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Mark Scheme (Results)

Summer 2015

Pearson Edexcel GCSE
in Manufacturing & Engineering (5EM03)
Paper 3D: Engineering Fabrication

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General Marking Guidance

- All learners must receive the same treatment. Examiners must mark the first learner in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Learners 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 learner'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 learner's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the learner has replaced it with an alternative response.
- Mark schemes will indicate within the table where, and which strands of QWC, are being assessed. The strands are as follows:

  i) Ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear

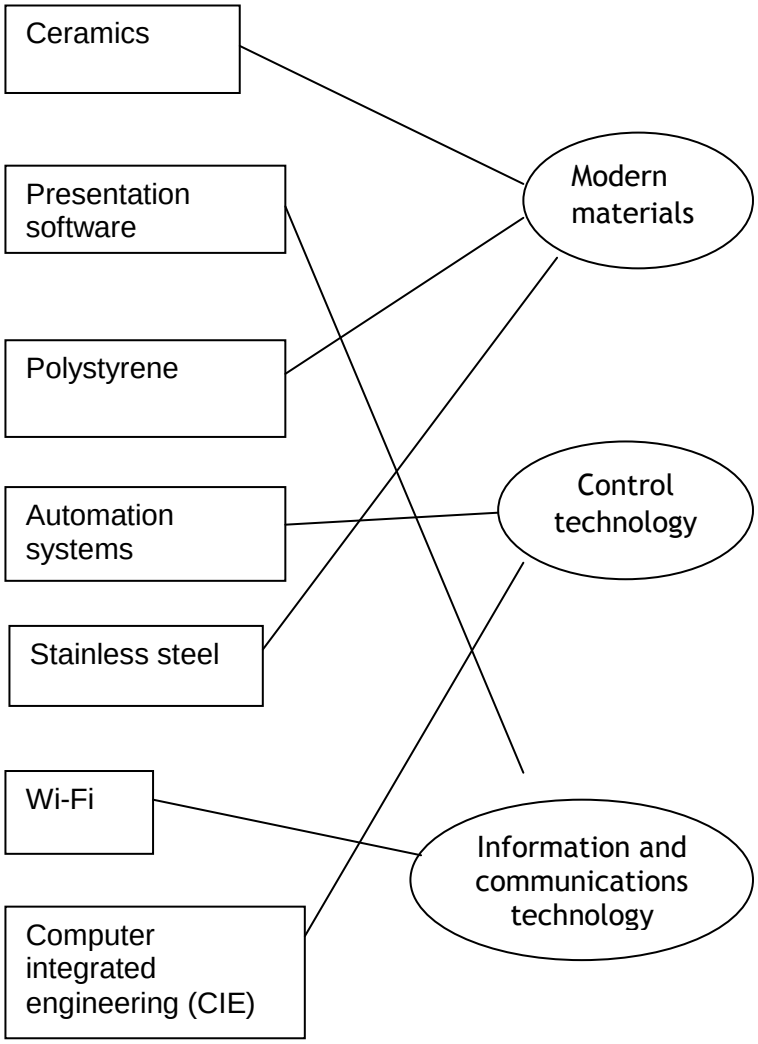
  ii) Select and use a form and style of writing appropriate to purpose and to complex subject matter

  iii) Organise information clearly and coherently, using specialist vocabulary when appropriate.

Question	Answer	Mark
1(a)	• Barbeque • Garage door *If 3 boxes or more crossed - no marks.* (2 x 1)	**(2)**
1(b)	• Manhole cover • Tin snips *If 3 boxes or more crossed - no marks.* (2 x 1)	**(2)**
		(Total 4 marks)

Question	Answer	Mark
2(a) 1	• Centre punch • Centre pop • Dot punch Do not accept 'punch' on its own *Accept any recognisable spelling (phonetic) of the answer above* (1 x 1)	
2(a) 2	• Tap wrench • Tap holder Do not accept 'clamp', 'holder' or 'wrench' on its own *Accept any recognisable spelling (phonetic) of the answer above* (1 x 1)	**(2)**
2(b)	An answer that makes reference to two of the following points: • To measure external dimensions/diameters/sizes (1) • To measure precisely/accurately (1) • Uses a ratchet to get the correct feel when measuring (1) • To measure from 0-25mm (1) • Used with slip gauges/standards (1) • Can make a good comparator (1) • The barrel is tightened by hand (1) *Accept any other appropriate response* e.g. a piece of equipment that is used for measuring external diameters (1) with a high degree of accuracy (1) (1 x 2)	**(4)**

	An answer that makes reference to two of the following points: • A work holding device (1) • Used to support a product when marking out (1) • Used to support a product when machining (1) • Allows you to set a product at a range of angles (1) • Allows you to clamp/hold irregular shapes (1) • Can be used as a jig/fixture in batch production (1) • Has slots to allow for easy clamping of products (1) *Accept any other appropriate response* e.g. A work holding device (1) that allows you to set components at a range of angles (1). (1 x 2)	
		(Total 6 marks)

Question	Answer	Mark
3	Key terms linked to a key area  *No mark awarded where 2 or more lines are drawn from a term. Lines do not have to be straight but term and key area must be clearly linked.* (7 x 1)	**(7)**
		(Total 7 marks)

Question	Answer	Mark
4(a)	Appropriate two **products** such as e.g. • Skateboard • Office stapler • Lawn sprinkler • Shopping trolley • Hole punch • Golf trolley • Mechanics Vice • Wheelbarrow • Darts • Mountain Bikes A brand name of a specific product is acceptable *This list is not exhaustive; accept any product associated with the engineering fabrication sector that uses modern materials in its manufacture.* (2 x 1)	**(2)**
4(b)(i)	• Skateboard – aluminium alloy • Office stapler – hardened steel • Lawn sprinkler - polystyrene • Shopping trolley – stainless steel • Hole punch – mild steel • Golf trolley - aluminium • Mechanics Vice – cast iron • Wheelbarrow - nylon • Darts - brass • Mountain Bikes - titanium *Accept any other appropriate response* (1 x 1)	**(1)**

Question	Answer	Mark
4(b)(ii)	One mark for identifying each benefit One mark for each explanation • Better functional characteristics (1) - weight (1) / size (1) / protection (1) / rigidity (1) / flexibility (1)/ comfort (1) • Better wear characteristics (1) - strength (1) / durability (1) • Better aesthetic characteristics (1) - surface finish (1) / texture (1) / colour (1)/ appearance (1) • Meets consumer needs (1) – appeal to target audience (1) • Better quality (1) – consistency (1) / reliability (1) • Reduced weight (1) – better strength to weight ratio (1) • Reduced price (1) – better value for money (1) Any other appropriate functional / aesthetic characteristic relating to the benefit e.g. bicycle - improves strength to weight ratio (1) so the cyclist can ride faster for longer (1) *No answer or incorrect answer to 4(b)(i) no marks for 4(b)(ii)* *Low response (1) or two low responses (2) or detailed response (2), for each of the 2 benefits* (2 x 2)	**(4)**

4(c)(i)	Must be related to the sector • Polymorph (1) • Shape memory alloys (1) • Smart wire (1) • Memory wire (1) • Smart springs (1) • QTC – Quantum Tunnelling Composite (1) • Nitinol (1) • Piezoelectric (1) • Ionic polymers (1) • Magneto / electro – rhological fluids / ferrofluids (supermagnets) (1) • Smart grease (1) • Anodised aluminium (1) • Phosphorescent pigments (1) • Thermochromic inks (1) • Hydrochromic inks (1) • Photochromic inks (1) • Or other appropriate smart material (1) Accept the same answer as given in 4(b)(i) if it is a sector based smart material (1 x 1)	**(1)**
4(c)(ii)	One mark for a characteristic One mark for the description • Polymorph - is a thermoplastic material that can be shaped and reshaped any number of times (1) and fuses together when heated (1) • Shape memory alloys – a material that "remembers" its original shape (1) returning to the pre-deformed shape when heated (1) • Smart wire - changes its length/creates a useful pulling force (1) when a small current is passed through it (1) • Memory wire – an alloy that remembers its shape (1) and returns to the pre-deformed shape when heated (1) • Smart springs – a spring that at room temperature can be pulled apart (1) and return to its original state they need a constant electricity supply/they need heat to make the wire return it to its original state (1) • QTC – Quantum Tunnelling Composite – a composite of metals and elastomer binders (1) that enables it to act as a delicate pressure sensor (1) • Nitinol - undergoes deformation at one	**(2)**

	temperature (1) then recover its original, un-deformed shape upon heating above its transformation temperature (1) • Piezoelectric – a material that when has an applied stress (1) will generate a voltage (1) • Ionic polymers - synthetic composite material that display behaviour (1) under an applied voltage (1) • Magneto / electro – rhological fluids / ferrofluids (supermagnets) – a fluid made of magnetic nanoparticles (1) which becomes strongly magnetised when in a magnetic field (1) • Smart grease – can control movement (1) producing a dampened, slowed down feeling (1) • Anodised aluminium (1)- if scratched (1) repairs its own coating (1) • Phosphorescent pigments – a material that absorbs radiation (1) then re-emits the radiation later (1) • Thermochromic inks - inks that will change colour (1) when subjected to a change in temperature (1) • Hydrochromic inks - is a type of ink that changes colour (1) if water has been applied (1) • Photochromic inks - inks that have pigments that react (1) to changes in light levels (1) Accept any other appropriate response *If no answer or incorrect answer to 4(c)(i) no marks for 4(c)(ii)* (1 x 2)	
		(Total 10 marks)

Question	Answer	Mark
5(a)(i)	*An answer that makes reference to three of the following points, including an example:* • A global network of computers (1) • A means of transferring data (1) • A means of collecting data (1) • A means of accessing data (1) • A communication tool (1) • An easy-to-use interface (1) • A system which uses TCP/IP (Transmission Control Protocol/Internet Protocol) (1) • A network that includes web pages and large files that might be digital videos, music files or computer programs (1) • A tool that can be used to send email (1) • A tool that can be used to transfer files (1) *Accept any appropriate response* *e.g. a global network of computers (1) which allow data to be transferred internationally (1) such as images, music files and emails (1)* (3x1)	(3)
5(a)(ii)	One mark for disadvantage One mark for extension • Expected to be continually available (1) increased stress (1) • Staff time wasted (1) lowers productivity (1) • Overrates the performance of the company (1) Not meeting customer expectations / loss of personal contact / less direct communication (1) • Online data can be hacked / viruses introduced (1) loss/corruption of data (1) • Presumes a certain level of IT skills (1) staff need training (1) • Replaces research skills (1) Knowledge base lost / loss of innovative solutions (1) • Systems failure/power loss/loss of connection (1) causing disruption to manufacturing (1) *Accept any other appropriate response* *Disadvantages must relate to the manufacturer* (1x2)	(2)

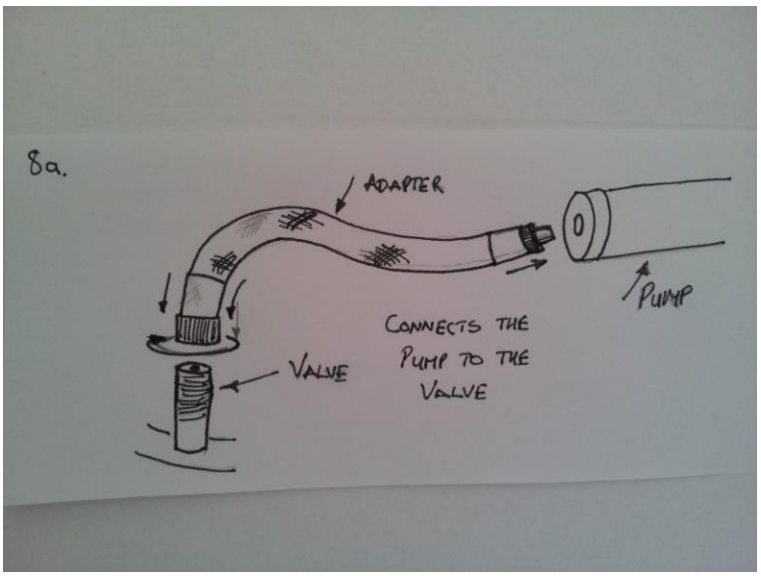
Question	Answer	Mark
5(b)(i)	• Mobile phone/infrared/bluetooth • Video conferencing • Voice over Internet Protocol (VoIP) • Electronic point of sale (EPOS) • EDI • ISDN • Texting • Phone • Walkie talkie • Fax • Smart phone • Tablet • Near field communication (NFC) • Email • WIFI *Accept any appropriate response* *Accept Brand names of the above* (1x1)	(1)
5(b)(ii)	One mark for identifying the benefit One mark for the extension • Mobile phone/infrared/Bluetooth - flexibility (1) roaming location (1) • Video conferencing – no travel expenses (1) less time wasted in travel (1) • Voice over Internet Protocol (VoIP) - no travel expenses (1) less time wasted in travel (1) • Electronic point of sale (EPOS)/EDI – immediate transfer of information (1) no hard copies needed (1) • ISDN – more data transferred in parallel (1) quicker (1) • Texting – stored record of transaction (1) accountable (1) • Phone – immediate two way conversation (1) clarity (1) • Walkie talkie – flexibility (1) roaming location (1) • Fax – hard copy record (1) quick transfer of data (1) • Smart phone - immediate (1) access to vast amounts of information (1) • Tablet - flexibility (1) roaming location (1) • Near field communication (NFC) – fast data transfer (1) over short distances / between two devices (1) • Email – permanent record (1) for audit	(2)

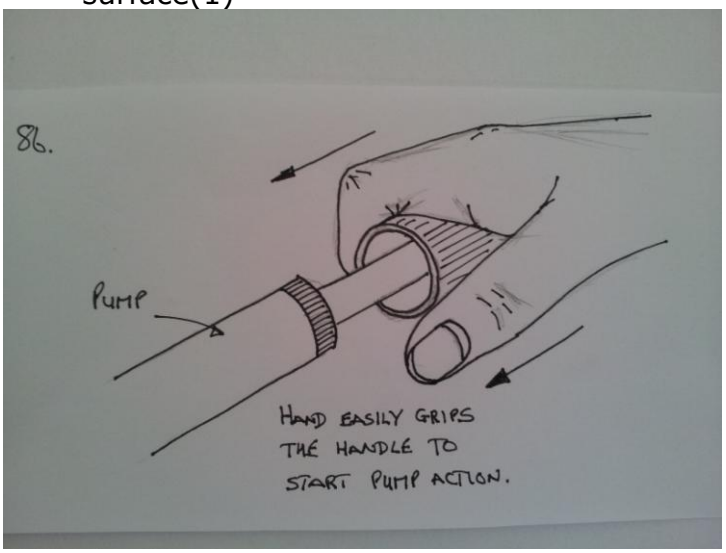
Question	Answer	Mark
	purposes / attaching documents (1) • WIFI – convenient access (1) in a wide variety of locations (1) Other advantages may be seen in light of: Speed, accuracy, information retrieval, meets consumer demands, quicker, increased sales, reduced stock levels, reduced business costs, reduced lead times, calculation of sales, storage space reduced or any other appropriate response. Advantages must relate to the distributor *No answer or incorrect answer to 5(b)(i) no marks for 5(b)(ii)* (1x2)	
		(Total 8 marks)

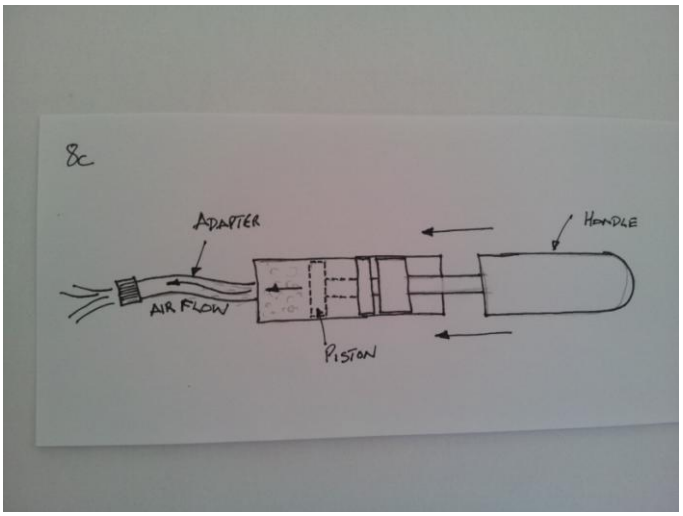
Question	Answer	Mark
6(a)(i)	• Lifting heavy goods (1) • Transfer of goods around factory (1) • Pick and place (1) • Assembling parts/products (1) • Automatic positioning/cutting of parts/products (1) • Welding (1) • Loading machines (1) • Loading lorries (1) • Painting products (1) Accept any other appropriate response. (1x1)	(1)
6(a)(ii)	One mark for each disadvantage One mark for each extension • High set-up costs (1) – purchasing of equipment (1) • High training costs (1) – new skills required (1) • Long set-up time (1) – time needed for new practices to be implemented (1) • Extra space needed (1) – older style factories may not be set up appropriately (1) • Reputation may suffer (1) – due to making staff redundant (1) • They require regular maintenance (1) from specialist technicians (1) • Incorrect programming (1) leads to repetitive mistakes (1) • Increased energy usage (1) leading to high emissions (1) Accept any other appropriate response. (2x2)	(4)

6(b)	One mark for identifying feature One mark for extension • Uses closed-loop processes (1) based on real time inputs (1) • A manufacturing system is linked together (1) using a CAD/CAM interface (1) • Using computers/PLCs/microcontrollers to control an entire production process (1) with constant exchange of information (1) • The whole process is controlled (1) by embedding computers in the system (1) • An integrated system using computers (1) to monitor and control the manufacturing processes (1) • Suppliers can be integrated into the system (1) facilitating just-in-time techniques (1) Accept any other appropriate response. (2x2)	(4)
		(Total 9 marks)

Question	Answer	Mark
7(a)	An answer that makes reference to any of the following points: • Know how many units are to be produced (1) • Plan stock levels (1) • Quantity of materials / components required for each unit (1) • Can order in time (1) • Quantity of materials / components already in stock (1) • Can amend new materials orders (1) • Cost of materials / components (1) • Can budget accordingly (1) • Supplier of materials / components (1) • Ease supplier relations (1) *Accept any other appropriate response* e.g. *The manufacturer would need to know how many units are required (1) to be able to plan stock levels (1) and inform suppliers earlier in the chain (1). This allows the manufacturer to budget accordingly (1).* *4 x 1 marks for 4 low responses, or up to 4 marks for a detailed response* (1 x 4)	**(4)**
7(b)	One mark for each benefit One mark for each extension • Accurate information (1) – updated regularly (1) • Fast access to data (1) – search/sort/query (1) • Effective goods tracking (1) – barcoding/EPOS (1) • Fast distribution (1) – fast delivery details (1) • Detailed information (1) – high storage space (1) • Improved planning (1) – short lead times (1) • Forecasting (1) – collects volumes of data/modelling (1) • Cost of control (1) – better scheduling (1) • Waste control (1) – process monitoring/control (1) • Reduced stock holding(1) – tracks trends/JIT (1) *Accept any other appropriate response* (1x2)	**(2)**
		(Total 6 marks)
	Total Marks for Section A	**50**

Question	Answer	Mark
8(a)	An answer that makes reference to any of the following points: • To connect the bike with the pump(1) • To allow air travel through to inflate the tyre (1) • Its flexible to allow the user to pump the tyres in different places (1) • To fit onto the bike valve (1) • To attach to the pump (1) • To act as a location when attaching to the bike (1)  *Accept any other appropriate response* *Must have notes and sketches (notes or sketches only maximum 2 marks)* *1 x 1 mark low response, or up to 3 marks for detailed response* (3 x 1)	**(3)**

8(b)	An answer that makes reference to any of the following points: • To allow the user to hold the pump (1) • To initiate the pumping action to inflate the tyre (1) • To house the adapter when finished(1) • To prevent trapping injuries by having a larger diameter than the hand pump body (1) • To house the return spring (1) • To provide easier grip by having a textured surface(1)  Accept any appropriate response. *Must have notes and sketches (notes or sketches only maximum 2 marks)* *1 x 1 mark low response, or up to 3 marks for detailed response* (3 x 1)	**(3)**

8(c)	An answer that makes reference to any of the following points: • To create a seal to allow the air to be pumped out(1) • To push the air out of the pump(1) • To allow air to be sucked in when drawn back (1) • To provide mechanical advantage as less force is required to pump (1) • The piston is a non-return valve (1)  Accept any appropriate response. *Must have notes and sketches (notes or sketches only maximum 2 marks)* *1 x 1 mark low response, or up to 3 marks for detailed response* (3 x 1)	**(3)**
		(Total 9 marks)

Question	Answer	Mark
9(a)(i)1	• Marketing (1 x 1)	
9(a)(i)2	• Processing and production • Production and processing • Processing • Production (1 x 1)	**(2)**
9(a)(ii)	• Assembly and finishing • A and F • Finishing • Assembly • Stage 6 / six • Six / 6 (1 x 1)	**(1)**
9(b)	Any three of the following points: • Development of the design brief (1) • Design specification for the mass produced bicycle hand pumps (1) • Listing design criteria (1) • Listing performance requirements (1) • Use of internet/websites to investigate existing designs (1) • Sketches are produced by hand (1) • Initial design ideas are produced (1) • Development of design ideas (1) • Modelling ideas using ICT (1) • Using CAD software (1) • Prototyping before manufacture (1) • Sourcing materials/supplies/consumables (1) • Costing resource requirements (1) • Communicating with client/customer (1) • Design modification (1) Accept any other appropriate response (3 x 1)	**(3)**

Question	Answer	Mark
9(c)	Appropriate descriptions including three of the following points(statements must be applicable to bicycle hand pumps): • Gathering together of manufactured parts (1) • Selecting correct packaging materials/equipment (1) • Pumps boxed / bagged (1) • Package boxed/sealed (1) • Labelling the packaging (1) • Bar coding/product code applied to boxed sets of products (1) • Boxes packed onto pallets (1) • Pallets/products transferred to storage/dispatch (1) • Final quality checks (1) • Packing/shipping lists (1) • Planning route for delivery (1) • Box items sent to distributors (1) • Details sent to finance department for invoicing requirements (1) • Stock control (1) *Accept any other appropriate response but must be related to the manufacture of bicycle hand pumps* (3 x 1) e.g. At this stage the bicycle hand pump would be put into the packaging (1) and put into boxes (1) and then sent to the customer (1). The details of the delivery would then be sent to the customer to ask for the money that they owe (1). *Up to 3 marks* *1 x 1 mark low response, 3 x 1 mark 3 low responses or up to 3 for detailed response*	**(3)**
		(Total 9 marks)

Question	Answer	Mark
10(a)	• Brass • Phosphur bronze • Nylon • Aluminium/ aluminium alloy Accept any other appropriate response. Do not accept 'steel'.	**(1)**
10(b)(i)	Any three of the following: • drilling • turning • milling • grinding • hardening/surface hardening • annealing/normalising • polishing/coating/painting/powder coating/plating • screen printing • cutting • injection moulding • gluing • welding • vulcanizing/braiding • stitching • pressing • threading • extrusion *Any other appropriate response* *Accept any recognisable spelling (phonetic) of the answers above* (3 x 1)	**(3)**

Question	Answer	Mark
10(b)(ii)	An explanation that makes reference to three of the following points: • quick method / fast production rate • creates a quality finish • reliable process • minimal waste • can be mass produced easily • products have consistent quality • suitable for a variety of materials • batches can be repeated • change of set up with minimum effort • produces a near complete component • built in safety system • low cost per unit Accept any other appropriate response e.g. CNC machining produce parts with a consistently quality (1) with minimal waste produced (1). A quality surface finish is produced which requires little or no further processing (1) *3 x 1 marks for 3 responses, or up to 3 marks for a detailed response* *Allow 1 mark for any combination of the following without explanation:* *faster/quicker/cheaper/easier/accurate/consistent* (3x1)	**(3)**

Question	Answer	Mark
10(c)	An explanation that makes reference to three of the following points: • Aesthetically pleasing • Available in a range of colours • Lightweight material • Parts can be mass produced easily • Low cost per unit • Complex shapes can be formed • Little waste as material can be reused • Warm to the touch • Durable • Suitable for injection moulding, vacuum forming, etc. Accept any other appropriate response e.g. *Thermoplastics are available in a range of colours (1) and they can be produced with very little waste (1) at a low cost per unit (1).* Upto 3 marks Low response (1) or three low responses (3) or detailed response (3). (3x1)	**(3)**
		(Total 10 marks)

Question	Answer	Mark
11(a)(i)	Two of the following: • Automatic quality checks carried out on finished product (1) • Sensors used to detect foreign bodies (1) • Used to combine the correct parts for assembly (1) • Used to monitor machinery is working correctly (1) • Automatic quantity checks (1) • Automatic movement (1) Accept any other appropriate response Do not accept assembling or finishing product on its own (2 x 1)	(2)
11(a)(ii)	One mark for each type One mark for each extension • PLCs (1) to control processes in production (1) • Use of conveyor systems (1) to move the bike pump from one process to the next (1) • Embedded computers (1) to perform dedicated functions (1) • Machine monitoring (1) to control quality and accuracy (1) • To improve safety (1) in hazardous conditions by using robots (1) • Use of CAM (1) to monitor whole process performance (1) Do not accept CAD or CNC on their own Accept any other appropriate response *Low response (1) or two low responses (2) or detailed* *response (2) per example* (2 x 2)	(4)

11(b)	One mark for each benefit One mark for each extension • Reduced customer complaints (1) better/consistent quality (1) • Repeatability of specification (1) due to no human involvement (1) • Reduced costs (1) as less staff are required (1) • Faster production rates (1) due to 24/7 operation (1) • Dangerous operations can be carried out (1) without risk or injury to workers (1) • Less waste produced (1) due to carefully controlled production (1) • Better process control (1) due to in-process monitoring (1) • Less energy consumed (1) due to reduction in wasted activity (1) *Accept any other appropriate response* *2 x 1 marks for 2 responses each, or 2 marks for a detailed response* *Allow 1 mark for any combination of the following without explanation:* *faster/quicker/cheaper/easier/accurate/consistent* (3 x 2)	**(6)**
		(Total 12 marks)

Question	Answer	Mark
12(a)(i)	An answer that makes reference to two of the following points: • A system for reducing waste (1) • Maximises customer value (1) • A responsive system (1) • Eliminating processes that do not add value (1) • Focuses processes and production (1) • Organising a 'flow' system of processes (1) • A system which allows processes to be flexible (1) *Accept any other appropriate response* e.g. lean manufacturing is a responsive system (1) which allows a company to minimise waste (1) (2 x 1)	**(2)**
12(a)(ii)	One mark for identifying the advantage One mark for explanation • More consistent/accurate products (1) - fewer returns (1) • Lower purchase price (1) – increased sales (1) • Shorter ordering times (1) – improved response for customer (1) • Automated ordering (1) – in-demand products available (1) • Fewer customer complaints (1) - more repeat sales (1) • Ability to order bespoke/varied products (1) – improved customer satisfaction (1) • Better communication with manufacturer (1) – less likelihood of delivery errors (1) • Receipt and movement of goods inward improved (1) – simplified tracking procedures (1) • Increased number of customer referrals (1) resulting in a larger customer base (1) *Do not accept 'easier', or 'faster/quicker' without explanation* *Low response (1) or two low responses (2) or detailed response (2), for each of the advantages* (2 x 2)	**(4)**

Question	Answer	Mark
12(b)(i)	Two of the following: • May reduce carbon emissions (1) • May result in operational efficiencies / less energy / saves fossil fuels (1) • Likelihood of reduced waste going to landfill (1) • Could produce healthier environment (1) *Accept any other appropriate response* (2 x 1)	**(2)**
12(b)(ii)	One mark for identifying benefit, one mark for extension Explain **one** benefit that this change could have on the workforce. • Healthier working environment (1) because it is cleaner (1) • Requirement to learn/use specialist techniques such as fishbone diagrams and SPC (1) contributing to worker development • Bonus payments/incentives (1) may be performance related (1) • Development of communication skills (1) as team working important (1) • Improved promotion prospects for those in post (1) as skills in demand (1) • More direct communication (1) as fewer layers of management (1) • More job security (1) as manufacturing likely to be more efficient (1) • Higher motivation (1) workers will not become tired of monotonous/repetitive jobs (1) Accept any other appropriate response (1 x 2)	**(2)**
		(Total 10 marks)

Question	Answer	Mark
13	An answer that makes reference to any of the following points: • Use suitable forms of supply to reduce waste • Reworking non-compliant products to save materials • Burn packaging materials to reclaim heat • Offcut materials being collected, re-used and placed back into the supply chain • Recover energy from the processing of materials through exhaust systems/heat exchangers • Rework materials to make new products • Recycling materials so less waste materials go to landfill • Use recycled polymers to reduce consumption of fossil fuels • Source local materials to reduce transportation costs • Using alternative forms of energy (1) to reduce the consumption of fossil fuels *Accept any other appropriate response* *Up to 4 low responses (4) or detailed response (up to 4)* (1 x 4)	**(4)**
		(Total 4 marks)

Question	Answer	Mark
14 **QWC i, ii, iii**	**Indicative content** **Indicative content** Discussion may address the following issues: • *Impact* ▪ Increased level of accuracy • *Development* ▪ Greater levels of automation allow for greater levels of control ▪ Reduction in human errors ▪ Higher level of precision from machines ▪ Automatic sensors / quality control checks ensuring the quality of the product • *Impact* ▪ Reduced wastage ▪ Automation can self-regulate and does not tire/become inaccurate • *Development* ▪ Automation allows for earlier detection of faulty goods ▪ Automation allows for automatic removal of goods not up to quality • *Impact* ▪ Move away from highly skilled manual jobs / crafts • *Development* ▪ Automation may be less efficient when making items of a bespoke standard or skill level and when carrying out one-off quality checks *Accept any other appropriate response*	**(6)**
		(Total 6 marks)

Level	Mark	Descriptor
	0	No material deserving of reward
1	**1-2**	The learner identifies at least two impacts that automation has on the quality of products or gives a brief description of one impact, and shows some understanding of the topic. The learner uses everyday language and the response lacks clarity and organisation. Spelling, punctuation and the rules of grammar are used with limited accuracy.
2	**3-4**	The learner gives a brief description of at least two impacts that automation has on the quality of products or a detailed description of one impact. The learner uses some manufacturing/technological terms and shows some focus and organisation. Spelling, punctuation and the rules of grammar are used with some accuracy. Some spelling errors may still be found.
3	**5-6**	The learner gives a detailed explanation of at least two impacts that automation has on the quality of products. The learner uses a range of appropriate manufacturing/technological terms and shows good focus and organisation. Spelling, punctuation and the rules of grammar are used with considerable accuracy.
		(Total 6 marks)
	Total Marks for Section B	**60**
	Total Marks for the whole paper for Section A & B	**110**