



LEVEL 1/LEVEL 2 AWARD MARK SCHEME

SUMMER 2015

**ENGINEERING UNIT
9793/01**

(d)	<p>Up to 6 marks available.</p> <p style="text-align: center;">circle = $\pi \times r^2$ except any other correct formula</p> <p>Area of Circle</p> <p style="text-align: center;">= $\pi \times 20^2$ = $\pi \times (20 \times 20)$ = 3.14159... \times 400 = 1256.6(to1 decimal places)</p> <p>Area of rectangle</p> <p style="text-align: center;">= w \times h = 60 \times 40 = 2400</p> <p style="text-align: center;">Surface Area Total</p> <p style="text-align: center;">1256.6 + 2400 =3656.6mm²</p>	<p style="text-align: right;">1</p> <p style="text-align: right;">1</p> <p style="text-align: right;">1</p> <p style="text-align: right;">1</p> <p style="text-align: right;">1</p> <p style="text-align: right;">1</p>
(e) (i)	<p>Up to 3 marks available for correct identification.</p> <p>Push switch (1) except switch Light emitting diode(1) except LED Resistor(1)</p>	<p style="text-align: right;">1</p> <p style="text-align: right;">1</p> <p style="text-align: right;">1</p>
(ii)	<p>Up to 2 marks available.</p> <p>Example 2 mark answer.</p> <p>A resistor is an electrical component that limits or regulates the flow of electrical current in an electronic circuit(1). Therefore protecting the LED(1). Or any other reasonable/correct response.</p>	<p style="text-align: right;">2</p>
(f)	<p>Up to 3 marks available.</p> <p>1 mark awarded for named SMART material</p> <ul style="list-style-type: none"> • Smart wire [1] • Thermo colour sheet [1] • Polymorph [1] • Conductive polymers [1] <p>Any other appropriate response. 2 marks for correct description.</p> <p>Example 2 mark answer.</p> <p>A smart material is a material or component which exhibits some kind of useful response to external changes [1], such as light, heat electric current [1].</p>	<p style="text-align: right;">1</p> <p style="text-align: right;">2</p>

<p>2 (a)</p>	<p>Up to 4 marks available.</p> <p>Indicative content.</p> <p>Can be more accurate than hand drawn designs - it reduces human error.</p> <p>You can save and edit ideas, which make it easier and cheaper to modify your design as you go along.</p> <p>You can modify existing ideas, which saves time.</p> <p>CAD files can be sent electronically.</p> <p>Or any other reasonable correct response.</p> <p>Example 4 mark answer.</p> <p>Computer aided design allows engineers to work accurately and it reduces the possibility of human error. The system allows for drawings to be produced quickly and changes to line types and lengths can be corrected easily. Different engineers can work separately on the master drawings when trying to correct a problem before making suggestions for improvement. Drawings are saved easily and the drawings can be sent to all parts of the world, which allows for meetings to take place via teleconferencing.</p>	<p>4</p>
<p>(b)</p>	<p>Up to 4 marks available</p> <p>Indicative content.</p> <p>Miniaturisation of components (1) enabling compact design (1)</p> <p>Developments with led screen technology, screens becoming thinner(1)</p> <p>New battery technologies (1) reduced size (1), increased power (1), longer battery life(1)</p> <p>Connectivity –wireless (1)</p> <p>Improved reliability (1) due to high technology manufacturing methods (1)</p> <p>Or any other reasonable response</p>	<p>4</p>
<p>(c)</p>	<p>Up to 4 marks available.</p> <p>Indicative content</p> <p>Recycling</p> <ul style="list-style-type: none"> • Waste materials are broken down and reformulated into different products e.g. thermoplastic case made into fleece clothing. • Computer parts can be stripped of their most valuable components and sold for scrap. Metals like copper, aluminium, lead, gold and palladium are recovered from circuit boards etc. • Manufactured to allow easy disassembly of components and material identification. • Reduce the number of different materials used <p>Or any other reasonable correct response.</p>	<p>4</p>

	<p>Example answer.</p> <p>Where possible, materials should be used that can be recycled,(1) e.g. the casing of the computer should be made from a thermoplastic (1)such as HDPE, polypropylene or UPVC. Circuit boards should be designed so that components can be disassembled (1)and recycled, leaving the board to be stripped of its copper content.(1)</p>	
(d)	<p>Reason 1 and justification.</p> <p>Reason 2 and justification.</p> <p>Indicative content</p> <p>Lightweight Easily formed Available in varying density's Can be formed into complex shapes Can be found in various forms. i.e. granular or slab form Available in a range of colours Or any other reasonable correct response.</p> <p>Example answer.</p> <p>Polystyrene is a thermoplastic [1] which means that it can be easily formed using injection moulding[1].</p> <p>Polystyrene is lightweight,[1] and therefore reduces transportation costs.(1)</p>	<p>2</p> <p>2</p>

<p>3 (a)</p>	<p>Up to 12 marks available.</p> <p>2 marks for producing a sketched 3rd angle orthographic projection.</p> <p>Up to 2 marks for each of the 3 completed views – (6) maximum marks where all features are included.</p> <p>Up to 2 marks for inclusion of construction lines.</p> <p>1 marks for hidden detail.</p> <p>1 mark for overall quality.</p>	<p>12</p>
<p>(b)</p>	<p>Up to 5 marks available</p> <p>Face off to length(1) Turn diameter(1) Thread cutting(1)- accept ant suitable process Knurling(1) Parting(1)</p> <p>Any logical 5 operations acceptable that are related to machining or marking out.</p>	<p>5</p>
<p>(c)</p>	<p>Up to 3 marks available.</p> <p>Indicative content.</p> <ul style="list-style-type: none"> • Light weight (1) • Corrosion resistant(1) • Does not require painting(1) • Available in a variety of colours(1) • Easily assembled(1) • Can be dismantled for storage(1) • Easily cleaned(1) <p>Example answer.</p> <p>The shed is lightweight and can be assembled very quickly without the need of fixings such as nails etc.</p>	<p>3</p>