Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2022/2023

COURSE NAME	:	DESIGN FOR MANUFACTURE
COURSE CODE	:	BDX 20702
PROGRAMME CODE	:	BDX
EXAMINATION DATE	:	JULY/AUGUST 2023
DURATION	:	2 HOURS
INSTRUCTION	1.	ANSWER **FOUR (4)** QUESTIONS **ONLY** FROM **FIVE (5)** QUESTIONS
	2.	THIS FINAL EXAMINATION IS CONDUCTED VIA **CLOSE BOOK**
	3.	STUDENTS ARE **PROHIBITED** TO CONSULT THEIR OWN MATERIAL OR ANY EXTERNAL RESOURCES DURING THE EXAM CONDUCTED VIA CLOSED BOOK

THIS QUESTION PAPER CONSISTS OF **FOUR (4)** PAGES

Q1 **(a)** Discuss the stages in product life cycle by considering the transportation industries with the aid of sketch and relevance example.

(9 marks)

(b) Analyse **FOUR (4)** reasons of a substituting material is considered important in design for manufacture (DFM).

(8 marks)

(c) Based on the **Figure Q1(c)**, briefly explain what is the problems with the design related to design form manufacture (DFM) and design for assembly (DFA) and constuct a new design to overcome the problem.

(8 marks)

Q2 **(a)** Discuss **TWO (2)** important roles of ergonomic in an aviation industry and justify **TWO (2)** approaches of managing human error from an ergonomics perspective.

(8 marks)

(b) Analyze the critical considerations for specific aircraft structures on
i) fuselage design,
ii) wing design,
iii) empennage, and
iv) landing gear.

(8 marks)

(c) Evaluate **FOUR (4)** reason why the carbon fiber reinforced polymer (CFRP) become a material of choice in aircraft industry.

(9 marks)

Q3 **(a)** Evaluate critical material design criteria for metal based structures in aircraft.

(9 marks)

(b) Describe the deep drawing in sheet metal forming and give an example of aircraft part that used deep drawing method for shaping process.

(8 marks)

(c) Analyse **FOUR (4)** mistakes to be avoided when designing sheet metal parts.

(8 marks)

Q4 **(a)** Due to the application of high cutting speed, justify **FOUR (4)** reasons why total production cost increased after 600 FPM (feed per minute), as tolerance and surface finish becomes increasingly fine. Refer **Figure Q4(a)** as reference.

(8 marks)

(b) One of the DFMA part design considerations in injection molding is about 'Radius'. By referring **Figure Q4(b)** analyze **FOUR (4)** reasons why 'Radius' is important.

(8 marks)

(c) Appraise **FIVE (5)** reasons for implementing plastic parts in aircraft industry.
(9 marks)

Q5 (a) Explain **FOUR (4)** design considerations of plastic parts.
(8 marks)

(b) Define the importance of applying surface treatment in aircraft components.
(8 marks)

(c) Justify **THREE (3)** reasons why manufacturer try to avoid post-processing operation when fabricating a product? Support your judgement with a suggestion on how to reduce the possibility of post-processing operation.
(9 marks)

- END OF QUESTION –

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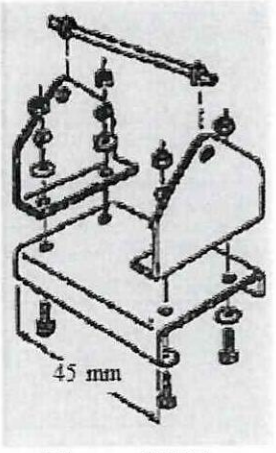

Figure Q1(c)

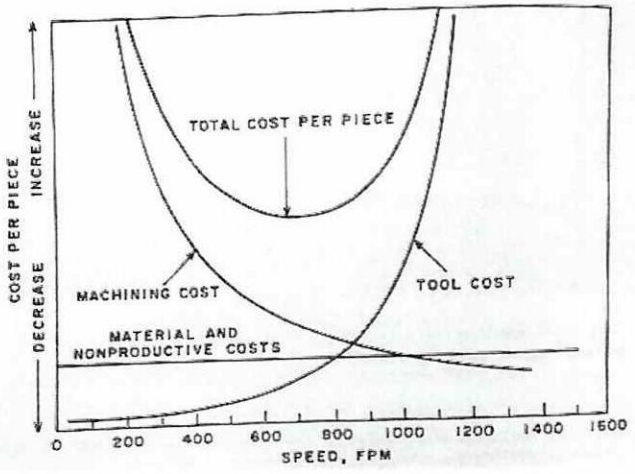

Figure Q4(a)

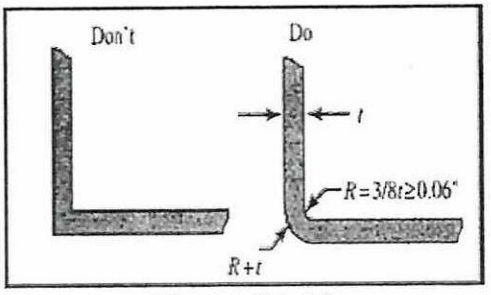

Figure Q4 (b)