



**UNIVERSITI KUALA LUMPUR
Malaysia France Institute**

**FINAL EXAMINATION
JULY 2010 SESSION**

SUBJECT CODE : FWD 32502
SUBJECT TITLE : WELDING INSPECTION AND TESTING
LEVEL : DIPLOMA
**TIME / DURATION : 12.30pm – 3.00pm
(2.5 HOURS)**
DATE : 11 NOVEMBER 2010

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, Section A and B. Answer all questions in Section A and TWO (2) questions in Section B.**
 6. Answer all questions in English.
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THERE ARE 7 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

SECTION A (Total: 60 marks)

INSTRUCTION: Answers all question and should be write in the OMR sheet provided in Appendix 1.

- 1 Name the ASME code for the design of Pressure Piping
- A. ASME 9
 - B. ASME B 31
 - C. ASME B 31.3
 - D. ASME B 31.1
- (2 marks)
- 2 Name the ASME code for qualification of welding procedure
- A. ASME 8
 - B. ASME 2 part A
 - C. ASME 9
 - D. ASME B 31.3
- (2 marks)
- 3 What is the meaning of A-number in ASME IX
- A. Represent group of weld deposit
 - B. Represent group of material
 - C. Represent group of filler metal
 - D. Represent group of process
- (2 marks)
- 4 What is the meaning of P-number in AMSE code and standard
- A. Represent group of filler metal
 - B. Represent group of gas
 - C. Represent group of process
 - D. Represent group of material
- (2 marks)
- 5 What is the difference between SA 36 and A36
- A. Tensile strength
 - B. Yield strength
 - C. Difference Code and Standard
 - D. Difference clauses
- (2 marks)

- 6 What is the test pressure of Hydrostatic leak test in metallic piping system.
- A. Not less than 150% times the design pressure
 - B. Less than 150% times the design pressure
 - C. Not less than 110% times the design pressure
 - D. Less than 110% times the design pressure
- (2 marks)
- 7 What is the fluid use in Hydrostatic Leak test
- A. Gas
 - B. Water
 - C. Oil
 - D. Foam
- (2 marks)
- 8 What is the meaning of Random Radiography
- A. This applies only to girth weld
 - B. This applies only to GMAW-S weld bead
 - C. This applies only to girth and miter groove welds
 - D. This applies only to welded with porosity
- (2 marks)
- 9 How many bend test specimen is needed to qualify a procedure for plate more than 10mm according to ASME 9
- A. 2 side bend test and 2 face bend test
 - B. 4 side bend test
 - C. 2 side bend test and 2 root bend test
 - D. 2 side bend test
- (2 marks)
- 10 Which code governs procedure qualification for process piping
- A. ASME 8
 - B. ASME 9
 - C. ASME B 31.3
 - D. ASME 2 Part A
- (2 marks)
- 11 To what construction does AWS D1.1 applies?
- A. To cover Steel structure construction
 - B. To cover pressure piping construction
 - C. To cover Pressure Vessel construction
 - D. To cover Process piping construction
- (2marks)

- 12 Full Radiography is applied to metal with P no. 1 Group No. 1 when the material thickness exceeds
- A. 2 inch
 - B. 1.5 inch
 - C. 1.25 inch
 - D. 1 inch
- (2marks)
- 13 What is the purpose of shielding gas in an arc welding process?
- A. To eliminate hydrogen from the region of the arc
 - B. To retard the cooling rate of the weld
 - C. To exclude the atmosphere from the region of the arc
 - D. All of the above
- (2marks)
- 14 Which of the following will vary the most when varying the arc length using MMA process?
- A. Voltage
 - B. Amperage
 - C. Polarity
 - D. None of the above
- (2marks)
- 15 According to ASME 9 Sec. QW 142, Radiographic examination may be substituted with mechanical testing for groove weld performance qualification, except or one process. What is the process?
- A. GMAW-G
 - B. GMAW-P
 - C. GMAW-S
 - D. FCAW
- (2marks)
- 16 Why is it necessary to carry out a welder qualification test?
- A. To ensure that the welder can weld
 - B. To ensure that the welds can withstand extreme stresses
 - C. To give maximum confidence that the welder can produce welds that meets the requirements of the approved welding procedure(s)
 - D. To make sure that the welder can produce a defect free weld
- (2 marks)
- 17 Give a meaning of in-process examination
- (2 marks)
- 18* What is the difference between pipe with NPS 20 and DN 500.
- (2 marks)

- 19 After flame cut performed on bevels of low-alloy and intermediate-alloy steel what is the next step to do, before proceed to welding (2 marks)
- 20 Which electrode group does E 6010 fall under (2 marks)
- A. Low hydrogen electrode
 - B. Minimum tensile
 - C. High strength electrode
 - D. High impact electrode
- 21 What is lamellar tearing? (2 marks)
- A. A product defect caused during steel manufacturing
 - B. A type of crack which occurs in the parent material due to welding stresses acting in a short transverse direction of the parent material
 - C. A type of crack associated with poor through thickness ductility
 - D. A type of crack found in welds, which are subjected to cyclic stresses
- 22 Why is preheat sometimes carried out on steels? (2 marks)
- A. To remove moisture from the weld preparation
 - B. To retard the cooling rate of the weld
 - C. To aid fusion between weld metal and parent material
 - D. All of the above
- 23 In a martensite grain structure what would you expect to increase: (2 marks)
- A. Ductility
 - B. Hardness
 - C. Toughness
 - D. All of the above
- 24 Which of the following is not a type of crack? (2 marks)
- A. Fissure
 - B. Lamellar tear
 - C. Fish eye
 - D. Hot tear

- 25 Why is welding procedure qualification test necessary?
- A. To ensure the welder is able to make sound welds meeting the requirements of the agreed welding procedure
 - B. To ensure the welder satisfies the NDT and mechanical requirements of the specification
 - C. To give maximum confidence that the welding variables are compatible and will produce sound welds meeting the requirements of the agreed specification
 - D. To give a guarantee that a defect free welds are going to be produced
- (2 marks)
- 26 A side bend test, is to test for:
- A. Fatigue fracture strength
 - B. Lack of side wall fusion
 - C. Toughness value
 - D. All of the above
- (2 marks)
- 27 Maximum allowable limit for butt welding of piping components with internal misalignment
- A. 1.0mm
 - B. 1.5mm
 - C. 2.0mm
 - D. 2.5mm
- (2 marks)
- 28 What is the range of temperature of Carbon steel use for ASME B 31.3
- A. Limited to 800°F
 - B. Over 800°F
 - C. Limited to 1100°F with reduced allowable stresses
 - D. Over 1100°F with reduced allowable stresses
- (2 marks)
- 29 What is the preheat temperature for material in P No. 6
- A. 400 °F
 - B. 200 °F - 400 °F
 - C. 200 °C
 - D. 200 °C - 400 °C
- (2 marks)
- 30 What is the length of reduced section of reduced-section tension specimen according to AWS D1.1
- A. Widest face of weld + 1/2" (12mm)
 - B. Widest face of weld + 1" (25.4mm)
 - C. Widest face of weld + 1/2" (12mm), minimum 2 1/4" (60mm)
 - D. Widest face of weld + 1" (25.4mm), minimum 2 1/4" (60mm)
- (2 marks)

SECTION B (Total: 40 marks)**INSTRUCTION: Answer TWO questions only.****Please use the answer booklet provided.****Question 1**

- a. What is the difference between Inspection, Examination and Testing, what are the relations between three. (10 Marks)
- b. List down the procedure to conduct Hydrostatic Test (5 Marks)
- c. What is the precaution shall be take to account during Pneumatic Leak Test (5 Marks)

NOTE : All answers to be in accordance with ASME B31.3

Question 2

- a. List down the unacceptable relevant indications found by Liquid Penetrant Examination (8 Marks)
- b. What is the preheat temperature require when welding two difference P-number material. (6 Marks)
- c. What are the pressure components not covers by ASME B 31.1 (6 Marks)

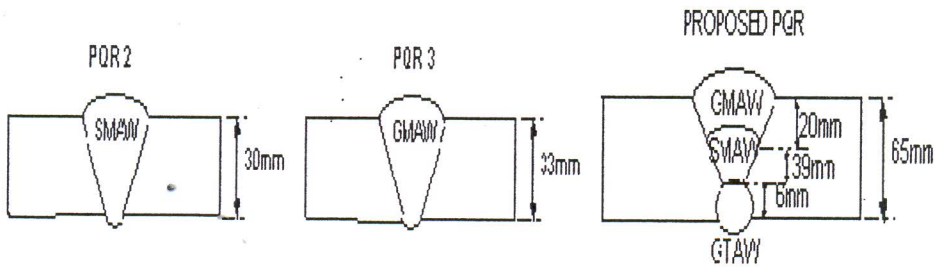
NOTE : All answers to be in accordance with ASME B31.1

Question 3

- a. What is the purpose of Radiography examination for welder qualification. (5 Marks)
- b. What is the meaning of repair and list down the procedure to repair a crack area? (10 Marks)
- c. How to perform welder qualification with single qualification. (5 Marks)

NOTE: All answers to be with API 1104

Question 4



- a. Can the propose PQR be made from the example + PQR 2 + PQR 3 (2 Marks)
- b. Considering the individual deposited thickness as per the proposed PQR, give the maximum allowable thickness as allowed by ASME IX. (9 Marks)
- c. Can SMAW process be used for proposed PQR, through thickness. (9 Marks)

NOTE: Refer to appendix 2 attached

END OF QUESTION

APPENDIX 2

QW-451 Procedure Qualification Thickness Limits and Test Specimens

QW-451.1
GROOVE-WELD TENSION TESTS AND TRANSVERSE-BEND TESTS

Thickness <i>T</i> of Test Coupon, Welded, in. (mm)	Range of Thickness <i>T</i> of Base Metal, Qualified, in. (mm) [Notes (1) and (2)]		Maximum Thickness <i>t</i> of Deposited Weld Metal, Qualified, in. (mm) [Notes (1) and (2)]	Type and Number of Tests Required (Tension and Guided-Bend Tests) [Note (2)]			
	Min.	Max.		Tension, QW-150	Side Bend, QW-160	Face Bend, QW-160	Root Bend, QW-160
Less than 1/8 (1.5)	<i>T</i>	2 <i>T</i>	2 <i>t</i>	2	...	2	2
1/8 to 3/8 (1.5 to 10), incl.	1/8 (1.5)	2 <i>T</i>	2 <i>t</i>	2	Note (5)	2	2
Over 3/8 (10), but less than 1/2 (19)	3/8 (5)	2 <i>T</i>	2 <i>t</i>	2	Note (5)	2	2
1/4 (19) to less than 1 1/2 (38)	3/16 (5)	2 <i>T</i>	2 <i>t</i> when <i>t</i> < 1/4 (19)	2 [Note (4)]	4
1/4 (19) to less than 1 1/2 (38)	3/16 (5)	2 <i>T</i>	2 <i>T</i> when <i>t</i> ≥ 1/4 (19)	2 [Note (4)]	4
1 1/2 (38) and over	3/16 (5)	8 (200) [Note (3)]	2 <i>t</i> when <i>t</i> < 1/4 (19)	2 [Note (4)]	4
1 1/2 (38) and over	3/16 (5)	8 (200) [Note (3)]	8 (200) [Note (3)] when <i>t</i> ≥ 1/4 (19)	2 [Note (4)]	4

NOTES:

- (1) The following variables further restrict the limits shown in this table when they are referenced in QW-250 for the process under consideration: QW-403.9, QW-403.10, QW-404.32, and QW-407.4. Also, QW-202.2, QW-202.3, and QW-202.4 provide exemptions that supersede the limits of this table.
- (2) For combination of welding procedures, see QW-200.4.
- (3) For the welding processes of QW-403.7 only; otherwise per Note (1) or 2*T*, or 2*t*, whichever is applicable.
- (4) See QW-151.1, QW-151.2, and QW-151.3 for details on multiple specimens when coupon thicknesses are over 1 in. (25 mm).
- (5) Four side-bend tests may be substituted for the required face- and root-bend tests, when thickness *T* is 3/8 in. (10 mm) and over.