



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2021/2022**

COURSE NAME : DESIGN FOR MANUFACTURE
COURSE CODE : BDX 20702
PROGRAMME CODE : BDX
EXAMINATION DATE : JULY 2022
DURATION : 2 HOURS
INSTRUCTION : 1. ANSWER ALL 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 EXAMINATION CONDUCTED VIA CLOSED BOOK

THIS QUESTION PAPER CONSISTS OF **FIVE (5) PAGES**

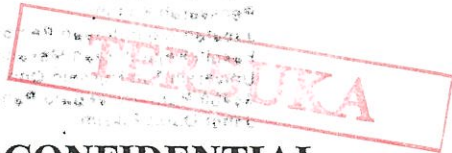
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- Q1**
- (a) Based on **Figure Q1(a)**, please evaluate on how manufacturer decided to do materials selections to fabricate the parts. (9 marks)
- (b) In general, product design can be categorized into 4 phases; i) conceptual design, ii) detailed design, iii) manufacturing, and iv) distribution, servicing, and disposal. Choose and justify what is the most important phase in product design. (8 marks)
- (c) Discuss **THREE (3)** an achievements when we could apply Design for Assembly (DFA) particularly in an early stage product manufacturing. (8 marks)
- Q2** In aircraft, conceptual design phase could take advantage of novel methodology that would not be based on empirical or semi-empirical equations to estimate performance, weights, cost and loads, but rely on analytical models to greater extent.
- (a) Explain the **THREE (3)** initial phases of an aircraft design as seen in **Figure Q2(a)**. (6 marks)
- (b) Find and evaluate the suitable materials for the metal structures as shown in **Figure Q2(b)** and suggest with explanation the manufacturing process to produce the empennage. (9 marks)
- (c) In aircraft structural design, describe and analyze the functional parameters of these structures on i) fuselage design, ii) wing design, iii) empennage, and iv) landing gear. (10 marks)
- Q3**
- (a) There are **TWO (2)** types of joints suitable for CFRP with a thermosetting resin, mechanical fasteners and adhesive. Analyze an issue that may arises with both types of joint when applying to CFRP. (8 marks)
- (b) In sheet metal cutting as shown in the **Figure Q3(b)**, define and interpret the differences in between the three process. (9 marks)
- (c) Illustrate and describe **TWO (2)** points between an expandable mold and a permanent mold. (8 marks)

- Q4**
- (a) Appraise a reason for implementing injection molding in aerospace industry. (8 marks)
 - (b) Interpret DFMA design consideration in injection moulding based on **Figure Q4(b)**. (8 marks)
 - (c) Briefly explain why certain components required surface treatment. (4 marks)
 - (d) Common problems that may occur during the painting particularly in aircraft parts is poor adhesion. Appraise a reason why poor adhesion in painting is occur and give suggestion on how to overcome the problem. (5 marks)

- END OF QUESTION -



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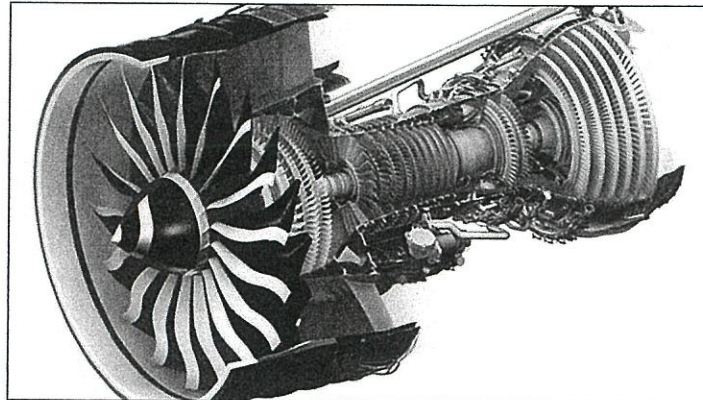


Figure Q1(a)

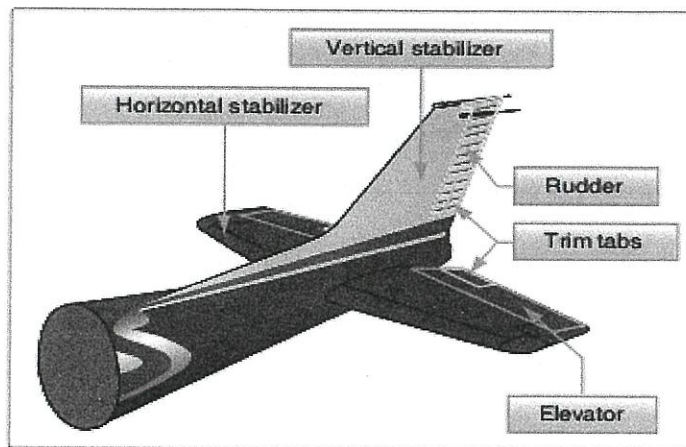


Figure Q2(a)

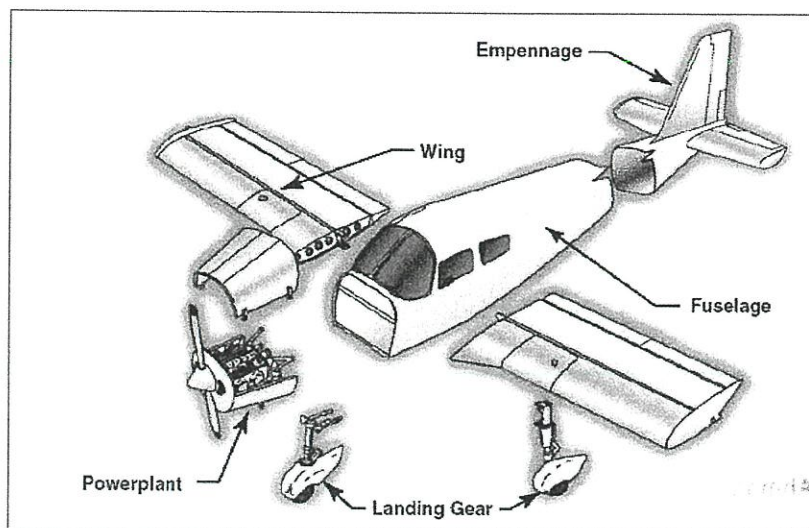


Figure Q2(b)

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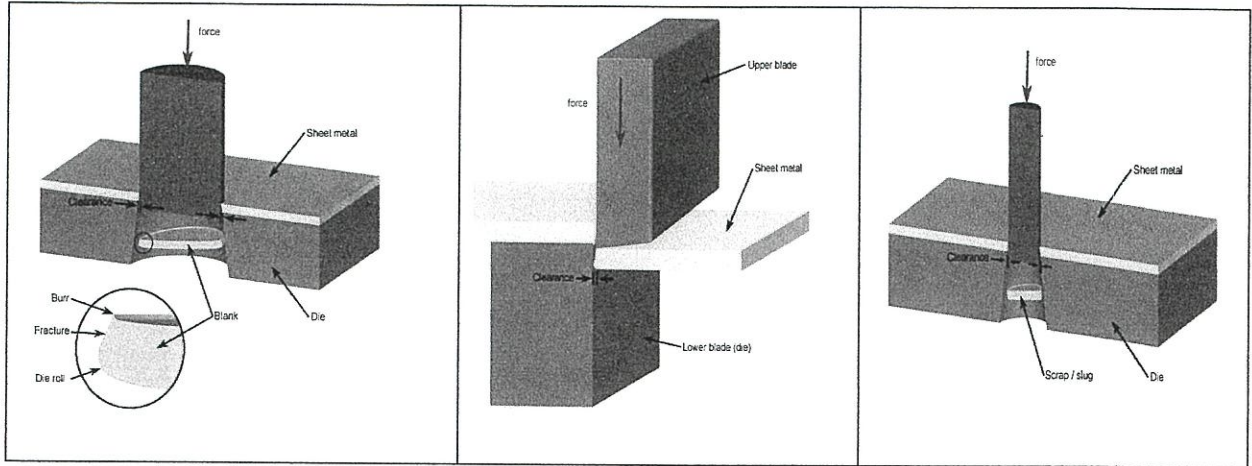


Figure Q3(b)

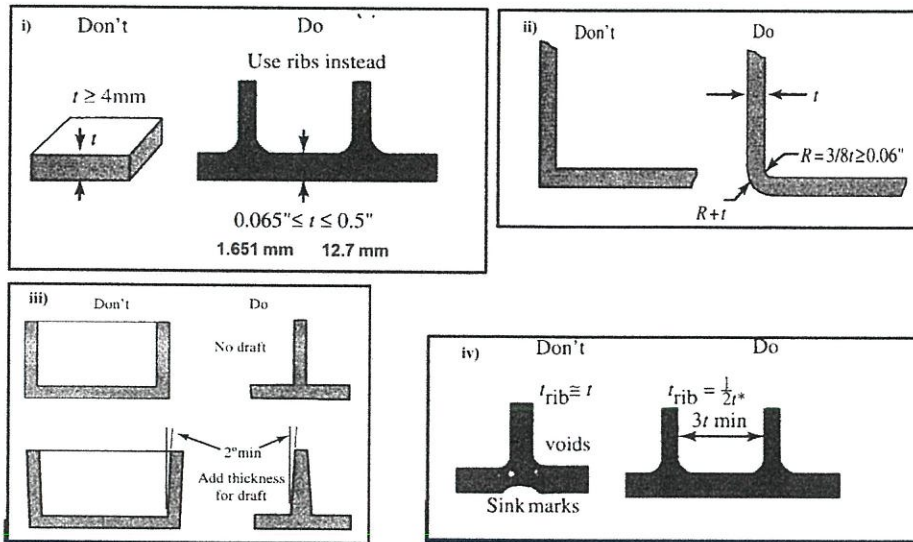


Figure Q4(b)

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