



**UNIVERSITI KUALA LUMPUR
MALAYSIAN INSTITUTE OF INDUSTRIAL TECHNOLOGY**

**FINAL EXAMINATION
JANUARY 2016 SEMESTER**

COURSE CODE : JFB 30203
COURSE TITLE : RELIABILITY CENTERED MAINTENANCE (RCM)
PROGRAMME LEVEL : BACHELOR
DATE : 20 MAY 2016
TIME : 2.30 – 5.30 PM
DURATION : 3 HOURS

INSTRUCTIONS TO CANDIDATES

1. Please read the instructions given in the question paper CAREFULLY.
 2. This question paper is printed on both sides of the paper.
 3. This question paper consists of ONE section.
 4. Answer FOUR (4) questions only.
 5. Please write your answers on the answer booklet provided.
 6. Please answer all questions in English only.
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THERE ARE 2 PAGES OF QUESTIONS EXCLUDING THIS PAGE.

INSTRUCTION : Answer FOUR (4) questions only
Please use the answer booklet provided.

Question 1

The concept of maintenance management has evolved over the last few decades.

- (a) With the aid of diagram, outline **THREE (3)** major trends in maintenance management.
(15 marks)
- (b) Distinguish the type of maintenance methodology in question 1 (a) in terms of:
- i) Effectiveness in managing the maintenance of equipment and system.
 - ii) Application of tools and techniques.
 - iii) Method of operation
- (10 marks)

Question 2

Failure Mode and Effect Analysis (FMEA) is one of the first step of a system reliability study.

- (a) Discuss **FIVE (5)** main objectives of utilizing FMEA.
(10 marks)
- (b) Discuss **FIVE (5)** steps involved in identifying the potential problems with risk priority numbers (RPN) method.
(10 marks)
- (c) Illustrate the typical FMEA table.
(5 marks)

Question 3

Reliability Centered Maintenance (RCM) is high level maintenance strategy that is implemented to optimize the maintenance program of a company or facility.

- (a) Elaborate the key principal of RCM methodology.
(5 marks)
- (b) Discuss **FOUR (4)** principles that are critical for RCM program.
(10 marks)
- (c) Discuss **SEVEN (7)** basic questions that need to be asked when drafting the maintenance program for each asset or system
(10 marks)

Question 4

A great strength of RCM is that it recognizes the consequences of failures rather than their technical characteristics.

- (a) Discuss **FOUR (4)** of failure consequences in RCM.
(10 marks)
- (b) Bathtub curve (BTC) is a well-known concept to represent failure behaviour of various engineering items or products. With the aid of diagram, discuss the concept of BTC.
(15 marks)

Question 5

Kaizen is the practice of continuous improvement and was originally introduced to the West by Masaaki Imai in his book Kaizen: The Key to Japan's Competitive Success in 1986.

- (a) Discuss **FIVE (5)** objectives of Kaizen activity.
(10 marks)
- (b) Discuss the **THREE (3)** scenarios in which Kaizen activity can be used to improve the maintenance activity.
(15 marks)

END OF EXAMINATION PAPER

