



**UNIVERSITI KUALA LUMPUR**  
**Malaysia France Institute**

---

**FINAL EXAMINATION**  
**SEPTEMBER 2014 SESSION**

---

**SUBJECT CODE** : FFB32303  
**SUBJECT TITLE** : DESIGN & FABRICATION (STEEL STRUCTURE)  
**LEVEL** : BACHELOR  
**TIME / DURATION** : 3.30 PM – 6.00 PM  
( 2.5 HOURS )  
**DATE** : 08 JANUARY 2015

---

**INSTRUCTION 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 SIX (6) questions. Answer FOUR (4) questions only.**
  - 6. Answer all questions in English.**
- 

**THERE ARE 3 PAGES OF QUESTIONS EXCLUDING THIS PAGE**

---

**INSTRUCTION: Answer FOUR (4) questions only.**

**(Total 100 Marks).**

**Please use answer booklet provided.**

### Question 1

- a). List and briefly describe the main processes and activities carried out during fabrication.  
(5 Marks)
- b). In any structural projects, DESIGN and FABRICATION are the **TWO (2)** main activities for the successful completion of the said projects. Describe what is Design and Fabrication.  
(10 Marks)
- c). State the main OBJECTIVES of Welding Design and the **FIVE (5)** points for Designing welded structures.  
(10 Marks)

### Question 2

- a). Describe what is STRESS, STRAIN and STRESS RAISER. Gives examples to your answers.  
(5 Marks)
- b). Draw a Stress-Strain Diagram of a typical ductile material and label the main elements in the graph  
(5 Marks)
- c). Structures will deform under excessive load. What are the **SIX (6)** basic modes of deformation caused by the external loads. Describe each of the modes and gives examples.  
(15 Marks)

### Question 3

- a). Chemical elements in steel would have significant effect on the steel properties. State the effect of the following chemical elements;  
(i). Carbon (ii). Sulphur and (iii). Chromium  
(5 Marks)

- b). Name and Describe any **THREE (03)** Mechanical properties of steel. (10 Marks)
- c). Define what is FATIGUE Strength and describe how fatigue strength test is conducted. (10 Marks)

#### Question 4

- a). There are **FIVE (5)** types of weld joints specified in AWS A 3.0, Standard Welding Terms and Definition. List and sketch the **FIVE (5)** types of the weld joints. Suggest and explain which types are most suitable for static and cyclical load. (10 Marks)
- b). Describe the **SIX (6)** principles of welded joints and gives examples. (10 Marks)
- c). Choose the correct **ONE (1)** among words and mark it on its alphabetical letter;
- (I). The elongation and the reduction of area of steel materials are also known as;
- (i) elasticity. (ii) plasticity. (iii) ductility. (iv) magnetism.
- (II). The nature of metals, that the strain caused by a load disappears to become zero when the load is removed, is defined as;
- (i). Elasticity (ii). Plasticity (iii). Ductility (iv). Magnetism
- (III). High tensile strength steel is the steel material that has high;
- (i). strength (ii). toughness (iii). elongation (iv). plasticity
- (IV). The yield ratio of high tensile strength steels is generally;
- (i). larger than that of low carbon steel.
- (ii). smaller than that of low carbon steel.
- (iii). nearly the same as that of low carbon steel.
- (iv). unable to compare with that of low carbon steel.
- (V). In arc welding, the heat-affected zone (HAZ) is subject to;
- (i). a change in the microstructure but no change in the mechanical properties.

(ii). no change in the microstructure but a change in the mechanical properties.

(iii). changes in both the microstructure and mechanical properties.

(iv). no change in either the microstructure or mechanical properties.

(5 Marks)

### Question 5

a). Explain what is Total Quality Control (TQC) and Quality Control Circle (QCC).

(5 Marks)

b). Name and describe any **THREE (3)** types of QC Tools commonly used in fabrication industry.

(10 Marks)

c). ISO 3834 “Quality requirement in welding” specifies the activities and requirements to ensure the welding quality. State and describe at least **TEN (10)** activities and requirements specified in the standard.

(10 Marks)

### Question 6

a). Describe the planning for Test and Inspection (ITP) and explain why it is important for quality control.

(5 Marks)

b). The main matters of welding fabrication planning and management can be categorized by each of the 4M factors as follows: Materials, Machine, Methods and Man. Explain and gives examples each of the above factors.

(10 Marks)

c). Planning of equipment is one of the essential item in project planning so that allotment of volume of work is balanced in the schedule and between fabrication processes. Describe what are the essential items to be considered in the planning of equipment.

(10 Marks)

**END OF QUESTION**