



UTHM

Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

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

COURSE NAME : ADDITIVE MANUFACTURING

COURSE CODE : BDX30603

PROGRAMME : BDX

EXAMINATION DATE : JULY 2022

DURATION : 3 HOURS

INSTRUCTION : 1. ANSWER ALL QUESTION

2. THIS FINAL EXAMINATION IS
CONDUCTED VIA **CLOSED 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 **THREE (3)** PAGES

CONFIDENTIAL

TERBUKA

- Q1**
- (a) Many terms have been used to describe the meaning of Rapid Prototyping (RP). Discuss **THREE (3)** of such terms and explain why they have been used in place of RP. (6 marks)
 - (b) Write the advantages of Rapid Prototyping (RP) in terms of its beneficiaries such as the product designers, tool designers and manufacturing engineers. (6 marks)
 - (c) Why are some Rapid Prototyping (RP) parts required finishing processes? Distinguish **THREE (3)** methods to enhance surface roughness and accuracy of RP parts. (8 marks)
- Q2**
- (a) Compare the differences between Multi-Jet Modelling (MJM) and Fused Deposition Modelling (FDM). Explain **THREE (3)** strengths and weaknesses of these two systems. (10 marks)
 - (b) Draw the schematic diagram and describe the process Multi-Jet Modelling (MJM) system. (10 marks)
- Q3**
- (a) It is known that the process parameters such as layer thickness, part orientation and binder setting saturation value (shell and core) were according to certain values in three-dimensional printing process (3DP). Briefly explain these **THREE (3)** process parameters. (6 marks)
 - (b) Distinguish **THREE (3)** types of material processing capabilities of the Selective Laser Sintering (SLS) systems and briefly explain the benefits of each type. (6 marks)
 - (c) Three-dimensional printer (3DP) creates parts by a layered printing process and adhesive bonding, based on sliced cross-sectional data. Illustrate with an appropriate schematic diagram the 3DP system operations. Write **TWO (2)** types of application for 3DP process. (8 marks)



- Q4** (a) Identify the application of rapid tooling (RT) in investment casting (IC). What are the **THREE (3)** advantages and disadvantages of rapid tooling in investment casting?
(4 marks)
- (b) How would you differentiate between the following types of rapid tooling (RT) processes. Support your answer with relevant examples.
- (i) Direct soft tooling
 - (ii) Indirect soft tooling
 - (iii) Direct hard tooling
 - (iv) Indirect hard tooling
- (8 marks)
- (c) What are the Rapid Prototyping (RP) systems that is suitable for sand casting? Draw a suitable schematic diagram of RP part in sand casting process.
(8 marks)
- Q5** (a) Briefly explain how the preparation of CAD model in Reverse Engineering (RE) is differ from the standard Rapid Prototyping (RP) process and write the **TWO (2)** methods of preparing the CAD model in RE?
(6 marks)
- (b) Describe what are the steps in RE process and the **TWO (2)** area of its application?
(6 marks)
- (c) Evaluate how rapid prototyping (RP) process can be combined and helps to effectively functionalize reverse engineering (RE) process?
(8 marks)

- END OF QUESTION -