Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER I
SESSION 2021/2022

COURSE NAME	:	MANUFACTURING PROCESS
COURSE CODE	:	DAM 11002 / 23202 / 32202
PROGRAMME CODE	:	DAM
EXAMINATION DATE	:	JANUARY / FEBRUARY 2022
DURATION	:	2 HOURS 30 MINUTES
INSTRUCTION	:	1. PART A ANSWERS **FOUR (4)** QUESTIONS ONLY FROM **FIVE (5)** QUESTIONS PROVIDED. 2. PART B ANSWER **ONE (1)** QUESTION ONLY FROM **TWO (2)** QUESTIONS PROVIDED. 3. THIS FINAL EXAMINATION IS AN **ONLINE ASSESSMENT** AND CONDUCTED VIA **OPEN BOOK.**

THIS QUESTION PAPER CONSISTS OF **SIX (6)** PAGES

PART A : ANSWERS FOUR (4) QUESTIONS ONLY

Q1 (a) List **FIVE (5)** characteristics of successful product development.

(5 marks)

(b) Dimension and tolerance are two of the factors that determine the performance of a manufactured product. Explain the difference between dimension and tolerance.

(4 marks)

(c) Basic Oxygen Furnace (BOF) is one of the most important process in steel making. Explain the sequence of this process.

(6 marks)

(d) Describe what is copper.

(5 marks)

Q2 (a) Sketch a drawing showing the movement direction of cutting speed, feed, and depth of cut.

(3 marks)

(b) Explain the lathe process to turn a cylindrical workpiece of length 10 mm and diameter 3.2 mm into a finished product as **Figure Q2(b).**

(7 marks)

(c) Explain the **TWO (2)** categories of casting processes.

(4 marks)

(d) Explain shrinkage allowance. How do you as a machinist overcome the shrinkage problem.

(6 marks)

Q3 (a) A cylindrical shape product as **Figure Q3(a)** can be produced using machining or metal forming. State **ONE (1)** advantage and disadvantage of each method used.

(4 marks)

(b) Explain hot roll and cold roll metal steel. If you work in a building construction industry, which of the metal type will you use. Discuss your selection.

(6 marks)

(c) Explain three types of forging dies.

(6 marks)

(d) If you want to make a precision product, which of the forging dies in Q3(c) that will you use. Discuss your answer.

(4 marks)

Q4 (a) Explain thermoforming process and give examples of thermoforming.

(5 marks)

(b) Give **TWO (2)** general product design guidelines for plastic product and briefly explain the reason.

(5 marks)

(c) With a sketch, explain extrusion process and two main components of an extruder.

(6 marks)

(d) Describe Calendaring. Explain why Calendaring is important in sheet and film production processes?

(4 marks)

Q5 (a) Explain the difference between welding and brazing process and give the advantages of each process

(4 marks)

(b) **Table Q5(b)** shows various material and application. For each given material, suggest the welding or joining process that suitable to the material and application. Give the reason for each suggestion.

(6 marks)

(c) Explain why washer is often used with threaded fasteners. State **TWO (2)** types of washer and their functions.

(6 marks)

(d) Weld quality is important to ensure the strength of joint and to ensure the absent of defects. Explain how to minimize the warpage happened during welding process.

(4 marks)

PART B : ANSWER ONE (1) QUESTION ONLY

Q6 Company ABC Sdn Bhd plan to manufacture alloyed sport rim as shown in **Figure Q6(a)**. The new alloyed sport rim will replace the existing steel rim. With the alloyed sport rim, cars can have a more aesthetic appearance, a sportier look and more value. Also, the sport rim is expected to improve handling and reduce fuel consumption. The sport rim is also required to have less effect on wear rate of the tyre, brake pad and brake disc. The company has assigned you to study and answer to the following knowledge gap.

(i) Proposed suitable material for the product.

(2 marks)

(ii) Justify your suggestion by relating your answer with the requirement of the product.

(6 marks)

(iii) Draw the process flow chart in producing the sport rim. The flow chart should be started from ready stock material until it becomes ready sale product.

(9 marks)

(iv) Explain the purpose of each process and the changes of the material work material and too involved in the process.

(3 marks)

Q7 An engineer found that a keyboard casing made from ABS and produced by the injection moulding process has greater shrinkage than the calculated theoretical value. The part's most critical dimension is given as 220.5 ±0.25 mm in length. However, the measurements performed on the actual part found that the length is 221.5 mm. If the shrinkage value for ABS is 0.08 and the first approach in resolving the issue is to use the appropriate mold dimension :

(i) If the engineer does not want to change the mold dimension, propose **THREE (3)** adjustments in process parameters and the reason that could be made to reduce the amount of shrinkage

(9 Marks)

(ii) Draw the injection molding process flow in producing the keyboard casing. Explain the purpose of each process stages that involved.

(5 Marks)

(iii) List **THREE (3)** advantages and disadvantages ABS as a material for keyboard casing.

(6 Marks)

-END OF QUESTIONS –

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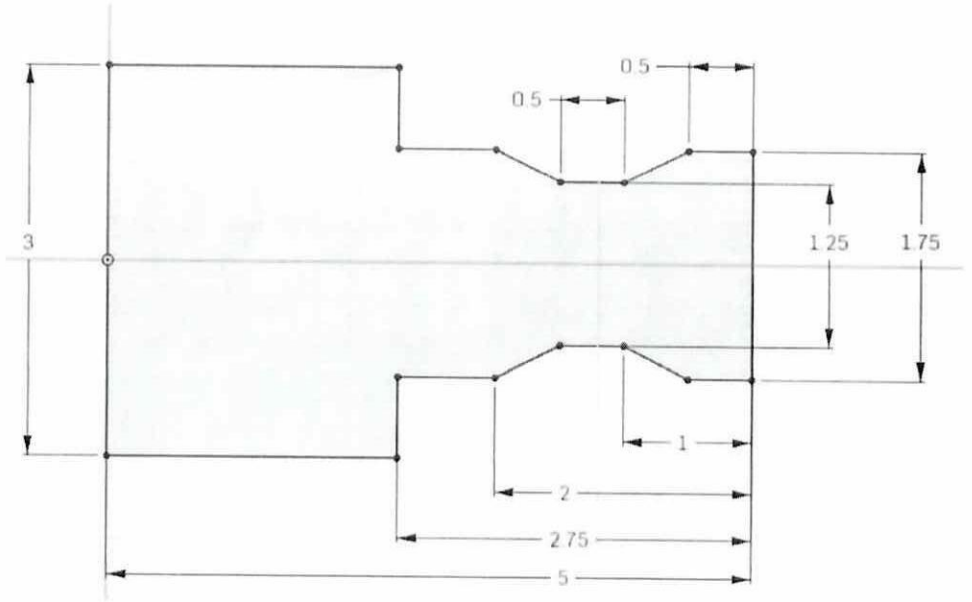

Figure Q2(b)

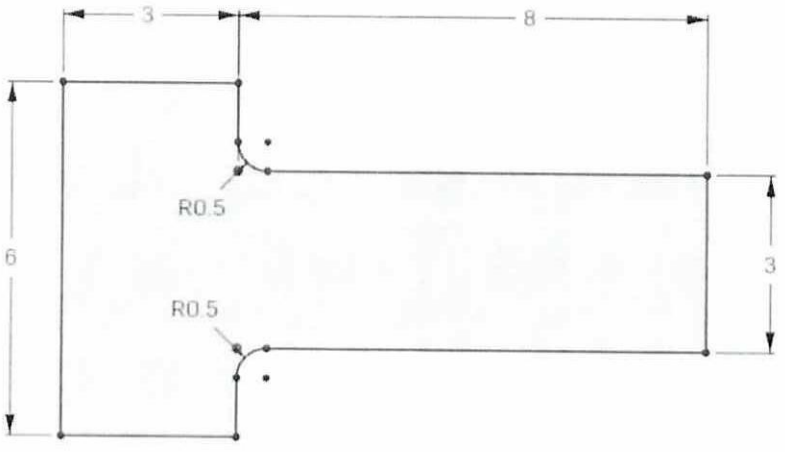

Figure Q3(a)

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Table Q3 (b): Material & application

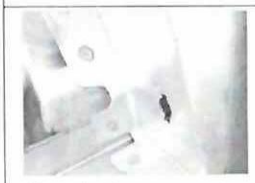
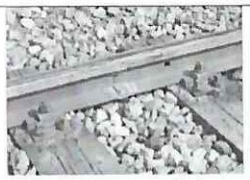
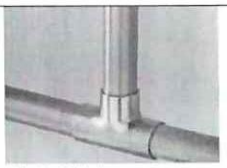
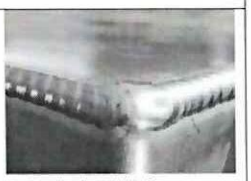
Material & application				
 (i) High strength low alloy steel & car body	 (ii) 1050 steel & rail	 (iii) SUS304 stainless steel tube & furniture structure	 (iv) Thin copper tube for air-condition line	 (v) AA5083 Aluminium & boat

Figure Q6 (b)