



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

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**FINAL EXAMINATION**  
**SEPTEMBER 2015SESSION**

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**SUBJECT CODE** : FMB31203  
**SUBJECTTITLE** : MACHINE TOOLS DESIGN  
**LEVEL** : BACHELOR  
**TIME / DURATION** : 9.00 AM – 11.30 AM  
( 2.5 HOURS )  
**DATE** : 9 JANUARY 2015

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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) questions only.
  6. Answer all questions in English.
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**THERE ARE 4 PRINTED 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**

With reference, there is **NO** one definition which adequately defines 'design'. Briefly describes;

- (a) Your own definition to design (the verb).

(10 marks)

- (b) How importance of design in terms of business, development and sustainability.

(10 marks)

**Question 2**

Describe about the machine tools classification criteria base on general principal of it design in terms of:

- (a) Degree of automation

(6marks)

- (b) Weight and capabilities

(6marks)

- (c) Level or degree of specialization

(8 marks)

**SECTION B (Total: 60 marks)**

**INSTRUCTION: Answer THREE (3) questions ONLY.**

**Please use the answer booklet provided.**

**Question 3**

Design Process

- (a) Draw and label the Waterfall Diagram for design control. (10 marks)
  
- (b) What is a Design History File (DHF)? What information/data should be placed into it? (5 marks)
  
- (c) Consider the design of an elevator (passenger lift). Identify a list of needs in 3 scenarios: normal use, dysfunction, abuse/misuse for two sets of users – the passengers and the building operators. Number each need and mark with an asterisk functional needs.

You might choose to lay your answer out in a tabular format similar to that given below.

user	needs in:		
	normal use	dysfunction	abuse/misuse

(5 marks)

**Question 4**

In machine tools design the working and auxiliary motion are highly desired in the preliminary concept design;

- (a) Explain in details with some illustration how these concepts have been adapted in current available machine tools.

(10 marks)

- (b) Machine tools motion and accuracy principally base on its guide-ways, describe how this guide-ways can be classified and the basics requirement in machine tools design.

(10 marks)

**Question 5**

- (a) Determine the rpm of a lathe spindle if a work-piece of diameter 100 mm is to be turned at a cutting speed of 88 m/min.

(6 marks)

- (b) A 40 mm hole is drilled at a speed of 30mm/min and feed of 0.1 mm/tooth. Calculate the feed per minute of the operation.

(8 marks)

- (c) List down the three machine tools that can be classified by different criteria of the degree of automation and briefly explain each one of them.

(6 marks)

**Question 6**

Shafts in machine tools must be designed to minimise deflection. Too much deflection can degrade gear performance leading to noise and vibration. One of the factors in machine tool shaft design is loading.

- (a) Explain with auxiliary sketching and label what are the typical load that can be found during shaft operation

(10 marks)

- (b) Briefly discuss the design guidelines to minimize machine tool shaft fatigue.

(10 marks)

**END OF QUESTION**