NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF INDUSTRIAL TECHNOLOGY

DEPARTMENT OF INDUSTRIAL AND MANUFACTURING ENGINEERING

M ENG MANUFACTURING SYSTEMS AND OPERATIONS MANAGEMENT/ M ENG MANUFACTURING ENGEERING AND OPERATIONS MANAGEMENT

QUALITY SYSTEMS

TIE 6230

FIRST SEMESTER SUPPLEMENTARY EXAMINATION

DECEMBER 2014

This examination paper consists of 3 pages

Time Allowed: **3 hours**

Total Marks: **100**

Special Requirements: **Statistical Tables, Graph paper**

Examiner's Name: **Eng. T R Chikowore**

INSTRUCTIONS AND INFORMATION TO CANDIDATES

1. Answer any five (5) questions, at least TWO from each section

2. Each question carries 20 marks

MARK ALLOCATION

QUESTION	MARKS
1.	20
2.	20
3.	20
4.	20
5.	20
6	20
7	20
TOTAL	100

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Question 1

Companies have had varying success in implementing Total Quality Management (TQM). Some have been quite successful, but others have struggled.

a) Outline any five principles of TQM. [10]

b) Discuss five factors that can be cited as causes for TQM implementation failures. [10]

Question 2

a) Students trying to register online for a course, Quality systems, sometimes find that the course has been closed, or the course is not available. Prepare a cause-and-effect diagram for this problem. [12]

b) Using examples explain how a company can achieve lower production costs and increase productivity by improving the quality of its products and services. [8]

Question 3

ISO 9000:2000 focuses on eight quality management principles, which, if applied effectively, lead to the satisfaction of all interested parties. Discuss these principles and explain how companies can use ISO 9000:2000 to shift their focus from preventing failure to causing success. [20]

Question 4

Discuss the various quality control tools and techniques. Which ones are applicable to an organisation of your choice? [20]

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Question 5

a) A company has just negotiated a contract to produce a part for another firm. In the process of manufacturing the part, the inside diameter of successive parts becomes smaller and smaller as the cutting tools wears. However, the specification are so wide relative to machine capabilities that is possible to set the diameter initially at a large value and let the process run for a while before replacing the cutting tool.

   The inside diameter decrease at an average rate of 0.001 cm per part, and the process has a standard deviation of 0.05 cm. The variability is approximately normal. Assuming a three-sigma buffer at each end, how frequently must the tool be replaced if the process specifications are 3 cm and 3.5 cm? [10]

b) Discuss the impact of inadequate process capability on the cost of manufacturing a product. [10]

Question 6

a) Describe the process-cost model and explain how it can be used to assess quality costs. [11]

b) Explain three major ways that good internal quality can promote good external quality. [9]

Question 7

a) Mean charts and Range charts are constructed differently but always used together to monitor and control a process variable. Using diagrams and examples explain why they are always used together and not separately to monitor and control a given process variable. [10]

b) A certain product has customers reject it if it is 2.5 mm undersize or 6mm oversize. The estimated cost to the customer is $80.00. Given that the current size range of the product is 10 mm:
   i) Estimate the size of a customer order that corresponds to the same loss for undersize or oversize. [6]
   ii) Calculate the average loss to the customer. [4]

END OF EXAMINATION

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