



**UNIVERSITI TUN HUSSEIN ONN MALAYSIA**

**PEPERIKSAAN AKHIR  
SEMESTER II  
SESI 2011/2012**

**NAMA KURSUS : PROTOTAIP DERAS**

**KOD KURSUS : BDD 4043**

**PROGRAM : SARJANA MUDA  
KEJURUTERAAN MEKANIKAL  
DENGAN KEPUJIAN**

**TARIKH PEPERIKSAAN : JUN 2012**

**JANGKA MASA : 2 JAM 30 MINIT**

**ARAHAN : JAWAB LIMA (5) SOALAN  
SAHAJA DARI YANG  
DISEDIAKAN ENAM (6) SOALAN.**

**KERTAS SOALAN INI MENGANDUNGI EMPAT (4) MUKA SURAT**

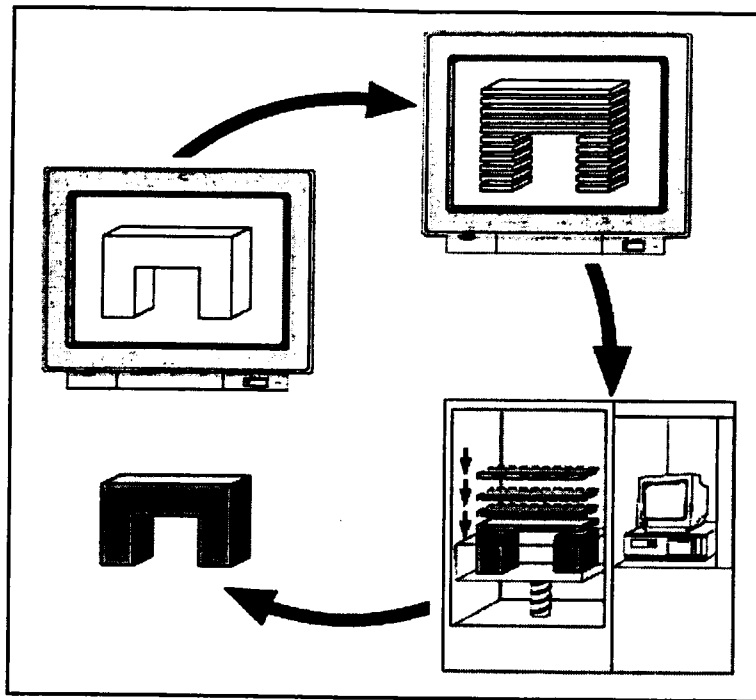
- Q1** (a) Depending on the architecture of the machine and the material used in the application of rapid prototyping (RP) technology leads to concept models/geometry prototypes or to functional prototypes/technical prototypes. How to differentiate the items below,
- (i) Rapid Prototyping
  - (ii) Rapid Manufacturing
- (4 marks)
- (b) The demands on models differ according to the degree of progress the product development has reached. Explain:
- (i) Proportional model
  - (ii) Ergonomic model
  - (iii) Functional model
- (6 marks)
- (c) Describe the generic characteristic of the rapid prototyping technology and its processes with reference to Figure Q1.
- (10 marks)
- Q2** (a) Make a simple comparison or analysis on part fabricated using 3D Printer (3DP) and Fused Deposition Modelling (FDM) process with respect to the properties below:
- (i) Type of materials and solidification method
  - (ii) Post processing work
- (4 marks)
- (b) With the aid of figure, illustrated Stereolithography Apparatus (SLA) process. What are the advantages of these system?
- (6 marks)
- (c) How to develop the product prototype using 3D Printer (3DP) with some examples prototype?
- (10 marks)
- Q3** (a) Although there are many RP techniques available, almost all follow the same basic **five (5)** steps process in making a prototype. Describe briefly the 5 steps.
- (5 marks)
- (b) Some RP techniques require support structure in the part fabrication. What does it mean by support structure and list **two (2)** rapid prototyping techniques that **does not** require any support and provide with the reason.
- (6 marks)
- (c) Make a comparison between powder based rapid prototyping system with liquid based rapid prototyping system. What are the advantages and disadvantages for each of these systems?
- (9 marks)

- Q4** (a) Describe the advantages and disadvantages of rapid prototyping pattern for investment casting?  
(4 marks)
- (b) Compare between the laminated tooling and laser sintered tooling for direct tooling applications  
(6 marks)
- (b) Explain how a rapid prototyping pattern can be used for vacuum casting with silicon molding. Use appropriate examples to illustrate your answer.  
(10 marks)
- Q5** (a) How would you differentiate between the soft tooling and hard tooling in the Rapid Tooling (RT) technology?  
(4 marks)
- (b) In future, what are the challenges of Rapid Tooling (RT) technology? Describe **three (3)** challenges of Rapid Tooling (RT).  
(6 marks)
- (c) Rapid prototyping (RP) is used in two ways to make tooling; directly method and indirect by RP system. How to develop direct metal tooling and investment casting tooling through direct or indirect process?  
(10 marks)
- Q6** (a) What is the common format used by rapid prototyping system? Describe the advantages and disadvantages of using this format?  
(4 marks)
- (b) Explain the challenges of building rapid prototyping system for tissue engineering applications.  
(6 marks)
- (c) How to develop rapid prototyping model which can be used to support organ replacement by tissue engineering?  
(10 marks)

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**FIGURE Q1**