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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2023/2024**

COURSE NAME : MANUFACTURING TECHNOLOGY I
COURSE CODE : BDX10902
PROGRAMME CODE : BDX
EXAMINATION DATE : JULY 2024
DURATION : 2 HOURS
INSTRUCTION : 1. PART A: ANSWER **ONE (1)** QUESTION FROM TWO (2) QUESTION ONLY
2. PART B: ANSWER ALL QUESTION
3. THIS FINAL EXAMINATION IS CONDUCTED VIA
 Open book
 Closed book
4. 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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PART A

- Q1** (a) Explain in general major manufacturing process of components in aircraft below. List **ONE (1)** example of the product produced by;
- i. Plastic Forming
 - ii. Metal casting
 - iii. Metal forming
 - iv. Composite
- (8 marks)
- (b) There are **FOUR (4)** key focusing technology investment on future needs in aerospace manufacturing. Justify the key point and elaborate in your own understanding
- (8 marks)
- (c) An aerospace industry has been driven by “market trend” and economic from initial aircraft designed and fabricated. Discuss the market trend criteria in your point of view.
- (9 marks)
- Q2** (a) There are three classifications of major material in an aircraft manufacturing.
- i. Classify each of the **THREE (3)** categories
 - ii. Justify **ONE (1)** example for each categories
 - iii. Compare the material in their physical properties
- (10 marks)
- (b) Composites is one material technology developed in majority of aircraft component. Distinguish the composite material in aircraft manufacturing in term of pattern crossed layer, ingredient and short or long fibre. You may need to sketch the illustration structure.
- (7 marks)
- (c) Environmental aspect is a common issue in order to maintain, repair and service the aircraft body and structure. Examine **THREE (3)** methods to deciding the aircraft body to prevent a corrosion and decaying issue.
- (8 marks)

PART B

- Q3** (a) Metal casting process can be divided into several types which need to be selected based design specifications. Compare the advantages and disadvantages between vacuum molding and investment casting.
(10 marks)
- (b) Sketch the process in centrifugal casting until the parts are produced. List up **TWO (2)** advantages and disadvantages of centrifugal casting in industries
(7 marks)
- (c) With the help of sketches, differentiate between open molds and closed molds. Explain the function of a core in casting process
(8 marks)
- Q4** (a) Impression die forging and flashless forging is one of the important sheet metal forming practice. Draw a flash problem and list **THREE (3)** comparisons
(8 marks)
- (b) Discuss the advantages of extrusion process and name **FOUR (4)** products using this technique
(8 marks)
- (c) **Figure Q4 (c)** shows a metal forming product having a crucial step to get a uniform wall thickness on the side wall.
- i. Name the suitable metal tooling forming process for the product.
 - ii. Sketch and label the process with explanation
- (9 Marks)

- Q5** (a) The criteria of sheet metal form to fabricate a fuselage and any stretching process depending on **SIX (6)** categories. Justify the categories and elaborate your answer
(6 marks)
- (b) Hot forming process including superplastic forming (SFP) either alone or in combination with diffusion bonding (DB) and hot die forming process is commonly used to fabricate titanium sheet metal part. These will enhance the performance of the aircraft. Support this statement
(7 marks)
- (c) Major application of formed extrusion includes wing stiffeners, channel vents, spar chords, fuselage frames and body chords. With the help of sketches, analyze **THREE (3)** fundamentals involve in stretch forming.
(12 marks)

- END OF QUESTION -

APPENDIX A



Parts courtesy of RemingtonArms.



Figure Q4 (c)