characterised by evidence that they have considered and analysed a variety of requirements for each stakeholder.</p> <p style="text-align: right;"><b>(5-8 marks)</b></p> <p><b>Band 3 – detailed</b> – fully detailed response showing awareness of a broad range of stakeholders and low carbon technologies, with analysis of the reasons for most of the potential impacts by stakeholders. The effects of different stakeholders are evaluated, with substantiation of which stakeholders are likely to have the greatest influence, making recommendations and producing supporting conclusions. Candidates at the top of this level may be characterised by analysing and evaluating the conflicting views and requirements of individual stakeholders and how these will impact the implementation of a range of low carbon technologies.</p> <p style="text-align: right;"><b>(9-12 marks)</b></p>	<p>local councils, environmental organisations etc.</p> <ul style="list-style-type: none"> <li>• Consumer preferences based on the perceived environmental impact of the product or company.</li> <li>• Different stakeholders may have different responses to different technologies.</li> <li>• Practical issues such as the identification of suitable sites and planning the construction of low carbon technology facilities.</li> <li>• Planning applications may be required. Members of the public may object to having facilities such as wind power generators close to communities for aesthetic reasons.</li> <li>• The advantages or disadvantages of specific low carbon technologies for specific stakeholders, for example: a power generation company may favour wind turbines because they have no fuel costs; an ecologist may dislike wind turbines because of the effect they have on the local avian population; local householders may dislike wind turbines because of the effect it will have on their view, etc.</li> <li>• Any other relevant point.</li> </ul> <p><b><i>For no awardable content, award 0 marks.</i></b></p>
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