



2009 Fabrication and Welding

Higher

Finalised Marking Instructions

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Solutions and Marking Instructions

Question 1	Solution	Marks	Notes
1 (a)	<ul style="list-style-type: none">By displacing the atmosphere from the weld pool and surrounding weld area.	2	
(b)	<ul style="list-style-type: none">Flat characteristic or constant potential/voltage.	1	
(c)	<ul style="list-style-type: none">Current controlled by the wire feed speed. For example: the higher the wire feed speed, the higher the resulting current.	2	
(d)	<ul style="list-style-type: none">(i) <ul style="list-style-type: none">Contact tip passes the welding current to wire electrode.(ii) <ul style="list-style-type: none">The wire drive unit pushes the wire through the conduit to the weld pool. The drive unit also allows the operator to set the wire feed speed.(iii) <ul style="list-style-type: none">The harness contains the welding lead, wire conduit, gas supply and the switch control cable.	1 3 4	

Question 2	Solution	Marks	Notes
2	<ul style="list-style-type: none">• Single bevel Butt weld on arrow side of joint.• Single Vee Butt Weld on arrow side of joint.	2 2	

Question 3	Solution	Marks	Notes
3 (a)	CE = 0.57	5	<ul style="list-style-type: none"> • Locating formula – (1 mark) • Correct substitution – (2 marks) • Final solution – (2 marks)
(b)	No pre-heat required	7	<p>Extracted from EN 1011</p> <ul style="list-style-type: none"> • Locating correct hydrogen scale (scale D, information from section C.2.3.3 Selection of hydrogen scales)* (2 marks) • Correct use of carbon equivalent (0.57) (1 mark) • Selecting correct table from resource pack (Graph C2g)* (1 mark) • Combined thickness (12 + 12 = 24)* (1 mark) • Correct use of arc energy (1.0 kJ/mm) (1 mark) • Correct answer (1 mark)
(c)	<p>Candidates should complete the following information marked with an asterisk in the worksheet:</p> <p>Range of Approval</p> <ul style="list-style-type: none"> • type of weld pass • joint type • gas/flux type • current type • joint prep detail <p>Weld and Filler Metal Details</p> <ul style="list-style-type: none"> • joint type • gas composition • run sequence sketch • pre-heat temp <p>Procedure Details Section - for each run:</p> <ul style="list-style-type: none"> • size of filler material • polarity 	17	<p>(1 mark)</p> <p>(1 mark)</p> <p>(1 mark)</p> <p>(1 mark)</p> <p>(5 marks)</p> <p>(1 mark)</p> <p>(1 mark)</p> <p>(3 marks)</p> <p>(1 mark)</p> <p>(1 mark)</p> <p>(1 mark)</p>

- 4 The planning operations sheet for the manufacture of the component is detailed below. While the answer below is a suggested response other sequences or methods of manufacture should be considered on their merit.

Op No	Marking out processes	Details of cutting and forming processes	Joining processes	Assembly methods	Inspection
1	Produce template for petal plate				Check size for accuracy
2	Mark out petal plate using template				
3		Thermal cut petal blank			
4		Produce prepped edge on petal plates and pipe (various methods acceptable)			
5		Dress edges where required			
6	Produce 'set template' for curvature				
7		Form petals (rolling)			Check curvature using 'set template'
8	Mark outside diameter on surface bench			Position petals to 600mm high centre	
9				Tack weld petals in position	Check for dimensional accuracy, and accuracy of joint preparation
10			Fully weld petal plates		
11		Clean and dress if required			Visual inspection of weld finish
12					Carry out MPI on petal plates
13				Offer pipe to petal plate	
14				Tack weld pipe in position	Check fit up
15			Fully weld pipe to end		
16		Clean and dress if required			Visually check quality of weld and ground finish
17					Final inspection and subsequent MPI testing

Question 5	Solution	Marks	Notes
5	(a) <ul style="list-style-type: none"> • Sketch showing test piece being pulled apart lengthways (or description of same) (b) <ul style="list-style-type: none"> • Heat to above upper critical temperature (to a maximum of 50° above) • Soak for 1 hour/25mm thickness • Cool in still air 	 2 2 1 1	

Question 7	Solution	Marks	Notes
7	<ul style="list-style-type: none"> • Degrease component • Apply contrast paint • Remove paint at contact points for magnetising • Magnetise • Apply ink • Check for defects • Magnetise again 90 degrees to previous • Check for defects • Complete inspection report • Remove residue of test 	<p style="text-align: center;">1 1 1 1 1 1 1 1 1 1</p>	

[END OF MARKING INSTRUCTIONS]