

SULIT



**UNIVERSITI TUN HUSSEIN ONN
MALAYSIA**

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

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| NAMA KURSUS | : | KEJURUTERAAN SEREMPAK DAN BALIKAN |
| KOD KURSUS | : | BDD 4053 |
| PROGRAM | : | SARJANA MUDA KEJUTUTERAAN MEKANIKAL DAN KEPUJIAN |
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| JANGKA MASA | : | 2 JAM 30 MINIT |
| ARAHAN | : | JAWAB EMPAT SOALAN SAHAJA DARI ENAM SOALAN YANG DISEDIAKAN |

KERTAS SOALAN INI MENGANDUNGI LIMA (5) MUKA SURAT

SULIT

- Q1**
- (a) State **TWO (2)** definitions of Concurrent Engineering. (4 marks)
- (b) Manufacturing today has changed as compared to the way it used to be 50 years ago. What are these changes that require companies to use Concurrent Engineering? (5 marks)
- (c) From the Design For Assembly guidelines listed below, what are the reasons behind them? Provide an example for each case. (6 marks)
- (i.) Design parts that orient themselves
 - (ii.) Use standard parts
 - (iii.) Minimize number of parts
- (d) Failure Modes and Effects Analysis (FMEA) is one of the tools in Design For Manufacturing (DFM). (5 marks)
- (i.) What is FMEA?
 - (ii.) List **THREE (3)** ways it can help DFM
- (e) If these are the voice of the customers, translate them into the engineering language and determine how to correct these problems: (5 marks)
- (i.) "My tea pot breaks in a thousand pieces when it falls"
 - (ii.) "This cup slips off too easily when I do the dishes"
 - (iii.) "I always have a back pain when I sit on that computer chair"
 - (iv.) "This car is rusty"
 - (v.) "These screws and nuts do fit, but they are too tight"

- Q2** (a) (i.) In relation to Product Life Cycle plot, distinguish between lead time and life cycle time.
- (ii.) Changes introduced in the later part of the product life cycle is common in American companies. Why the Japanese companies would rather make early changes even though it take a long time to begin production.
- (10 marks)
- (b) Explain **TEN (10)** benefits of Concurrent Engineering
- (5 marks)
- (c) i. Define "Teamwork".
- ii. "Concurrent Engineering cannot function without a good teamwork, good communication, and extensive support from the management". Present your personal opinion concerning this statement.
- (10 marks)
- Q3** (a) List **SIX (6)** criteria that need to be taken into consideration in selecting the right vendor.
- (6 marks)
- (b) What are the main reasons of maintaining a short-listed vendor list?
- (4 marks)
- (c) Describe how current technology may assist the implementation of Concurrent Engineering.
- (5 marks)
- (d) Explain what is meant by benchmarking or benchmark test in relation to vendor selection.
- (5 marks)
- (e) Discuss the advantages of using of STEP in Data Exchange Procedure.
- (5 marks)

- Q4** (a) State **THREE (3)** definitions of Reverse Engineering. (6 marks)
- (b) By simply looking at the surface data collected in the form of point clouds, it was almost impossible to perform Reverse Engineering with free form surfaces about twenty years ago. Explain this. (5 marks)
- (c) Reverse Engineering operations involve four main phases: points and images, polygon, curves, and NURBS surfaces. Describe the activities involved in each one of the phases. (7 marks)
- (d) How do you make a manufacturing process 'lean' without any waste? (6 marks)
- Q5** (a) Rapid Prototyping has been gaining popularity in manufacturing to fabricate parts.
- (i.) How does Rapid Prototyping complement Reverse Engineering? (10 marks)
- (ii.) List **FIVE (5)** Rapid Prototyping techniques.
- (b) What is the purpose of the Economic and Engineering Report used in the Reverse Engineering effort? (5 marks)
- (c) Why is it necessary to have approvals at each stage of the reverse engineering process including a final approval before the project is executed? (5 marks)
- (d) Distinguish between Reverse Engineering and Forward Engineering (5 marks)

- Q6** (a) A turbine blade was designed and manufactured by an aircraft plant in Wichita, Kansas. One sample of the blade was sent along with the actual CAD design to UTHM. You are assigned to apply Reverse Engineering techniques in Quality Control using the scanner available in UTHM's Metrology Lab to study the differences of the original CAD design and the physical turbine blade. Discuss in detail how you would perform this Quality Control task?

(10 marks)

- (b) Digitizers consist of contact type and non-contact type.

(i.) List the disadvantages of contact digitizers

(ii.) Categorize **THREE (3)** available measuring systems designed to nondestructively scan the internal parts of products or internal organs in medical applications.

(7 marks)

- (c) You are given the heart of a lamb. Your task is to create a 3D reconstruction of this heart in a CAD system using a digitizing method. Discuss in detail the procedure you need to perform in order to transform this heart into a digitized form.

(8 marks)