



UNIVERSITI KUALA LUMPUR
Malaysia France Institute

FINAL EXAMINATION
JANUARY 2010 SESSION

SUBJECT CODE : FWB 22403
SUBJECT TITLE : WELDING DEFECTS
LEVEL : BACHELOR
TIME / DURATION : 9.00 am – 11.30 am
(2.5 HOURS)
DATE : 26 APRIL 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. For Section B, answer four (4) question only.
 6. Answer all questions in English.
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THERE ARE 6 PAGES OF QUESTIONS, INCLUDING THIS PAGE.

SECTION A (Total: 40 marks)**INSTRUCTION: Answers should be written in the OMR sheet provided in Appendix 1.**

Q1. Several situations lead to the weld defect "porosity." What is the common cause of weld porosity?

- a. Excessive current or amperage,
- b. Too long arc length,
- c. Travel speed is too fast,
- d. All of the above.

(2 marks)

Q2. A non-planar defects found in welds

- a. are always acceptable
- b. will result in the removal of the entire weld if they break the surface
- c. not usually as significant as planar defects
- d. can only be detected using radiography as the inspection medium

(2 marks)

Q3. What action should an inspection personnel take if arc strikes are found adjacent to a weld on high tensile strength material (specification does not reference arc strikes)?

- a. Have the total weld and parent material cut out
- b. Have the arc strikes checked MPI or DPI
- c. Accept the weld area
- d. Have the welder qualified

(2 marks)

Q4. What is the possible result if the amperage is too low during welding of a root bead using an arc welding process with a consumable electrode?

- a. Incomplete root penetration
- b. Lack of root fusion
- c. The freezing of electrode to the work
- d. All of the above

(2 marks)

Q5. What is lamellar tearing?

- a. A product defect caused through 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

(2 marks)

- Q6. Cold lapping is another term for:
- Lack of fusion at the toe of a weld reinforcement
 - Undercut at the toe of a weld
 - Lack of root penetration
 - Entrapped gas caused through contaminated joint preparation
- (2 marks)
- Q7. Which of the following statements is true regarding hydrogen cracking?
- It is a type of hot crack
 - It is most commonly found in ductile grain structures
 - It only occurs in the HAZ
 - It is the most common type of crack encountered in steel weldments
- (2 marks)
- Q8. What four criteria are necessary to produce HICC?
- Hydrogen, moisture, martensite and heat
 - Hydrogen, poor weld profiles, temperature above 200°C and slow cooling
 - A grain structure susceptible to cracking, stress, hydrogen and a temperature 200°C
 - Weld defects, pearlite, hydrogen and a temperature above the melting point for the material being welded.
- (2 marks)
- Q9. Which of the following is not a type of crack?
- Fissure
 - Lamellar tear
 - Fish eye
 - Hot tear
- (2 marks)
- Q10. Stress acting in the opposite direction to compressive stress is known as:
- Residual stress
 - Shear stress
 - Hoop stress
 - Tensile stress
- (2 marks)
- Q11. Inclusions are generated by extraneous material and disrupt the base metal continuity. They can be
- slag,
 - tungsten,
 - sulfide or oxide inclusions,
 - all of the above.
- (2 marks)

- Q12. Clustered porosity at the weld's center is not considered a dangerous fatigue promoter, nor detrimental to fatigue resistance, but it may reduce the.....
- static stress carrying capacity of the weldment,
 - compressive stress carrying capacity of the weldment,
 - cyclic stress carrying capacity of the weldment,
 - All of the above.
- (2 marks)
- Q13. Distortion may be affected by:
- Restraint
 - Heat input
 - The number of runs deposited
 - All of the above
- (2 marks)
- Q14. An undesirable property of aluminium oxide residue is that it:
- Decreases weld pool fluidity
 - Requires more heat to melt it when compared with aluminium.
 - Causes the welder to travel quickly
 - None of the above
- (2 marks)
- Q15. A discontinuity or flaw is called a defect if it
- does not follow the specified drawings issued by the engineering department,
 - is nothing more than an excessive discontinuity;
 - exceeds the acceptance limits established by engineering based on fitness for service criteria,
 - None of the above.
- (2 marks)
- Q16. Why cracks and planar discontinuities are considered the most dangerous in causing fatigue failure?
- Fatigue loading conditions (i.e., successively increasing and decreasing) are present in service,
 - Their shape extends mainly in two dimensions and constitutes stress raisers.
 - In visual inspection, only a linear indication may be visible.
 - All of the above.
- (2 marks)
- Q17. Burn-through (too much penetration) is caused by having too much heat input in the weld zone. You can correct this problem by:
- reducing the wire-feed speed,
 - increase the travel speed,

- c. increase the wire stick-out and oscillate the torch slightly,
- d. All of the above.

(2 marks)

Q18. Surface defects caused by welding include the following:

- a. weld spatter (metal particles left after welding, which do not form part of the weld)
- b. pickups (depressions left at the end of a weld)
- c. scabs (rough metal or partial welds remaining from fabrication that are not part of the permanent structure)
- d. All of the above.

(2 marks)

Q19. Reheat Cracking

- a. Occurs in creep resisting and thick-section high strength low alloy steels during post weld heat treatment,
- b. Caused by poor creep ductility in HAZ,
- c. Accentuated by notches and defects,
- d. All of the above.

(2 marks)

Q20. Porosity is a collective name describing cavities or pores caused by gas entrapment in molten metal during solidification. What could be the cause of porosity in aluminium?

- a. Hydrogen
- b. Sulphur
- c. Phosphorus
- d. Nitrogen

(2 marks)

SECTION B (Total: 60 marks)**Answer question 1 and 3 other questions****Please use the answer booklet provided.**

- Q1. Explain what you understand by the term Hot cracks. Explain how to avoid the hot cracking defect. (15 marks)
- Q2. Describe what is lamellar tearing. What actually causes lamellar tearing? (15 marks)
- Q3. What are laminations? Explain how laminations are formed in metal. (15 marks)
- Q4. Three (3) factors are said to cause lamellar tearing when they appear simultaneously. Explain briefly. (15 marks)
- Q5. What are Micro-fissures? Explain briefly how these defects are formed. (15 marks)
- Q6. Describe what you know about crater cracks. Explain how such a defect could be avoided. (15 marks)

END OF QUESTION

OMR SHEET FOR MULTI-CHOICE QUESTIONS
(Circle your Answers)

1.	Question 1	A	B	C	D
2.	Question 2	A	B	C	D
3.	Question 3	A	B	C	D
4.	Question 4	A	B	C	D
5.	Question 5	A	B	C	D
6.	Question 6	A	B	C	D
7.	Question 7	A	B	C	D
8.	Question 8	A	B	C	D
9.	Question 9	A	B	C	D
10.	Question 10	A	B	C	D
11.	Question 11	A	B	C	D
12.	Question 12	A	B	C	D
13.	Question 13	A	B	C	D
14.	Question 14	A	B	C	D
15.	Question 15	A	B	C	D
16.	Question 16	A	B	C	D
17.	Question 17	A	B	C	D
18.	Question 18	A	B	C	D
19.	Question 19	A	B	C	D
20.	Question 20	A	B	C	D