



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

PEPERIKSAAN AKHIR SEMESTER I SESI 2011/2012

NAMA KURSUS	:	PROTOTAIP DERAS
KOD KURSUS	:	BDD 4043
PROGRAM	:	SARJANA MUDA KEJURUTERAAN MEKANIKAL DENGAN KEPUJIAN
TARIKH PEPERIKSAAN	:	JANUARI 2012
JANGKA MASA	:	2 JAM 30 MINIT
ARAHAN	:	JAWAB LIMA (5) SOALAN DARIPADA ENAM (6) SOALAN.

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

- Q1** (a) 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
 - (iv) Styling model
- (8 marks)
- (b) Successful product development means developing a product of highest quality, at lowest costs, in the shortest time, in such a way that it can be produced quickly, safely, and at a reasonable price. List and explain in briefly **four (4)** reasons changed circumstances for product development.
- (12 marks)
- Q2** (a) List down **two (2)** benefits of rapid prototyping technology in product development phase and **two (2)** challenges or limitations in using the technology.
- (4 marks)
- (b) 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. Explain the relationship of the items below in basic product development phases.
- (i) Rapid Prototyping
 - (ii) Rapid Tooling
 - (iii) Rapid Manufacturing
- (6 marks)
- (c) With the aid of figure in the attachment, it shows the relation of rapid prototyping techniques in the modern product development phases. Give the names of the specific rapid prototyping technique (**a ~ j**) according to their processes in the product development phase.
- (10 marks)
- Q3** (a) Make a simple comparison or analysis on part fabricated using 3D Printer (3DP) and Fused Deposition Modeling (FDM) process with respect to the properties below:
- (i) Materials
 - (ii) Solidification Method
- (4 marks)
- (b) List down **three (3)** benefits of Fused Deposition Modeling (FDM) in product development phase and **three (3)** limitations in using these processes.
- (6 marks)

- (c) With the aid of figures, describe in detail the principle and operation of 3D Printer (3DP) process. (10 marks)
- Q4** (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) The Fused Deposition Modeling (FDM) develop the prototypes directly by extruding semi liquid melt ABS material onto the model. What are the **three (3)** applications of prototype from these FDM process? (9 marks)
- Q5** (a) Can investment casting be used as rapid tooling? List **two (2)** advantages and disadvantages of pattern from RP machine used in investment casting? (8 marks)
- (b) Silicone Molding Vacuum Casting Process is a standard method of making small quantities of polymer parts. Any rapid prototyping-generated part can be used as a pattern to make silicone rubber tooling. Explain in detail the process. (12 marks)
- Q6** (a) Briefly describe what you understand in term of 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. Briefly describe the direct and indirect processes. Describe in detail the process of direct metal tooling and investment casting tooling. (10 marks)

PEPERIKSAAN AKHIR

SEMESTER/SESI : SEM I/ 2011/2012

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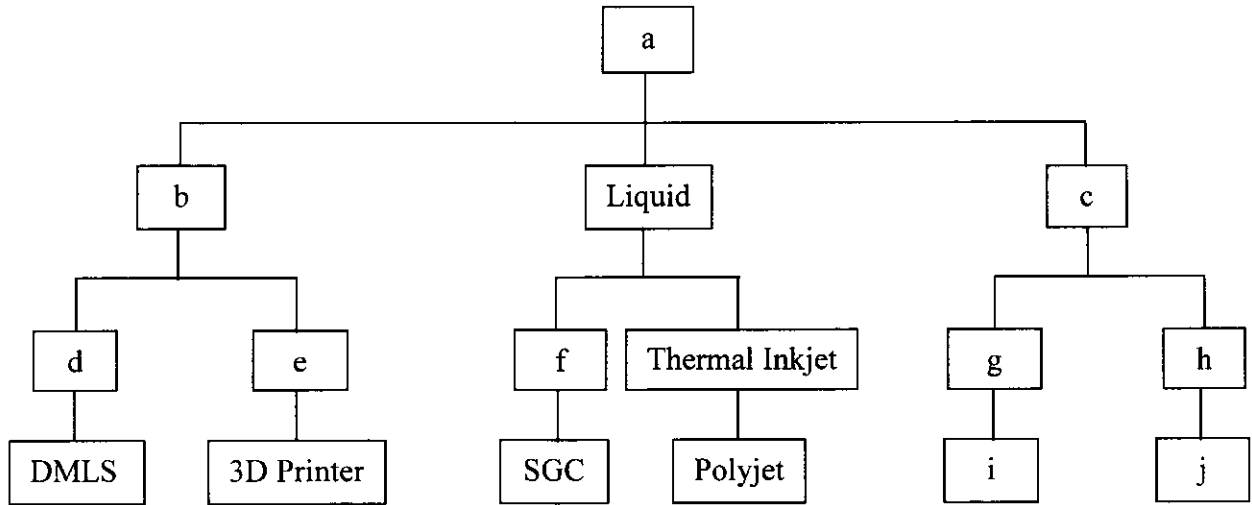


FIGURE Q2 (c)