



**UNIVERSITI KUALA LUMPUR
Malaysia France Institute**

**FINAL EXAMINATION
JANUARY 2010 SESSION**

SUBJECT CODE : FIB 46202
SUBJECT TITLE : QUALITY MANAGEMENT
LEVEL : BACHELOR
TIME / DURATION : 9.00am – 11.00am
(2 HOURS)
DATE : 04 MAY 2010

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. Please write your answers on the answer booklet provided.
 4. Answer should be written in blue or black ink except for sketching, graphic and illustration.
 5. This questions paper consists of TWO (2) sections. Section A and B. Answer ALL questions in section A. For section B, answer THREE (3) questions only.
 6. Answer ALL questions in English.
 7. FMEA FORM and constant Table for Control Chart are appended.
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THERE ARE 8 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

SECTION A (Total: 40 marks)

INSTRUCTION: Answer ALL questions.

Please use the answer booklet provided.

Question 1

What are the three (3) components of the ISO 9000:2008 standard? What are the other two (2) components which were deleted from the ISO 9000:1994?

(5 marks)

Question 2

What are the five (5) steps of problem-solving approach used in the Six-Sigma program?

(5 marks)

Question 3

Explain five (5) key management and organizational principles that are necessary for effective implementation of Six Sigma.

(10 marks)

Question 4

The most important asset of any organization is its customers. ISO-9001:2008 clause 5.2 states that "*top management shall ensure that customer requirements are determined and are met with the aim of enhancing customer satisfaction.*" In order to achieve customer satisfaction, we must know who our customers are. There are two distinct types of customers which are **internal and external customers**. List the five (5) internal customers and five (5) external customers of the *University Kuala Lumpur – Malaysian France Institute*.

(10 marks)

Question 5

Syarikat Mudah Angkut Sdn Bhd (SMASB) is a short-haul household furniture moving company. SMASB's labor force, selected from the local university's students, is on temporary and part-time basis. SMASB is concerned with recent complaints, as tabulated on Tally Sheet in Table-1.

Table-1: Tally Sheet of Customer Complaints

Complaint	Tally
Broken glass	
Delivered to wrong address	
Furniture rubbed together while on truck	
Late delivery	
Late arrival for pickup	
Missing items	
Nicks and scratches from rough handling	
Soiled upholstery	

- a. Develop a Pareto Chart to identify the most serious moving problems.
(5 marks)
- b. Use a Cause and Effect Diagram to identify the potential cause of the most serious complaints.
(5 marks)

SECTION B (Total: 60 marks)

INSTRUCTION: Answer only THREE questions.

Please use the answer booklet provided.

Question 6

Failure Mode and Effect Analysis (FMEA) is an analytical technique that combines the technology and experience of people in identifying foreseeable failures modes of a product or process and planning for its elimination. FMEA activities include recognizing and evaluating the potential failure of a product or process and its effects, then identifying the actions that could eliminate or reduce the chance of potential failures.

Perform **Process FMEA** to anticipate what you could do to eliminate at least five (5) potential problems while completing your studies at UniKL-MFI. Assume that you have completed Semester 6 successfully and are preparing to enroll for Semester 7 as well as Industrial Training in Semester 8. (Use the given **Process FMEA Form** appended in Appendix-2.)

(20 marks)

Question 7

The data processing department of the ABC Bank has five data entry clerks. Each day their supervisor verifies the accuracy of the random samples of 250 records. A record containing one or more errors is considered defective and must be redone. The results of the last 30 samples are shown in the Table-2 below. All were checked to make sure that none were out of control.

Table-2: Number of Defective Records

Sample Number	Number of Defective Records	Sample Number	Number of Defective Records	Sample Number	Number of Defective Records
1	7	11	18	21	17
2	5	12	5	22	12
3	19	13	16	23	6
4	10	14	4	24	7
5	11	15	11	25	13
6	8	16	8	26	10
7	12	17	12	27	14
8	9	18	4	28	6
9	6	19	6	29	11
10	13	20	11	30	9

- a. Based on these historical data given, calculate the Central Line (CL), Upper Control Limit (UCL) and Lower Control Limit (LCL) by using $z=3$.
(6 marks)
- b. Plot the p -control-chart from the given data.
(10 marks)
- c. Samples for the next four days are shown in the Table-3. What is the supervisor's assessment of the data-entry process likely to be?
(4 marks)

Table-3: Number of Defective Records

Sample Number	Number of Defective Records
31	17
32	15
33	22
34	21

Question 8

The data in Table-4 were collected from a process of manufacturing power supplies. The variable of interest is output voltage (mV), and $n=5$.

Table -4: Output voltage

Sample Number	\bar{X}	R	Sample Number	\bar{X}	R
1	103	4	11	105	4
2	102	5	12	103	2
3	104	2	13	102	3
4	105	11	14	105	4
5	104	4	15	104	5
6	106	3	16	105	3
7	102	7	17	106	5
8	105	2	18	102	2
9	106	4	19	105	4
10	104	3	20	103	2

- Compute center lines and control limits suitable for controlling future production. (Use constant table in Appendix-3)

(5 marks)
- Plot the x-bar and R-control-charts.

(5 marks)
- Assume that the quality characteristic is normally distributed. Estimate the process standard deviation.

(2 marks)
- What are the apparent three-sigma natural tolerance limits of the process?

(2 marks)
- What would be your estimate of the process fraction nonconforming if the specifications on the characteristics were 103 ± 4 ?

(2 marks)
- Specify four (4) approaches to reduce the defects.

(4 marks)

Question 9

A supplier ships a components in lots of size $N = 3000$. The Acceptable Quality Level (AQL) has been established for this product at 1%. Find;

- a) **normal**,
(3 marks)

- b) **tightened**, and
(3 marks)

- c) **reduced** single sampling plans for this situation from MIL STD 105E, assuming that general inspection **level-II** is appropriate.
(3 marks)

- d) Find the normal, tightened and reduced single-sampling plans for this situation from MIL STD 105E, assuming that general inspection **level-I**.
(9 marks)

- e) Discuss the differences in the various sampling plans.
(2 marks)

END OF QUESTIONS

Appendix-2

Failure Modes & Effects Analysis

Process/Product: FMEA Team: Black Belt:		FMEA Date: (original) (Revised)		Page: _____ of _____																		
Item Process Steps	Potential Failure Mode	Process			Severity	Potential Cause(s) of Failure	Occurrence	Current Controls	Detection	Risk Priority Number	Actions		Responsibility and Target Completion Date	Action Taken	Results	Severity	Occurrence	Detection	Risk Priority Number			
		Potential Effects of Failure	Potential Cause(s) of Failure	Severity							Recommended Action	Recommended Action										
Total Risk Priority:													Resulting Risk Priority									

Appendix-3

n	A₂	D₃	D₄
2	1.880	0	3.267
3	1.023	0	2.574
4	0.729	0	2.282
5	0.577	0	2.114
6	0.483	0	2.004
7	0.419	0.076	1.924
8	0.373	0.136	1.864
9	0.337	0.184	1.816
10	0.308	0.223	1.777