



**UNIVERSITI KUALA LUMPUR
Malaysia France Institute**

**FINAL EXAMINATION
JANUARY 2014 SESSION**

SUBJECT CODE : NMB 22203
SUBJECT TITLE : DESIGN 1
LEVEL : BACHELOR
TIME / DURATION : 2 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 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 5 PAGES OF QUESTIONS EXCLUDING THIS PAGE.

SECTION A (Total: 40 marks)**INSTRUCTION: Answer ALL questions.****Please use the answer booklet provided.****Question 1**

The design process is a series of stages and check-points where each step in this process can be reviewed and analyzed.

- (a) Interpret three (3) importance of understanding the 'problem definition' in the initial phase of a new product development. (6 marks)
- (b) List and explain four (4) benefits of employing Quality Function Deployment (QFD) in the design stage. (8 marks)
- (c) Analyze how product benchmarking exercise may assist in development of a product that satisfies customer requirements. (6 marks)

Question 2

Design for sustainability is a concept which demands in every design of nowadays product concepts as well as services.

- (a) List three (3) key principles of design for sustainability. (6 marks)
- (b) Explain how the design for sustainability may benefits to manufacturer. (8 marks)
- (c) Interpret the concept of the 'design for sustainability' and give one (1) example of design that applying the concept. (6 marks)

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

A successful appliance company wants to design a new generation of coffee maker (as shown in Figure 1). After spending a lot of money developing several prototypes, they discovered during field testing that every prototype had features that customers did not like. *The problem:* The Product design team did not know how to accurately identify customer needs.



Figure 1

- (a) Analyze how would the company accurately identify customer needs in order to develop a new generation of coffee maker to ensure the new coffee maker satisfy customer requirements. (6 marks)
- (b) Develop strategies that the company can implement in order to determine the technical requirements of the coffee maker. (8 marks)
- (c) Generate three (3) possible technical specifications for the coffee maker. (6 marks)

Question 4

You are a member of a product design team of a large manufacturing company which has developed a new three pin plug as shown in Figure 2.

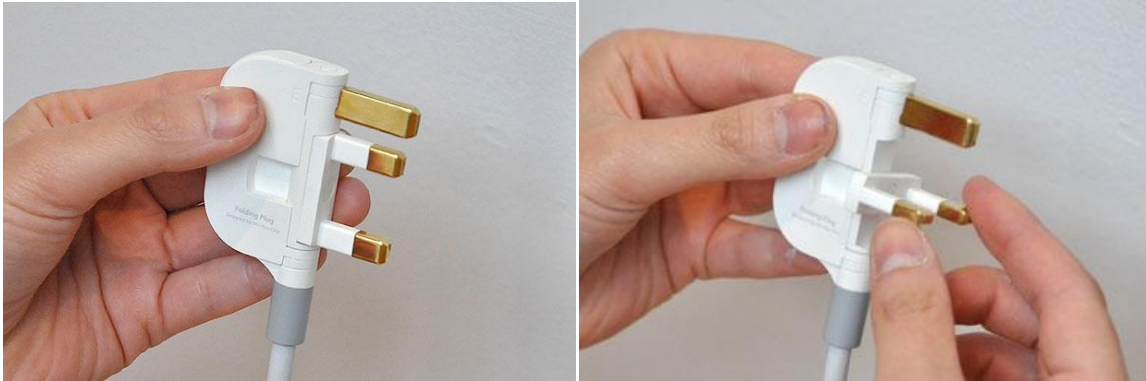


Figure 2

- (a) Generate another three (3) concepts that are possible for the three pin plug and explain each concept. (12 marks)
- (b) Relate how the execution of 'Concept Screening Matrix' and 'Concept Scoring Matrix' may assist your team in selecting the best design concept. (4 marks)
- (c) Analyze how the design of three pin plug as shown in Figure 2 can be further improved by considering the 'design for sustainability' concept. (4 marks)

Question 5

Design for Manufacture and Assembly (DFMA) requires team working with manufacturer.

- (a) Explain about the involvement of production personnel in design phase. (4 marks)

- (b) In general, there are three main elements of manufacturing costs that have to take into account; component costs, assembly costs and overhead costs. Relate how the concept of DFMA may contribute to the overall manufacturing cost reduction. (6 marks)

- (c) With reference to Design for Assembly (DFA) guidelines, plan and generate strategies for improvement of assembly product as shown in Figure 3 that you and your team will propose in order to reduce costs in assembly. Sketch the improved design. (10 marks)

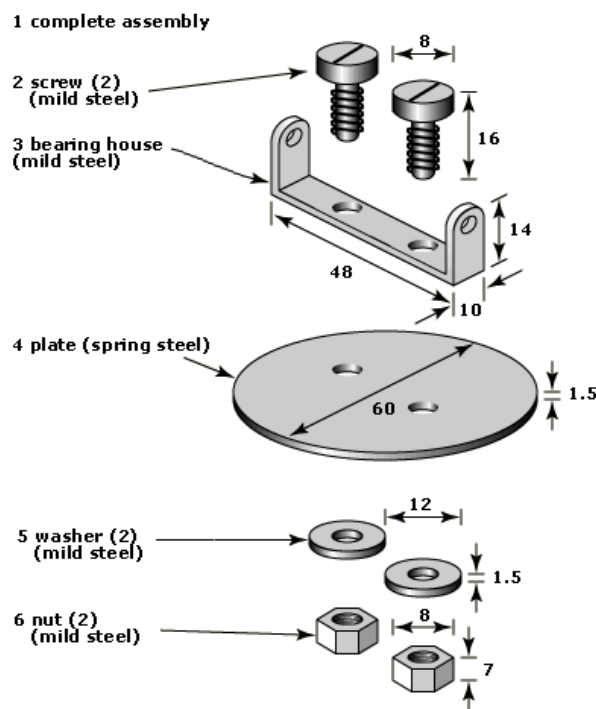


Figure 3

Question 6

In general, office workers spend about 9 hours a day sitting on their chair. Thus, a comfortable and ergonomics sit is a top priority in designing an office chair.

- (a) Interpret your understanding on the term 'ergonomics design'.
(4 marks)
- (b) List four (4) possible consequences of not considering ergonomics approach in the design of the office chair.
(4 marks)
- (c) As part of good working posture, analyze how the best posture of a person when sitting on the chair is.
(6 marks)
- (d) Referring to Figure 4, explain the improvements that can be suggested on the design of the office chair by considering ergonomics approach.
(6 marks)



Figure 4

END OF QUESTION