



Chartered Quality Institute

CQI Examinations January 2013

Unit 303

Monitoring and Measuring for Quality (Level 3)

24 January 2013

Time: 9.40 – 12.10
(2½ hours)

Notes for candidates

At 9.30, you have 10 minutes preparation time before the exam begins.
Your exam booklet will be handed out at 9.40.

Attempt **ALL THREE questions** in **Section A**. Attempt **any TWO** questions from **Section B**.
If you attempt three or more questions in Section B, only the first two will be marked.

Questions may be attempted in any order. All questions carry equal marks.
The maximum marks for each part of each question are shown.

Begin each question at the top of a fresh side of paper.
Do not write in the margins.

If you use any additional sheets (i.e. graph paper or additional answer booklet)
please write your CQI student number, examination name and date on each sheet.

Candidates must show all their working out for any calculations.

SECTION A – ANSWER ALL QUESTIONS

QUESTION 1

Key performance indicators (KPIs) are commonly used by an organisation to evaluate its success or the success of a particular activity in which it is engaged.

- a) Describe the benefits that an organisation would get from using Key Performance Indicators (KPIs).
(10 marks)
- b) Suggest **TWO** KPIs that may be given to a Sales Team Leader at his/her annual appraisal and discuss how these would be reflected in improvements for his/her team's performance.
(10 marks)

QUESTION 2

A quality management principle is a comprehensive and fundamental rule/belief for leading and operating an organisation, aimed at continually improving performance over the long term by focusing on customers while addressing the needs of all other stakeholders.

- a) Explain what is meant by a 'factual approach to decision making'.
(5 marks)
- b) Describe the steps that may be taken when applying this management principle.
(15 marks)

QUESTION 3

Sampling is a method used by businesses to reduce the cost of inspection and data collection.

- a) Explain, with **TWO** examples of each, what is meant by the following:
(i) Population sampling
(ii) Process sampling
(10 marks)
- b) Explain when and how to use the following two methods for choosing samples:
(i) Random
(ii) Systematic
(4 marks)
- c) What is meant by 'consumer risk' and 'producer risk' when using a sampling plan for goods inwards?
(6 marks)

SECTION B – ANSWER TWO QUESTIONS ONLY

QUESTION 4

Variation is the term applied to any differences that occur in products, services, and processes.

- a) Explain, with **TWO** examples of each, what is meant by the following:
- (i) Common cause variation
 - (ii) Special cause variation.
- (10 marks)**
- b) Explain, with an example, how you could reduce common cause variation.
- (5 marks)**
- c) Explain, in terms of common cause and special cause variation, when a process is said to be 'out of control'.
- (5 marks)**

QUESTION 5

Data capture tools provide simple methods for the recording of information, typically to be used in initial understanding of process behaviour or for verification that process improvements have been effective.

- a) Identify and describe **FIVE** methods for recording the data that is to be collected.
- (10 marks)**
- b) Identify and describe **FIVE** methods, with an illustration of each, for the visualisation of quantitative data.
- (10 marks)**

QUESTION 6

There are many tools for problem diagnosis and improvement that can be used in a problem diagnosis and improvement process.

The basic tools that are used for process improvement are:

Cause-effect diagram
Pareto chart
Check sheet
Scatter chart
Bar chart
Histogram
Control chart
Affinity diagram
Process flowchart
Brainstorming
Gantt chart

- a) From the above list of tools select the tool most suitable for:
- (i) mapping a sequence of actions
 - (ii) laying out a plan of action
 - (iii) identifying root causes of problems
 - (iv) identifying special causes of variation
 - (v) understanding correlation.
- (10 marks)**
- b) Describe an application of the use of **ONE** of the remaining six tools listed and explain, in a number of steps, how it would be used.
- (10 marks)**

QUESTION 7

In many situations, data follow a normal distribution (bell-shaped curve). One of the key properties of the normal distribution is the relationship between the shape of the curve and the standard deviation (σ for the population; s for sample).

a) Plot and label the bell curve for the data set in the following check sheet.

Value (x)	Frequency
6	111
7	1111
8	11111
9	1111111
10	1111
11	111
12	11

(6 marks)

b) Calculate the mean (\bar{x}) of x.

(2 marks)

c) Calculate the standard deviation (σ for the dataset assuming that it covers the total population).

Use the following table in your workings:

Show all your formula used and workings.

(12 marks)

x	x - \bar{x}	(x - \bar{x}) ²
6		
7		
8		
9		
10		
11		
12		