

Cork Institute of Technology

Higher Certificate in Science in Applied Biology – Award

(NFQ – Level 6)

Summer 2006

Quality Management Systems & Biocomputing

(Time: 2 Hours)

Answer FOUR questions. Answer **Question 1 (compulsory)** and ONE question from Section A and TWO questions from Section B.

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Section A

Q1. (Compulsory)

- (a) “The goal of improving factory production is not only a function of quality improvement, there are also considerations for efficiency, conservation of materials, energy saving costs, safety, hours of labour costs, etc. Whatever the situation, if the question is improvement, Pareto diagrams can be drawn and applied”?
Discuss the validity of this statement in relation to the function of Pareto diagrams.
(5 marks)
- (b) The table below shows the number of hours spent by workers on each task in a warehouse. Data was taken before and after a quality control standard operating procedure (QC SOP) was implemented by the quality control manager.
Draw a Pareto diagram to illustrate the data collected and discuss trends obtained.

Category	Frequency before Improvement	Frequency after Improvement
Inventory taking	140	50
Tending warehouse	200	310
Dispatching	610	350
Status Report	40	170
Receival	725	280
Dead Stock Disposal	140	45
Inspection	220	160

(15 marks)

- (c) Discuss the function of Scatter Diagrams. With the aid of schematic diagrams, describe the relationship between Correlation Tables and Scatter Diagrams.
(5 marks)

- Q2. (a) Explain the purpose of collecting data (population, sample) in a manufacturing organisation. (5 marks)
- (b) Discuss the value of check-sheets as a means of acquiring data. In your answer, include diagrams. (5 marks)
- (c) Outline the steps involved in constructing *cause* and *effect* diagrams. Draw a sketch showing their general structure and give an 'real' examples from a analytical laboratory situation of the use of a *cause* and *effect* diagram. (10 marks)

- Q3. (a) Explain, in detail, the role of control charts (\bar{X} -R, \bar{p} and \bar{pn}) in a typical production process, how are they useful as a means of controlling quality and assessing changes in production processes. In your answer, include clearly drawn labelled diagrams. (12 marks)
- (b) Draw the following \bar{pn} chart and discuss the significance of the trends obtained.

Subgroup No.	Subgroup size (n)	Number of Defectives pn		Subgroup No.	Subgroup size (n)	Number of Defectives pn
1	100	1		16	100	5
2	100	6		17	100	4
3	100	5		18	100	1
4	100	5		19	100	6
5	100	4		20	100	15
6	100	3		21	100	12
7	100	2		22	100	6
8	100	2		23	100	3
9	100	4		24	100	4
10	100	6		25	100	3
11	100	2		26	100	3
12	100	1		27	100	2
13	100	3		28	100	5
14	100	1		29	100	7
15	100	4		30	100	4

(13 marks)

Section B

- Q4. (a) Define each of the following quality terms:
- (i) Quality of conformance
 - (ii) Quality of design
 - (iii) Specification
 - (iv) Variable
 - (v) Attribute (15 marks)
- (b) Write a brief note on **ONE** of the following:
- (i) The seven basic stages of the design process
 - (ii) The performance and operation of a quality circle (10 marks)
- Q5. (a) Give an overview of the key sections of the EC Directive on Strict Product Liability. (10 marks)
- (b) What are the main implications of product liability legislation in terms of the following:
- (i) Insurance (5 marks)
 - (ii) Product Liability Prevention Program. (10 marks)
- Q6. (a) Give an account of training for quality under the following headings:
- (i) Types of training program (4 marks)
 - (ii) Training methods (4 marks)
 - (iii) Training documentation (4 marks)
 - (iv) Quality training (4 marks)
- (b) List the main sections which would be contained in a quality manual for a manufacturing company with a research and development function. (9 marks)