MARKING SCHEME

LEVEL 1 AND LEVEL 2 AWARD IN ENGINEERING 9793/01

SUMMER 2016

© WJEC CBAC Ltd.

INTRODUCTION

This marking scheme was used by WJEC for the 2016 examination. It was finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conference was held shortly after the paper was taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conference was to ensure that the marking scheme was interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conference, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about this marking scheme.

© WJEC CBAC Ltd.

9793/01
LEVEL 1 AND LEVEL 2 AWARD IN ENGINEERING

MARK SCHEME - SUMMER 2016

Question	Answer	Marks
1. (a)	1 mark for each correct answer. • Support / balance the rider of the scooter. • Allows user to steer. • House the grips and brake levers. • To withstand forces of the user or applied forces.	2
1. (b)(i)	1 mark for each correct answer. *Part* — *Material* — *Classification* Frame — Steel — Ferrous Handle bars — Carbon fibre/GRP — Composite Wheel rim — Aluminum alloy — Non ferrous Brake lever — ABS Acrylonitrile-Butadiene-Styrene — Thermo plastic	3
1. (b)(ii)	Up to 2 marks available for EACH benefit. Good strength to weight ratio. Resists cracking when forces are applied. Easily formed to create the shapes in the design. Easily joined to create the framework. Good shock absorption qualities.	2 + 2
1. (c)	1 mark available. Brazing or welding. Do not accept gluing or soldering.	1
1. (d)	Up to 2 marks available. 1 mark for each correct answer. Prevents corrosion Aesthetic appearance Improves sales	1 +1
1. (e)(i)	Up to 2 marks available. Example : carbon fibre/glass reinforced plastic/ Kevlar A composite material (also called a composition material or shortened to composite) is a material made from two or more constituent materials with significantly different physical or chemical properties that, when combined, produce a material with characteristics different from the individual components.	2

© WJEC CBAC Ltd.

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>1. (e)(ii)</td><td>Up to 4 marks available.

One mark for a simple one word answer.

Advantages
Lightweight
Good strength to weight ratio
Can be formed into complex shapes
Corrosion resistant
Good impact resistance

Disadvantages
Not easily recycled at present.
Hazardous to health during manufacture.
Difficult to repair.
Toxic if burnt.
Expensive to manufacture.</td><td>2

2</td></tr>
<tr><td>1. (f)</td><td>Up to 6 marks available

<table>
<tr><th>COMPONENT</th><th>PROPERTY</th><th>Reason for use</th></tr>
<tr><td>Wheel bearing</td><td>Hardness</td><td>The balls or rollers have been suitably hardened to prolong the life of the wheel bearing.</td></tr>
<tr><td>Rubber tyre</td><td>Elasticity</td><td>The ability of the rubber to absorb force and flex in different directions, returning to its original position.
This allows the tyre to deform without breaking</td></tr>
<tr><td>Brake cable</td><td>Tensile</td><td>The ability of a material to stretch without breaking or snapping. This allows a force to be applied to the brake lever without stretching or snapping the cable.</td></tr>
</table>
A mark can be awarded for relevant reasons for use.</td><td>6</td></tr>
<tr><td colspan="2">Total marks question 1</td><td>24</td></tr>
</table>

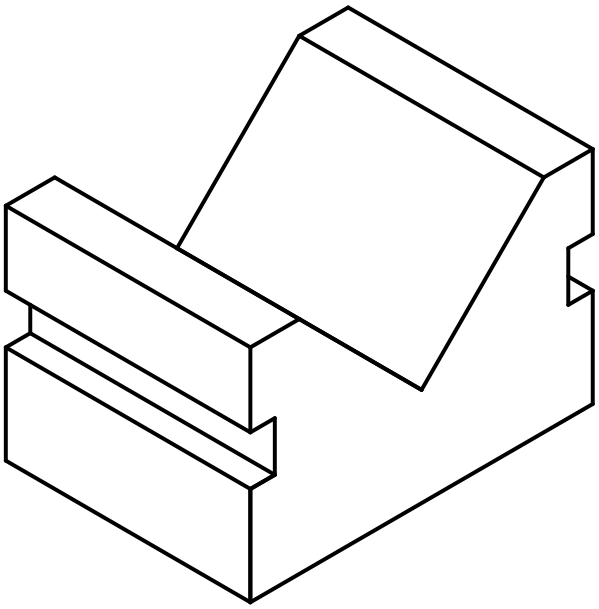
© WJEC CBAC Ltd.

Question	Answer	Marks
2. (a)	Up to 6 marks available for correct safety explanation. Explanations could be related to: Low voltage. No flex – trip hazard. Battery reduced size. Increased power. Longer battery life. Reduced weight. Faster cut off speed. To achieve the full two marks the answers must be explained.	6
2. (b)(i)	Computer Aided Design	1
2.(b)(ii)	• Up to 2 marks available. • Indicative content • Can be more accurate than hand drawn designs. • You can save and edit ideas. • You design as you go along. • You can modify existing ideas easily. • CAD files can be sent electronically. Any appropriate response that relates to the benefit of CAD. There must be a description to achieve two marks. • i.e. Can be more accurate than hand drawn designs and it reduces human error.	2
2.(b)(iii)	• Computer Aided Manufacture	1
2.(b)(iv)	• Up to 2 marks available Indicative content Improved quality. Reliability due to accurate manufacture. Consistency in quality. Improved finish. Cheaper purchase price due to reduced manufacturing costs. Miniaturization of components. Reduced production duration Any appropriate response that relates to the benefit of CAM. There must be a description to achieve two marks. i.e. Components can be checked by lasers and rejects can be clearly indicated.	2

© WJEC CBAC Ltd.

Question	Answer	Marks
1. (c)	Accept any validated reason that answers the question. Note: There must be two different reasons. Recyclable materials Accept any validated answer that applies to the question and is about recycling. i.e Easily recycled .Parts can are stripped of their most valuable components and sold for scrap. Metals like copper, aluminum, lead, gold and palladium are recovered from circuit boards etc. Maintenance Accept any validated answer that applies to the question and is about maintenance. i.e. moving parts will require oiling or replacing to prolong the life of the electric drill.	2 2
	Total marks	16

© WJEC CBAC Ltd.

Question	Answer	Marks
3. (a)	Up to 8 marks available. 1 mark for producing a suitable isometric drawing. Up to 2 marks for each of the 3 pictorial image faces–(6) maximum marks where all features are included. 1 mark for neatness. 	8
3. (b)	Up to 2 marks available. Indicative content Indicates that the component has been cut into half and shows the internal details. Example The hatched lines represent A cross-sectional view which portrays a cut-away portion of the object and is another way to show hidden detail within a component.	2
3. (c)(i)	Up to 6 marks available V a=πr^2 x h =π x5^2x35 =2748.9 mm^3 V b= πr^2 x h = π x10^2x5=1570.8 mm^3 Volume cylinder a + b = 2748.9 + 1570.8= 4319.7 mm^3 Total volume of the pin 4319.7 mm^3	6

© WJEC CBAC Ltd.

Question	Answer	Marks
1. (c)(ii)	Except any four logical consecutive stages. Set the lathe to the correct speed. Set up the tool point to the correct level. Turn the pin so that the smaller diameter fits into the three jaw chuck. Tighten the jaws to grip the pin in the three jaw chuck. Check your clothing and goggles (PPE). Check that the lubricant is flowing to the required speed. Move guard into position. etc etc etc.etc.	4
	Total marks question 3	20

© WJEC CBAC Ltd.