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**UNIVERSITI KUALA LUMPUR  
Malaysia France Institute**

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**FINAL EXAMINATION  
JANUARY 2014 SESSION**

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**SUBJECT CODE : FIB 46203**  
**SUBJECT TITLE : QUALITY MANAGEMENT**  
**LEVEL : BACHELOR**  
**TIME / DURATION : ( 2.0 HOURS )**  
**DATE :**

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**INSTRUCTIONS TO CANDIDATES**

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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 question 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 7 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.**

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**SECTION A (Total: 40 marks)****INSTRUCTION: Answer ALL questions.****Please use the answer booklet provided.****Question 1**

The basic of manufacturing concepts is to produce a product or deliver a service with the highest quality (Q) but using the lowest cost (C) and able to deliver (D) it on time. In order to achieve the highest quality product or provide the best service, we use several tools and techniques. There are 7 popular Quality Control (QC) tools discussed in the classroom.

List and explain the purpose of each of the “seven QC tools”.

(5 marks)

**Question 2**

Explain what is meant by the adequacy, compliance, and surveillance audits in the ISO 9000 certification process. Explain two (2) objectives of the internal audit.

(10 marks)

**Question 3**

Explain the key management and organizational principles that are necessary for the effective implementation of the Six Sigma Project. (List 5 principles only)

(5 marks)

**Question 4**

The most important asset of any organization is its customers. ISO-9001:2000 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 a *Billion Supermarket* located at Bandar Baru Bangi.

(10 marks)

**Question 5**

A process produces rubber belts in lots of size 2500. From the inspection records the last 20 lots, a Control Chart plotted as shown in Figure-1. Answer the following questions.

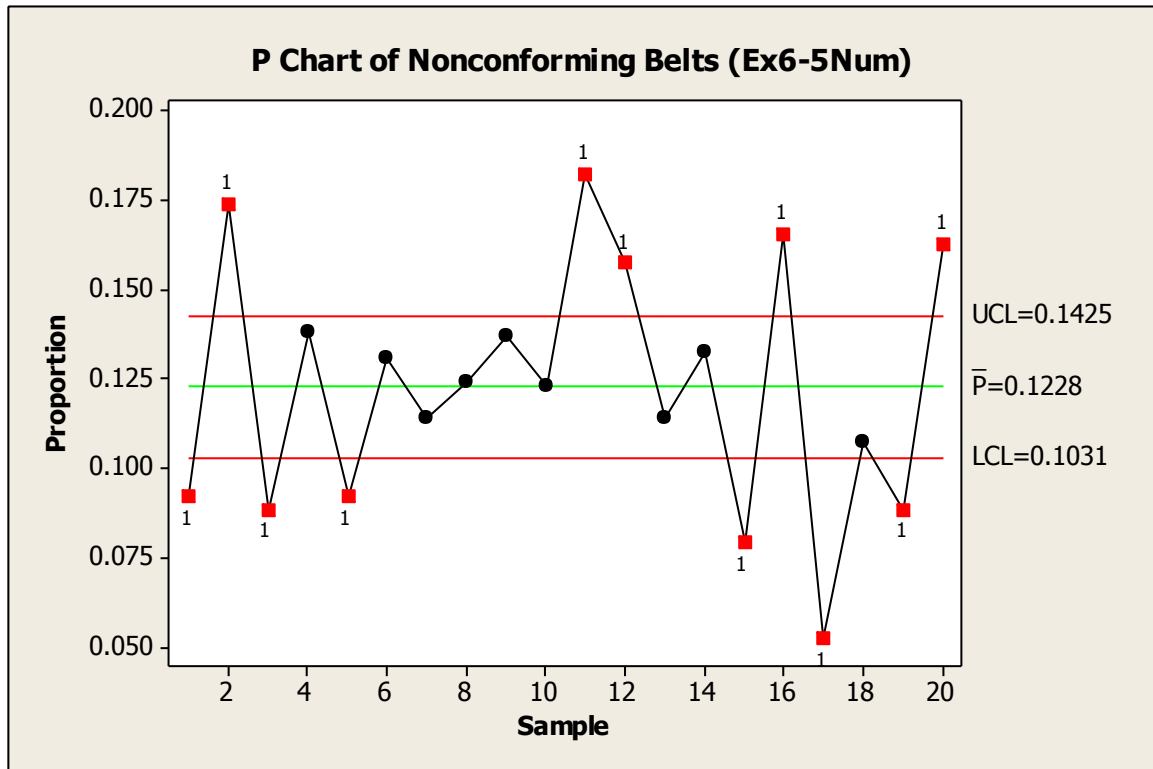


Figure-1: A trial Control Chart for Rubber Belt

- What type of Control Chart is plotted in Figure-1? (2 marks)
- Is the process in-control? Why? (Justify your answer.) (4 marks)
- What types of data were collected from this process? (Variable or Attributes Data?) (2 marks)
- If you wanted to set up a control chart for controlling future production, how would you use these to obtain the Central Line and Control Limits for the chart? (2 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 in not completing your studies and graduate on time. (Use the **Process FMEA Form** given in Appendix-2.)

(20 marks)

**Question 7**

Al Ameen Uni-Café (which is operating at your campus cafeteria) is facing a problem where most of the students prefer not to use their services but preferred using the services at restaurants and stalls outside the campus.

- a. The owner hired a consultant to analyze the problems. As the consultant, draw a fishbone diagram for the causes of these problems.

(10 marks)

- b. Provide some solutions and action plans to improve the situation.

(10 marks)

**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

- a. Compute center lines and control limits suitable for controlling future production. (Use constant table in Appendix-3) (6 marks)
- b. Plot the x-bar and R-control-charts. (10 marks)
- c. Assume that the quality characteristic is normally distributed. Estimate the process standard deviation. (2 marks)
- d. Specify two (2) approaches to reduce the defects. (2 marks)

**Question 9**

A supplier ships components in lots of size  $N = 8000$ . The AQL has been established for this product at 3%. 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**

### Failure Modes & Effects Analysis

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

Appendix-1

<b>n</b>	<b>A<sub>2</sub></b>	<b>D<sub>3</sub></b>	<b>D<sub>4</sub></b>
<b>2</b>	<b>1.880</b>	<b>0</b>	<b>3.267</b>
<b>3</b>	<b>1.023</b>	<b>0</b>	<b>2.574</b>
<b>4</b>	<b>0.729</b>	<b>0</b>	<b>2.282</b>
<b>5</b>	<b>0.577</b>	<b>0</b>	<b>2.114</b>
<b>6</b>	<b>0.483</b>	<b>0</b>	<b>2.004</b>
<b>7</b>	<b>0.419</b>	<b>0.076</b>	<b>1.924</b>
<b>8</b>	<b>0.373</b>	<b>0.136</b>	<b>1.864</b>
<b>9</b>	<b>0.337</b>	<b>0.184</b>	<b>1.816</b>
<b>10</b>	<b>0.308</b>	<b>0.223</b>	<b>1.777</b>

Appendix-2