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CONFIDENTIAL

SET A

UNIVERSITI KUALA LUMPUR
MALAYSIA FRANCE INSTITUTE

FINAL EXAMINATION
JANUARY 2014 SESSION

SUBJECT CODE	:	**FWB 32703**
SUBJECT TITLE	:	**WELDING PROCEDURE CONSTRUCTION**
LEVEL	:	**BACHELOR**
TIME / DURATION	:	**3.0 HOURS**
DATE	:	

INSTRUCTIONS TO CANDIDATES

1. **Please read the instructions given in the question paper CAREFULLY.**
2. **This question paper is printed on both sides of the paper.**
3. **Please write your answers on the answer booklet provided.**
4. **Answer should be written in blue or black ink except for sketching, graphic and illustration.**
5. **This question paper consists of TWO (2) sections. Answer ALL questions in Section A and Section B.**
6. **Answer all questions in English.**

THERE ARE 7 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

SECTION A (Total: 40 marks)

INSTRUCTION: Answer All Questions.

Please use the answer booklet provided.

Use Appendix 3 to Answer Question 6 in Section A.

Question 1

What is a ***"Welding Procedure Data Sheet (WPDS)"***? Explain briefly.

(5 marks)

Question 2

Explain briefly what you understand on the following standards.

2.1 BS EN 287-1:2011
2.2 BS EN ISO 9606 series
2.3 BS EN ISO 15614 series
2.4 BS EN 1418:1998
2.5 BS 4872 parts 1 and 2

(5 marks)

Question 3

What is a ***"WPS"***?

(5 marks)

Question 4

What does ***"Pre-Qualified"*** mean?

(5 marks)

Question 5

Appendix 1 is the ***"Range of Approval in accordance to welding position (EN 287-1)".*** Review the Range of Approval and specify the followings:-

5.1 The Approval range specifies positions ***H-L045 and J-L045***? Explain those positions.

5.2 If a welder is tested on butt weld (plates) and is qualified for PF position. ***What other positions and welds is he approved too***?

5.3 If a welder wanted to be approved for All positions, ***what plates / pipes and welds should he be tested***?

5.4 If a welder is tested on fillet (plates) and is approved for PD position. Is he approved for ***PD position*** on plates too?

5.5 PB position for pipes can be welded in two versions. ***What are they***?

5.6 Explain why a welder who is approved in position ***J-L045*** also approved in positions ***PG butts, PG fillets, PG fixed pipes (fillets/butts***)?

5.7 If a welder is tested in position PG on fillet welds, what other positions is he approved?

(10 marks)

Question 6

Appendix 3 is a ***"Welding Procedure Approval Record (WPAR)"*** Form.

You are required to do the following:

6.1 Review the ***Manufacturer's Welding Procedure Specification (Appendix 2)*** and transfer relevant details and data into the ***WPAR Form – Test Certificate (Appendix 3)***

6.2 The parameters shown in (***MWPS (Appendix 1)*** in reference to ***Amps, Volts and Heat Input*** are not correct. Use suitable formulas to find the corrrect parameters.

(10 marks)

SECTION B (Total: 60 marks)

Answer All Questions
Please use the answer booklet provided.

Question 1

For a Welder Qualification Test, specimens will have to be tested accordingly.

List the tests that can provide information on the ***"Required Properties"*** and also on "***Weld Quality"***

(20 marks)

Question 2

A welding procedure is used to make a record of all of the different elements, variables, and factors that are involved in producing a specific weld or weldment.

"Welding procedures" should be written whenever it is necessary to:

(10 marks)

Question 3

Can one company use welding procedures qualified by another company?

Explain briefly.

(10 marks)

Question 4

The variables involved in most specifications are considered to be ***"essential variables". "Essential variables"*** are those factors which must be recorded and if they are changed in any way, the procedure must be re-tested and re-qualified.

List the ***"essential variables"*** that are involved in the procedure.

(10 marks)

Question 5

"Non-essential variables" are usually of less importance and may be changed within prescribed limits and the procedure need not be re-qualified.

List the ***"non-essential variables"*** that are involved in the procedure.

(10 marks)

END OF QUESTION

Appendix 1

Table 7. Range of approval according to welding position

Welding position of approval test piece			Range of approval																											
			Plates									Pipes																		
			Butt welds				Fillet welds					Butt welds									Fillet welds									
												Pipe-axis and angle																		
												rotating			fixed						rotating [1]			fixed					
			PA	PC	PG	PF	PE	PA	PB	PG	PF	PD	0°			90°	45°				45°			0°			90°		
													PA	PG	PF	PC	H-L045	J-L045	PA	PB	PG	PF	PD [2]						
Plates	Butt welds	PA	*	—	—	—	—	×	×	—	—	—	×	—	—	—	—	—	×	×	—	—	—	—						
		PC	×	*	—	—	—	×	×	—	—	—	×	—	—	×	—	—	×	×	—	—	—	—						
		PG	—	—	*	—	—	×	×	×	—	—	×	—	—	—	—	—	×	×	×	—	—	—						
		PF	×	—	—	*	—	×	×	—	×	—	×	—	—	—	—	—	×	×	—	×	—	—						
		PE	×	×	—	×	*	×	×	—	×	×	—	—	—	—	—	—	×	×	—	×	×	×						
	Fillet welds	PA	—	—	—	—	*	×	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—						
		PB	—	—	—	—	—	×	*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—						
		PG	—	—	—	—	—	×	—	*	—	—	—	—	—	—	—	—	—	—	—	—	—	—						
		PF	—	—	—	—	—	×	—	—	*	—	—	—	—	—	—	—	—	—	—	—	—	—						
		PD	—	—	—	—	—	×	—	—	—	*	—	—	—	—	—	—	—	—	—	—	—	—						
Pipes	Butt welds	0°	PA	×	—	—	—	—	×	×	—	—	—	*	—	—	—	—	—	×	×	—	—	—	—						
			PG	—	—	×	—	—	×	×	×	—	—	—	*	—	—	—	—	×	×	×	—	—	—						
			PF	×	—	—	×	—	×	×	—	×	—	—	—	—	—	—	—	×	×	—	×	—	—						
			PD	—	—	—	—	×	×	—	—	—	×	—	—	—	—	—	—	×	×	—	—	×	×						
	Pipe-axis and angle	rotating fixed	90°	PA	×	—	—	—	—	×	×	—	—	—	*	—	—	—	—	—	×	×	—	—	—	—					
				PC	×	—	—	—	×	×	×	—	—	—	—	*	—	—	—	—	×	×	—	—	—	—					
				PF	×	—	—	—	—	×	×	—	×	—	—	—	*	—	—	—	×	×	—	×	—	—					
			45°	H-L045	×	×	—	×	×	×	—	×	×	—	—	—	—	*	—	—	×	×	—	—	×	×					
				J-L045	—	—	×	—	—	×	×	—	—	×	—	—	—	—	*	—	—	×	—	×	×	—					
	Fillet welds	rotating 1)	45°	PA	—	—	—	—	—	—	—	—	—	—	×	—	—	—	—	—	*	—	—	—	—	—					
				PB	—	—	—	—	—	×	×	—	—	—	—	×	—	—	—	—	—	*	—	—	—	—					
		fixed	0°	PG	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	*	—	—	—					
				PF	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	*	—	—					

[1] PB for pipes may be welded in two versions
(1) pipe: rotating; axis: horizontal; weld: horizontal vertical
(2) pipe: fixed; axis: vertical; weld: horizontal vertical.

[2] This is an approved position and is covered by the other related tests.

Key

* indicates the welding position for which the welder is approved in the approval test.
× indicates those welding positions for which the welder is also approved.
— indicates those welding positions for which the welder is not approved.

Appendix 2

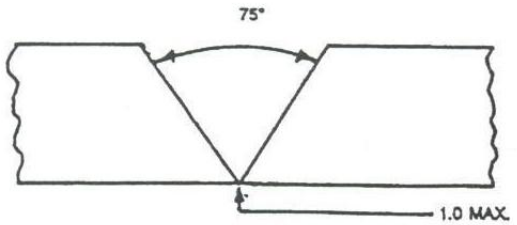
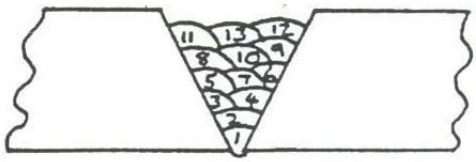
MANUFACTURERS WELDING PROCEDURE SPECIFICATION (WPS)

Location: ..... NOTHER WORKSHOP.....
Manufacturer's Welding Procedure: .....pWPS 001/A.....
Reference No: .....41920.....
WPAR No: .....0223.....
Manufacturer : .....FRED BLOGGS INDUSTRIES.....

Welder's Name: .....FREEDO.....
Welding Process: .....141(TIG ROOT)/111(MMA FILL & CAP).....
Joint Type: ..... VEE BUTT.....

Examiner or test body:.....METAL INDUSTRIES.....

Method of Preparation and Cleaning:.....DEGREASE & MACHINE...
Parent Material Specification: ..316L STAINLESS STEEL
C .03% Cr 17% Mn 1.5% Mo 2.5%
Ni 11% Si 0.5% + Residuals
Material Thickness (mm): 15mm
Outside Diameter (mm):.....155mm.....
Welding Position: .....HL045.....

Weld Preparation Details/Joint Design (Sketch)*	Welding Sequences
	

Welding Details

Run	Process	Size of Filler Metal	Current A	Voltage V	Type of current/ Polarity	Wire Feed Speed	Travel Speed*	Heat Input*
1	141	AUTOGENEOUS	60–70	10–12	DCEN	–	40mm/mn	1.0KJ/mm
2–4	111	3.2mm	110–120	20–22	DCEP	–	140mm ROL	1.0KJ/mm
5–10	111	3.2mm	95–110	20–22	DCEP	–	130mm ROL	1.0KJ/mm
10 to	111	2.5mm	70–90	20–22	DCEP	–	100mm ROL	1.0KJ/mm
completion		2.5mm	70–90	20–22	DCEP	–	100mm ROL	1.0KJ/mm
–	–	–	–	–	–	–	–	–

Filler Metal Classification and trade name:.....SOUDOMETAL SUPERCROM 316L to ISO 3581–E19:12:3:LR23.....
Any Special Baking or Drying: .....DRY AT 100°C FOR 2 HOURS QUIVER AT 75°C.....
Gas/Flux: shielding: .....ARGON – COMMERCIAL PURITY .....
backing : .....ARGON – COMMERCIAL PURITY .....
Gas Flow Rate – Shielding: .....8 LITRES/MINUTE.....
Backing: ....4 LITRES/MINUTE.....
Tungsten Electrode Type/Size: .....2% THORIUM 2.5 ϕ.....
Details of ~~Back Gouging~~/Backing: .....RETAIN UNTIL RUN 5 ONWARD..
Preheat Temperature: .....NONE.....
Interpass Temperature: .....150°C MAXIMUM.....

Post-Weld Heat Treatment and/or Ageing: .....NONE.....
Time, Temperature, Method: .....NOT REQUIRED.....
Heating and Cooling Rates*: .....AS PROCEDURE.....

Other information*:.....
e.g. weaving (maximum width of run): .....2 x ϕ.....
Oscillation: amplitude, frequency, dwell time: ....as required
Pulse welding details: ..... NOT REQUIRED .....
Stand off distance: .....NOT REQUIRED .....
Plasma welding details: .....NOT REQUIRED .....
Torch angle: .TILT 90° SLOPE 70°.....

Manufacturer

Name .....FREDERICK BLOGGS.....
Date .00–00–199–.....
Signature .....

Examiner or test body

Name .....I.C. ITCANBE.....
Date .....00–00–199.....
Signature .....

Appendix 3

WELDING PROCEDURE APPROVAL RECORD FORM (WPAR) TO EN288

WELDING PROCEDURE APPROVAL – TEST CERTIFICATE

Manufacturer's Welding Procedure Reference No.:.....

Examiner nor Test Body: .....
Reference No.: .....

Manufacturer: .....
Address: .....
.....

Code/Testing Standard: .....

Date of Welding: .....

EXTENT OF APPROVAL

Welding Process: .....

Joint Type: .....

Parent metal(s): .....

Conditions of tempered: .....

Metal thickness (mm): .....

Outside Diameter (mm): .....

Filler Metal Type: .....

Shielding Gas/Flux: .....

Type of Welding Current: .....

Preheat: .....

Post-Weld Heat Treatment and/or ageing: .....

Other information: .....
.....
.....

Certified that test welds prepared, welded and tested satisfactorily in accordance with the requirements of the code/testing standard indicated above.

Location: ..... Date of issue: .....

Examiner or test body

Name:

Date:

Signature: