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**UNIVERSITI TUN HUSSEIN ONN  
MALAYSIA**

**FINAL EXAMINATION  
(ONLINE)  
SEMESTER II  
SESSION 2019/2020**

COURSE NAME : MANUFACTURING TECHNOLOGY I  
COURSE CODE : BDX 10902  
PROGRAMME : BDX  
EXAMINATION DATE : JULY 2020  
DURATION : 2 HOURS  
INSTRUCTION :  
ANSWER ALL QUESTION

THIS QUESTION PAPER CONSISTS OF FIVE (5) PAGES

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**TERBUKA**

- Q1** (a) The mold in casting process contains a cavity whose geometry determines the shape of cast part.
- (i) With the help of sketches, differentiate between open molds and closed molds. (6 marks)
- (ii) Explain the function of a core in casting process and how to implement it. (2 marks)
- (b) Discuss the casting process required to produce the casting component shown in **Figure Q1(b)** with high accuracy of dimension and quantity. (5 marks)
- (c) (i) A steel rectangular plate with a dimension of 650mm length x 105mm width x 15mm thick, will be produced using sand casting. If the mold constant is 3.26 min/cm<sup>2</sup>, calculate the total solidification time required for the casting to solidify after pouring. (6 marks)
- (ii) After the plate was solidified, it was found that the plate has defects. By the aid of a sketch, distinguish **FOUR (4)** common types of defects that might occurred in sand casting with the cause of each defect. (6 marks)
- Q2** (a) Impression die forging and flashless forging are among two important process in metal forming practice. With the aid of diagram, compare these two process. (8 marks)
- (b) **Figure Q2(b)** shows a metal forming product that crucial to get a uniform wall thickness on the side wall.
- (i) Select the suitable metal tooling forming process for the product. (2 marks)
- (ii) Sketch and label the process with explanation. (6 marks)
- (c) Springback is a phenomenon happened in sheet metal bending operation. Identify the phenomenon. (3 marks)
- (d) Differentiate bulk deformation processes and sheet metal processes. (6 marks)

- Q3** (a) Manufacturing in its comprehensive sense, is the process of converting raw materials into finished products. Every industry has been designed to have specific manufacturing capabilities to fulfill the production requirement. List and explain **TWO (2)** main manufacturing capabilities that typically involved in the manufacturing company. (5 marks)
- (i) Identify the characteristics and limitations of an injection moulding product. (5 marks)
- (ii) List **TWO (2)** examples of products that is normally made by such technique. (2 marks)
- (b) Compare the differences between the mold for injection molding and the mold for compression molding process. (6 marks)
- (c) Describe the die swell phenomenon in extrusion. (3 marks)
- (d) Explain the functions of the screen pack and breaker plate at the die end of the extruder barrel. (4 marks)
- Q4** (a) Major application of formed extrusion includes wing stiffeners, channel vents, spar chords, fuselage frames and body chords. With the help of sketches, distinguish **THREE (3)** fundamentals involve in stretch forming. (9 marks)
- (b) “Hot forming processes including superplastic forming (SFP), either alone or in combination with diffusion bonding (DB), and hot die forming processes commonly used to fabricate titanium sheet metal parts. These will enhance the performance of aircraft”. Support this statement. (6 marks)
- (c) “In aerospace manufacturing, there are always demand for producing metal aircraft panels with improved performance including enhanced strength, lower weight, reduced fabrication costs, and increased resistance to fatigue and corrosion”. Appraise Creep age forming (CAF) technique to meet the aerospace demand. (6 marks)
- (d) Sheet metal products are available both in flat pieces and also in the form of coil stock produced by the primary sheet metal producers.

Aerospace designers select the sheet products according to the type of part designed for the aircraft including geometry. To satisfy the design requirements for a prospective new metal alloy, classify the consideration factors.

(4 marks)

**END OF QUESTION**

FINAL EXAM

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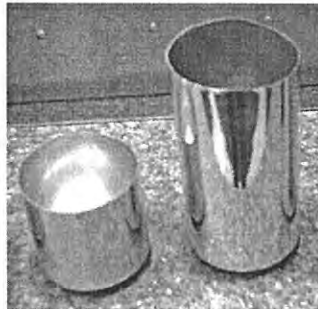
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**Figure Q1 (b)**



Parts courtesy of RemingtonArms.



**Figure Q2 (b)**