



**UNIVERSITI KUALA LUMPUR  
Malaysia France Institute**

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**FINAL EXAMINATION  
SEPTEMBER 2013 SESSION**

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**SUBJECT CODE** : FGB40103  
**SUBJECT TITLE** : JIGS & FIXTURES DESIGN  
**LEVEL** : BACHELOR  
**TIME / DURATION** : 3 HOURS  
**DATE** :

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**INSTRUCTIONS TO CANDIDATES**

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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 three (3) question only.
  6. Answer all questions in English.
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**THERE ARE 6 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.**

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**SECTION A (Total: 40 marks)**

**INSTRUCTION: Answer ALL questions.  
Please use the answer booklet provided.**

**Question 1**

- (a) Describe the difference between a jig and a fixture. (4 marks)
- (b) There are many types of jigs applied in industry. Sketch a simple *drilling jig* and describe it. (5 marks)
- (c) Define tool guiding and setting element in jig design. Sketch the element for better explanation. (4 marks)
- (d) State the advantages of using strap clamps in jigs and fixtures. (3 marks)
- (e) Discuss unilateral and bilateral tolerance in jigs and fixtures. (4 marks)

**Question 2**

- (a) Tool designer must always concern about design economic. Describe the design economic, and list down **four (4)** steps of maintaining the quality of economic design. (6 marks)
- (b) Describe ergonomics in related to jigs and fixtures. (4 marks)
- (c) Describe the purpose of predesign analysis in jigs and fixtures. (4 marks)
- (d) List down **six (6)** predesign analysis components in tool design. (6 marks)

**SECTION B (Total: 60 marks)****INSTRUCTION: Answer THREE (3) questions only.****Please use the answer booklet provided.****Question 3**

- (a) Describe renewable bushings in detail. (5 marks)

- (b) Locator is essential component in assembly jig. Evaluate and sketch the proper location for locators to locate the sample parts in Figure 1 and discuss why you choose that location. (6 marks)

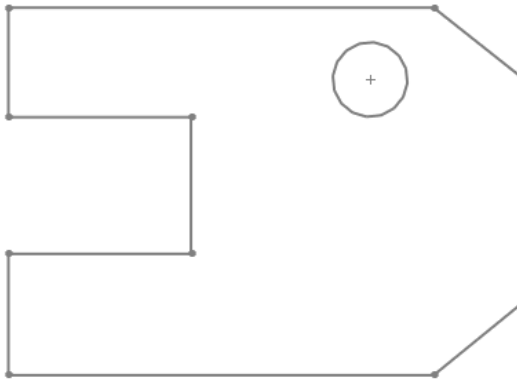


Figure 1

- (c) Describe preformed materials for tool body. Name **two (2)** most common preformed materials for tool body. (4 marks)

- (d) Describe the important of tooling alternatives. (5 marks)

**Question 4**

Please refer to the Figure 2 to answer question 4 (a) and (b).

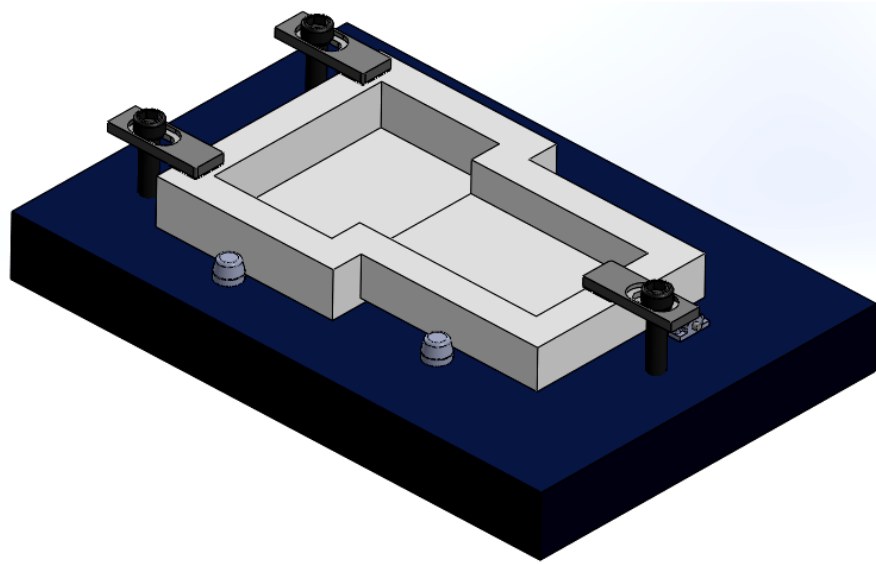


Figure 2

- (a) The fixture in Figure 2 is large and heavy. The fixture needs to be moveable from machine to other machine. Design a solution for the fixture to solve the large, heavy and to be moveable issues. Sketch and explain your answer.

(10 marks)

- (b) The fixture in Figure 2 needs to be mounted on a milling machine table where it can perform its job. Design a solution for the fixture that can be fixed on the milling machine table. Sketch and explain your answer.

(10 marks)

**Question 5**

Please refer to the Figure 3 to answer question 5 (a), (b) and (c).

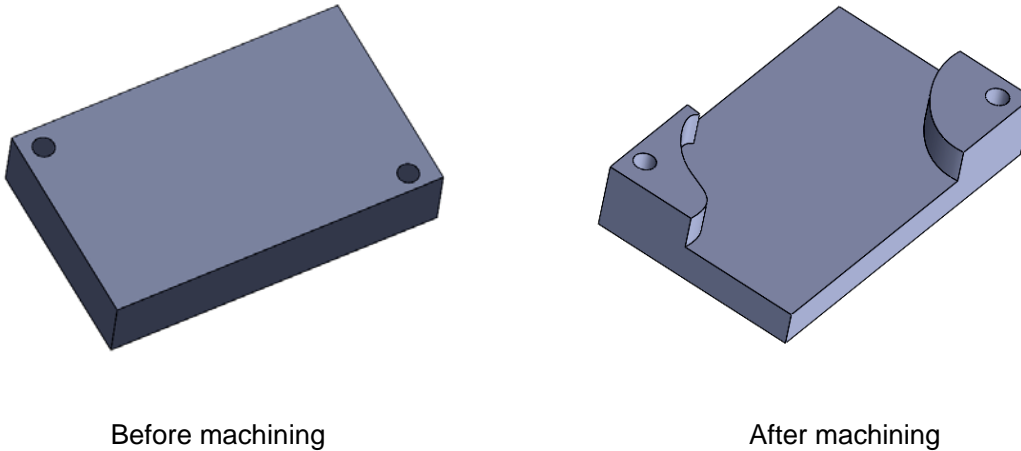


Figure 3 (Machining part)

- (a) Decide the best clamping method for the machining part in Figure 3. Analyze and sketch the clamping design method for the machining part to ensure there are no interference between cutting tools and the clamping design. (6 marks)
- (b) Describe the advantages of your clamping design. (4 marks)
- (c) Evaluate the design if the designer decided to use toggle clamp as a clamping device for the machining part. Discuss your answer. (6 marks)
- (d) Discuss the comparison between screw clamp and swing clamp. (4 marks)

**Question 6**

- (a) Discuss the comparison between tacking and welding jig. (4 marks)
- (b) Describe the purpose of backup bars in welding jig. (4 marks)
- (c) Discuss the important and advantages of using modular fixturing in welding. (5 marks)
- (d) Describe the function of inspection fixtures. (3 marks)
- (e) Discuss the purpose of gauging and measuring fixtures. (4 marks)

**END OF QUESTION**