



**UNIVERSITI KUALA LUMPUR
Malaysia France Institute**

**FINAL EXAMINATION
JANUARY 2011 SESSION**

SUBJECT CODE : FGB 40103
SUBJECT TITLE : JIGS & FIXTURES DESIGN
LEVEL : BACHELOR
TIME / DURATION : 9.00 am – 12.00 noon
(3 HOURS)
DATE : 08 MAY 2011

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 three (3) question only.
 6. Answer all questions in English.
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THERE ARE 4 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

SECTION A (Total: 40 marks)

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

Question 1

Manufacturing for global competitiveness clearly requires the success of concurrent engineering (CE). CE allows the tool design team member to be involved in product design and production where their knowledge of fixtures and manufacturing process will result in fewer design errors.

- (a) Define four (4) techniques needed by tool designer for satisfying the above objective. (8 marks)
- (b) Explain four (4) requirements to become a tool designer. (8 marks)
- (c) List four (4) factors that influence the design choices. (4 marks)

Question 2

Jigs and fixtures are so closely related that the terms are sometimes confused or used interchangeably. The difference is the way the tool is guided to the workpiece.

- (a) Identify the meaning of *jigs* and *fixtures*. (4 marks)
- (b) Describe the application of *index jigs*. (6 marks)
- (c) Classify the purpose of jig illustrated in the Figure 1 below.

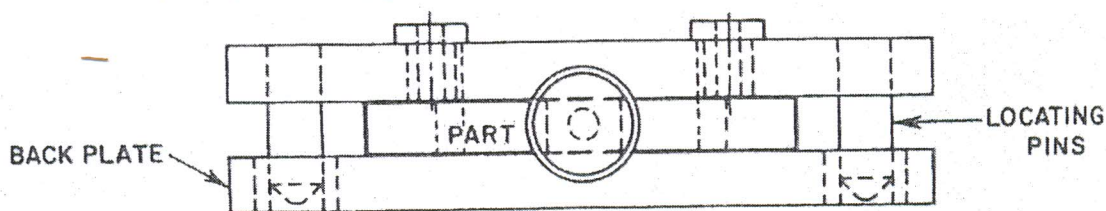


Figure 1

Sandwich Jig

(10 marks)

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

The tool designer must make sure the part is precisely located and rigidly supported. In addition to properly positioning the part, they should ensure the tool is easily loaded and unloaded.

- (a) Describe the basic rules of clamping. (6 marks)
- (b) Examine the principles of clamp to meet the above requirement. (8 marks)
- (c) Discuss how locating a part from a hole. (6 marks)

Question 4

Plate jigs are basically modified or improved template jigs. While performing the same locating function as templates, they also incorporate a means of securing the part.

- (a) Compare the principle differences between *plate jigs* and *template jigs*. (6 marks)
- (b) Explain the techniques to design *plate jig*. X (8 marks)
- (c) Describe type of jigs that uses two plates. (6 marks)

Question 5

Design economy begins with the tool designer's ideas and is carried through to the completion of the tool. The demands of modern industry for maximum productivity at minimal cost are a challenge to the tool designer.

(a) Describe the principles of economic design.

(5 marks)

(b) Develop comparative analysis of the alternatives below.

Thousand five hundred guide plates must be milled to receive a locating block. The tool designer has determined three possible alternatives:

1. Have a tool maker, who earns RM 15 per hour; mill the plates at a rate of 50 per hour.
2. Use limited tooling that costs RM 40 in the production department. The machine operator in this department, who earns RM 6 per hour, can make a part every 2 minutes.
3. Use more expensive tool that cost RM 190 but is capable of producing a part every 30 seconds. This would be done in the production department, where the machine operator earns RM 9 per hour.

Which alternative should the tool designer select as the most efficient and economical?

(15 marks)

Question 6

Plate fixtures are the most versatile and common form of fixture used today. The basic plate fixture is a simple plate on which the part is mounted, located, and held with a variety of tooling details. Please refer to the Figure 2 to answer the questions.

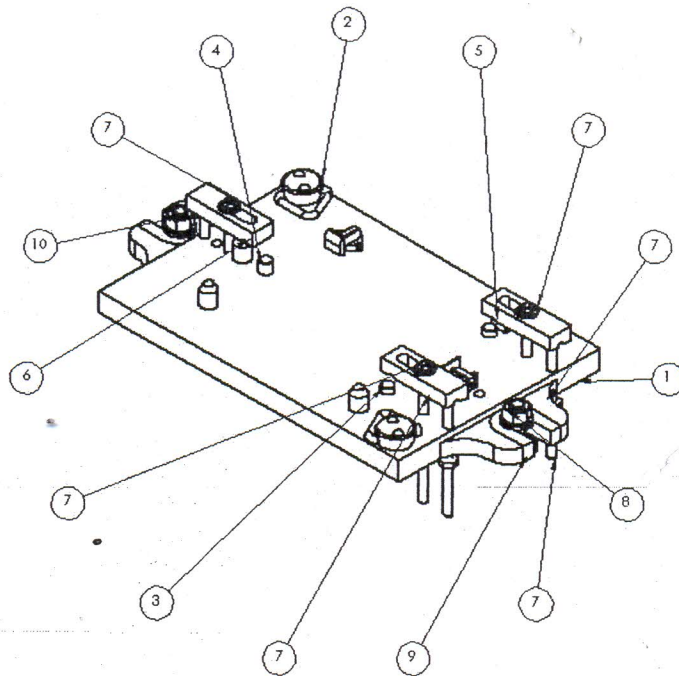


Figure 2

- (a) Describe and analyze briefly how design fixtures are planned as shown in Figure 2. (10 marks)
- (b) Elements no.3 is important at most fixture design. Evaluate it function in the design. (5 marks)
- (c) Discuss the use of element no.2 in the fixture design. (5 marks)

END OF QUESTION