



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESI 2013/2014**

COURSE NAME : REVERSE AND CONCURRENT
ENGINEERING

COURSE CODE : BDD 40503

PROGRAMME : 4BDD

EXAMINATION DATE : JUNE 2014

DURATION : 3 HOURS

INSTRUCTION : **SECTION A: PLEASE ANSWER ALL
QUESTIONS IN THIS SECTION.**

**SECTION B: PLEASE ANSWER
THREE (3) QUESTIONS FROM FOUR (4)
QUESTIONS PROVIDED IN THIS
SECTION.**

THIS PAPER CONSISTS OF SEVEN (7) PAGES

SECTION A

Please answer **ALL QUESTIONS** in this section.

- Q1 (a) (i) Vernier calipers are a common *ad hoc* approach for reverse engineering. However, many engineers choose the Coordinate Measuring Machine (CMM) as compared to calipers. Compare why CMM is a better choice rather than the calipers.
- (5 marks)
- (ii) The Coordinate Measuring Machine (CMM) and active illumination 3-D stereo are methods for Computer Aided Reverse Engineering (CARE). Discuss the comparisons of these two (2) methods.

Hint: Answer this question in a comparison table

(10 marks)

(b)

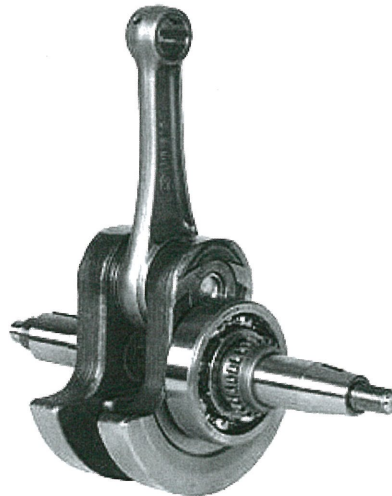


FIGURE Q1: Cranckshaft

Figure Q1 shows the cranckshaft that manufactured in 1985 by Company ABC. Unfortunately, the company was closed due to recession in early 1990's. Your company is still using the engine which is in a good condition. However, the cranckshaft need to be replaced but no spare parts available. To solve this requirement, you and your team need to apply reverse engineering approaches in order to solve the problem.

With a guide of a diagram or flow chart, evaluate and suggest the reverse engineering process that could be performed to remanufacture the product.

(10 marks)

SECTION B

Please ANSWER THREE (3) QUESTIONS from four (4) questions provided in this section.

- Q2 (a)**
- (i) Explain in which stage, the costs decrease with economies of scale?
(2 marks)
 - (ii) Suggest how the company could decrease their cost of products with economies of scale within the stage answered in 2(a)(i).
(5 marks)

(b)



SIM	Mini-SIM
Introduced	1999
Status	Discontinued

FIGURE Q2: Samsung Handphone SGH-600

Figure Q2 shows the obsolete model of Samsung SGH-600 handphone which introduced to the market in 1999. Why this product status is discontinued? Support your arguments with product life cycle phase.

(18 marks)

- Q3 (a)** The Quality Function Deployment (QFD) used a matrix format to capture a number of issues that are vital to the planning process. The House of Quality (HOQ) matrix is the most recognized and widely used form for this method. It translates customer requirements, based on marketing research and benchmarking data, into an appropriate number of engineering targets to be met by a new product design. Basically, there is the nerve center and the engine that drives the entire QFD process.

Therefore, explain the purposes of section A, B and C in House of Quality (HOQ) depict in Figure Q3a.

(9 marks)

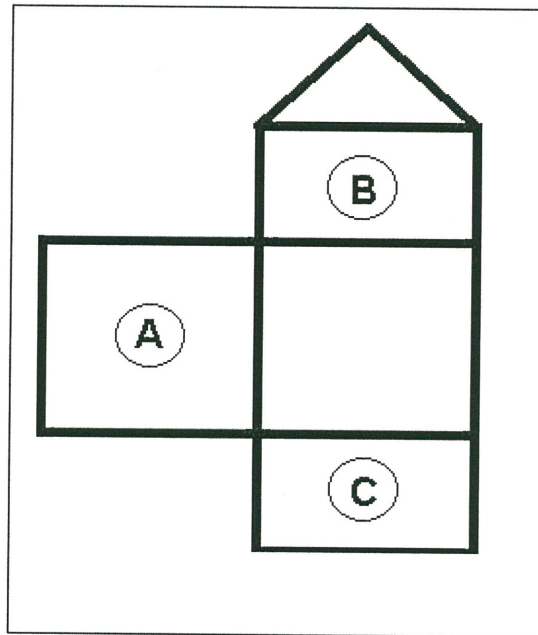


FIGURE Q3a : House of Quality (HOQ)

- (b) (i) Calculate the value of P, Q, R and S in Figure Q3b.

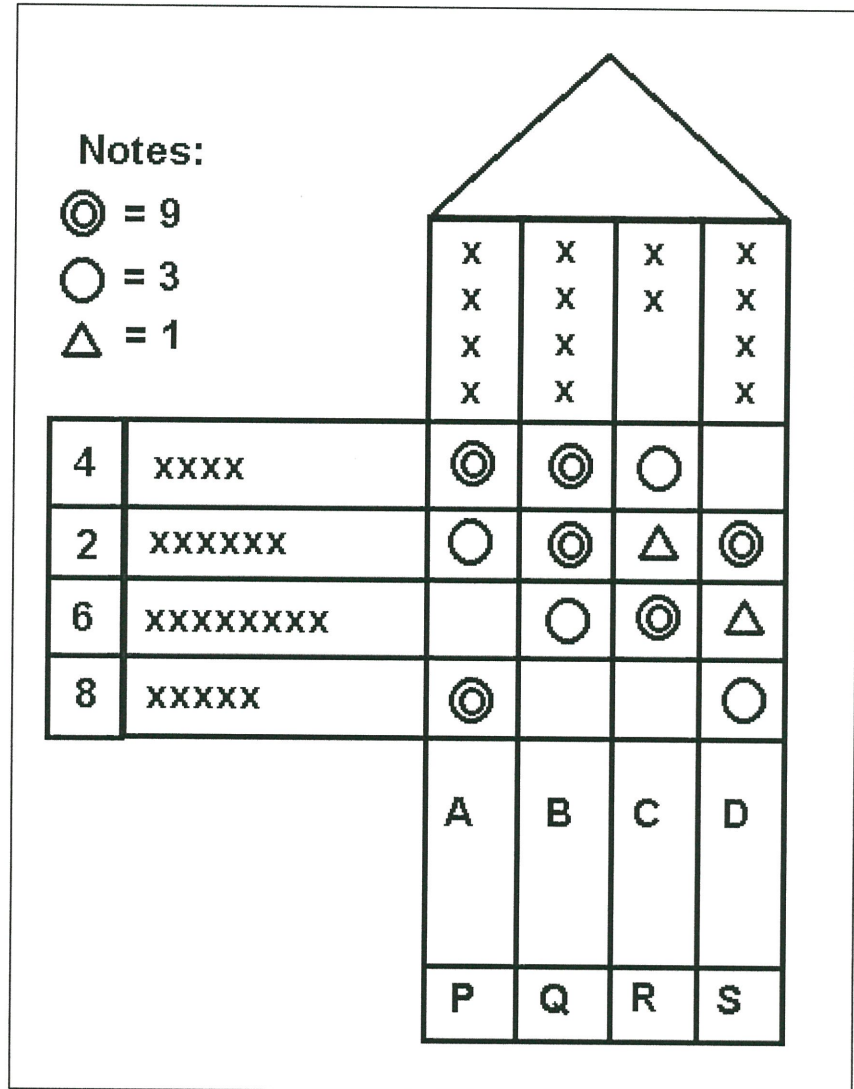


FIGURE Q3b

(12 marks)

- (ii) From the results in Q3 b(i), identify two (2) outputs between A, B, C or D which will be selected in HOQ.

(4 marks)

- Q4** (a) Industrial engineering is the process of designing, manufacturing, assembling, and maintaining products and systems. Define the following terms:
(i) forward engineering
(ii) reverse engineering
(5 marks)
- (b) Reverse engineering is now widely used in numerous applications, such as manufacturing, industrial design, and jewellery design and reproduction. Why the companies choose to use reverse engineering approach for their production purposes. Defend your arguments with appropriate examples.
(10 marks)
- (c) Concurrent and reverse engineering are interrelated. Describe the relationship between concurrent and reverse engineering in a product development process.
(10 marks)

- Q5** (a) (i) Noncontact methods is one of the reverse engineering hardware to measure the geometry of a product. If the noncontact methods are not touch onto the object, how it could do the measurement and data capturing? List three (3) methods.
(3 marks)
- (ii) Discuss the advantages and disadvantages of noncontact methods compared to contact methods.
(5 marks)
- (b) (i) Group Technology (GT) is a manufacturing technique and philosophy to increase production efficiency by exploiting the “underlying sameness” of component shape, dimensions, process and route. How groups are identified within this GT technique?
(8 marks)
- (ii) There are three (3) types of Parts Classification & Coding (PC&C); namely hierarchical (monocode), chain (polycode) and hybrid. Using appropriate diagrams and examples, constructs a sample code for each type of PC&C.
(9 marks)

END OF QUESTIONS