



**UNIVERSITI KUALA LUMPUR**  
**MALAYSIA FRANCE INSTITUTE**

---

**FINAL EXAMINATION**  
**JANUARY 2014 SESSION**

---

**SUBJECT CODE** : FWB 22802  
**SUBJECT TITLE** : WELDING MECHANICS  
**LEVEL** : BACHELOR  
**TIME / DURATION** : 2.5 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 **FIVE (5) Questions**. Answer **FOUR (4) Questions** only
  6. Answer all questions in English.
- 

**THERE ARE 2 PRINTED PAGES OF QUESTIONS, EXCLUDING THIS PAGE**

---

---

(Total: 100 marks)

**INSTRUCTION: answer FOUR (4) question only**

**Please use the answer booklet provided.**

### Question 1

- (a) Determine the maximum tensile load (P), if the weld throat is 6mm, weld length is 50mm and the allowable stress in is  $125 \text{ N/mm}^2$  (5 marks)
- (b) Describe in detail the Phenomena during an arc welding process. (10 marks)
- (c) Define what is THERMAL STRAIN and STRESS. Show diagrammatically an idealised residual stress distribution across the welded plate with. Please also indicate the yield region of the plate where the stresses changes from positive to negative. (10 marks)

### Question 2

- (a) Gives the reasons why some welding processes have higher arc efficiency than the others. Please give examples of such processes. (5 marks)
- (b) Name and describe the material properties that influence heat flow during welding. (5 marks)
- (c) Define what is welding heat input and how it is expressed. (5 marks)
- (d) Describe how the welding heat input influence the formation of Heat Affected Zone (**HAZ**). (5 marks)
- (e) Name and describe **THREE (3)** types of welding heat sources. (5 marks)

**Question 3**

- (a) What is the primary task of shielding during welding. List and describe **THREE (3)** common methods of shielding in welding. There are **TWO (2)** types of gasses that were used in welding, ie the **INERT** and **ACTIVE** gasses. Explain what an inert and active gas is. Please give **TWO (2)** examples each. (10 marks)
- (b) Describe what is an **AMPERAGE**, **VOLTAGE** and **OHM**. Explain what **WELDING ARC** is and show diagrammatically the arc structure in an arc welding. (10 marks)
- (c) Arc is one source of heat in welding. List **THREE (3)** other types of heat sources. Show your answers by sketches. (5 marks)

**Question 4**

- (a) Power source of welding machines were designed and manufactured with **TWO (2)** types of dynamic characteristics. List and describe the characteristics. (10 marks)
- (b) What type of power source characteristic does the Gas Metal Arc Welding (**GMAW**) processes were normally designed and explain why it was designed accordingly? (10 marks)
- (c) Show diagrammatically the effect of welding **POLARITY** on the distribution of heat between the electrodes (Consumables and Non-Consumables) and the base metal. (5 marks)

**Question 5**

- (a) List and describe the parameters that affect the welding penetration and the formation of beads. (5 marks)
- (b) During welding there is a heating and cooling. Explain what happen during heating and cooling. It is known that solidification will take place during cooling. Please explain the effect of solidification rate on the weldment. (10 marks)
- (c) Explain the Cathodic Cleaning Action during welding of Aluminum. (10 marks)

**END OF QUESTION**