

QUESTION 6

Data mining is a process of discovering patterns in large data sets involving statistical methods and database systems. The overall goal of the data mining process is to extract information from a data set and transform it into an understandable structure for further use.

(a) Identify **one** ethical issue associated with data mining.

(5 marks)

(b) Data mining may be applied within any of the following categories:

- Social media
- Business and marketing
- Engineering and science
- Human rights
- Spatial data
- Medical data
- Political data

Identify how data mining could be utilised in any **three** of the above categories.

(15 marks)

QUESTION 7

Collection of data by attributes and by variables are two types of inspection.

(a) Explain the difference between these **two** types of inspection.

(8 marks)

(b) Describe **two** advantages of using attributes and **two** advantages of using variables to control the process.

(12 marks)



Chartered Quality Institute

CQI Examinations June 2015

Unit 303

Monitoring and Measuring for Quality (Level 3)

25 June 2015

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 (graph paper or additional answer booklet) please write your CQI student number, examination name and date on each sheet.

SECTION A – ANSWER ALL QUESTIONS

QUESTION 1

Inspection may be defined as the process of measuring, examining, testing, gauging or otherwise comparing an item with its applicable requirements.

- (a) Briefly describe **four** purposes, each aimed at improving quality, for which inspection may be used. (8 marks)
- (b) There are three basic inspection techniques:
- Sorting inspection
 - Detection inspection
 - Preventative inspection

For each of these techniques provide **one** advantage and **one** disadvantage. (12 marks)

QUESTION 2

Sampling is concerned with the selection of a subset of individuals from within a statistical population to estimate characteristics of the whole population.

- (a) Explain the **two** fundamental risks, referred to as the consumers' risk and producers' risk, which may occur with sampling inspection. (8 marks)
- (b) Draw and label the axis of an Operating Characteristics curve (OCc) and show a 5% consumer risk and a 10% producer risk, the Acceptable Quality Level (AQL) and Lot Tolerance Process Defective (LTPD). (6 marks)
- (c) Explain what is meant by an acceptance sampling plan. (6 marks)

QUESTION 3

In statistics the standard deviation (represented by the Greek letter sigma, σ) is a measure that is used to quantify the amount of variation or dispersion of a set of data values.

Manually work out in a tabulated format, to two decimal places, the standard deviation for this set of assignment marks. All workings must be shown.

55, 73, 67, 71, 71, 74, 67, 86, 66, 60, 67, 57, 63, 77, 73 (20 marks)

SECTION B – ANSWER TWO QUESTIONS ONLY

QUESTION 4

Whatever precautions are taken within a process no two items will be absolutely identical. Differences may be barely measurable but exist, and tolerances are allowed to account for this. This is known as process variability.

- (a) The causes of variation can be divided into machine and process variation. Explain what is meant by machine and process variation. (10 marks)
- (b) The sources of variation can be further categorised as common causes and special causes. Explain what is meant by common causes and special causes. (10 marks)

QUESTION 5

Once raw data has been collected it then needs to be turned into meaningful information. The diameter of a sample of 40 widgets was measured with the following results:

4.31	4.74	4.55	4.20	4.45	4.49	4.62	4.86	4.44	4.39
4.38	4.57	4.63	4.24	4.76	4.55	4.56	4.18	4.00	4.83
4.57	4.24	4.32	4.39	4.42	4.35	4.63	4.41	4.40	4.30
4.48	4.49	4.27	4.51	4.51	4.73	4.12	4.37	4.48	4.14

- (a) From the data given above produce a chronological plot. (5 marks)
- (b) Group the data into class limits of 10 intervals and create a tally chart to record the number of items within each class to confirm a normal distribution. (15 marks)