**NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY**
**DEPARTMENT OF APPLIED CHEMISTRY**
**BACHELOR OF SCIENCE HONOURS DEGREE**
**END OF SECOND SEMESTER EXAMINATIONS – AUGUST 2009**
**QUALITY ASSURANCE MANAGEMENT AND CONTROL – SCH 2211**
**TIME: 3 HOURS**

**INSTRUCTIONS TO CANDIDATES**

Answer **ALL** questions from Section A and **ANY** THREE (3) questions from Section B. Section A carries forty (40) marks and each question in Section B carries twenty (20) marks.

Start your answers to each question on a new page. This paper comprises Two (2) printed pages plus one page as attachment.

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**SECTION A** [Answer All Questions from this Section. This Section carries forty (40) marks].

Study the following case and answer all the questions that follow.

1. Identify five (5) problems faced by Advanced Laser Technology (10 marks)
2. Give an answer to Bigolov's question, 'How does this add value?' (10 marks)
3. Group the 20 clauses of Chapter 4 of ISO 9000 into seven (7) cluster elements. (14 marks)
4. Suggest an organizational chart for Advanced Laser Technology. (6 marks)

**SECTION B** [Answer any three (3) questions from this Section. Each question carries twenty (20) marks].

1. The following are the objectives of a Six Sigma training course:
   - Use proven Six Sigma problem-solving methods and statistical tools
   - Master processes for collecting and analyzing data
   - Lead and coach quality improvement initiatives
   - Analyze process parameters using statistical and non-statistical techniques
   - Apply Lean Six Sigma in any type of business or industry

   Explain, using one practical example, how each of these objectives can be achieved. (20 marks)

2. Write an account of the benefits that the Quality Revolution derived from the works of three American and three Japanese quality *gurus*. (20 marks)

3. '*Quality is for free*!' says Crosby.

   a) Discuss the above statement citing at least three examples (9 marks)

   b) Why must statistical tools be an integral part of any total quality improvement program? (4 marks)

   c) In what ways is the organizational structure critical to TQM success? (7 marks)

4. a) What risks are associated with acceptance sampling? (6 marks)

   b) You are given the following process specification for plastic containers:

   $V = 110ml \pm 5ml$

   5 samples were drawn from one production lot and were found to be as follows:

   $X_1 = 114ml$ $X_2 = 113ml$ $X_3 = 103ml$ $X_4 = 102ml$

   $X_5 = 110ml$

   Use the Z-variable to find the percentage rejects from this production run. (14 marks)

*End of question Paper!!!*