NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF APPLIED SCIENCES

DEPARTMENT OF APPLIED BIOLOGY AND BIOCHEMISTRY

BACHELOR OF SCIENCE HONOURS DEGREE IN APPLIED BIOLOGY AND BIOCHEMISTRY

Principles of Quality Assurance SBB 2211

EXAMINATION PAPER

MAY 2017

This examination paper consists of 5 pages

Time Allowed:	**3 hours**
Total Marks:	**100**
Special Requirements:	**Graph paper, calculators**

INSTRUCTIONS TO CANDIDATES

1. **Answer ALL questions from Section A**
2. **Answer any three (3) questions from Section B**
3. **Section A carries 40 marks**
4. **Each question from Section B carries 20 marks**

SECTION A

1. Study the attached case (page 4) and answer the following questions:

      (a) Explain how British Airways used TQM for its organizational transformation. Give at least four examples   (12 marks)

      (b) Identify and describe three quality costs at British Airways and explain how each cost was dealt with.   (9 marks)

      (c) Define TQM philosophy and explain why TQM philosophy is important in TQM implementation.   (7 marks)

      (d) Explain how GMP and HACCP fit into a TQM programme.   (12 marks)

SECTION B

2(a) Describe the 5 elements of ISO 14001:2015   (15 marks)

  (b) Comment on the following statement "Many organisations seek ISO 14000 as a marketing tool and not a EMS……."   (5 marks)

3 (a) Define what is meant by "empowered environment" and explain how is it created.   (6 marks)

  (b) The intensive care unit lab process has an average turnaround time of 26.2 minutes and a standard deviation of 1.35 minutes. The nominal value for this service is 25 minutes with an upper specification limit of 30 minutes and a lower specification limit of 20 minutes. The administrator of the lab wants to have three-sigma performance for her lab.
    Assess if the lab process is capable of this level of performance.   (8 marks)

  (c) Mistake-proof the following:
    Passion Experience restaurant wishes to ensure high service quality through mistake-proofing. The first potential error occurs when customers enter. At times the waiter does not notice a customer is waiting if he/she is escorting other customers to their table, checking on table status or conferring with kitchen staff.   (6 marks)

4 (a) Define creativity. (4 marks)

(b) Citing at least 5 practical examples explain how creativity and creative thinking helps in the technological advancement of a country. (14 marks)

(c) Define poka yoke. (2 marks)

5. Your company is undergoing major changes due to a severe down turn in the economy. Your company's survival is in jeopardy. You have been selected to evaluate two methods for improvement. You are to evaluate the difference in the concept of Kaizen and Japanese 5 S. Analyze the implementation of these concepts and explain how each would impact the organization. Justify your evaluation and implementation plan.

(20 marks)

Case study

Implementation of total quality management at British Airways

In order to practice TQM, the main focus was on the British Airways transformation from an engineering based company in one dictated by the market. There are four key factors that contributed to the success of the company, namely: 1. Continuous reduction of costs; 2. Focus on providing excellent customer service at a premium price; 3. Cover growing market through alliances and partnerships; 4. Maximize return on individual flights by investing in computerized reservations. In 1987, the year when the company was privatized, the company management believed that to be the best and to be a world-class organization, they have to use the strategies and processes that should create vision and inspire the employees to gain their trust. This could only be possible by implementing TQM program. It was implemented in British Airways' Technical Workshops. The Technical Workshops (hangars) of British Airways are responsible for the overhaul and the repair of aircraft components. In order to be the best in this industry, the management team of British Airways Technical Workshops decided that they must win through teamwork, customer satisfaction, profitability and reputation. Along the "path" to implement TQM, there were identified the following key steps: 1. Conducting a study to diagnose the current position within the technical workshop and reporting results; 2. Obtaining support and a full commitment to TQM concept from all levels of management; 3. Educating staff according to the principles of TQM and facilitate necessary changes in management style; 4. Changes in policies, procedures and work practices that would fit and would facilitate new organizational culture required; 5. Starting the quality improvement process; 6. Reviewing progress made and fostering a sustained commitment from all levels of the organization. In order to examine the controversial issues and problems facing the staff, a survey was distributed among employees from technical workshops, among customers and in supplying areas. To do this, an analysis of the cost of quality was made. The approach taken by the company in collecting quality costs was the breakdown of employees activities related to quality in three main activities, namely: 1. Anticipation - activities that provide performance "right first time"; 2. Assessment -activities that check if the concept of "right first time" is done; 3. Failure - activities resulting from the failure of the concept "right first time". Each manager or team leader was asked to make an assessment of how their subordinate staff spent time during activities related to quality. Knowing how to bear the cost of quality has had a significant contribution in educating staff on the concept and principles of TQM. It also helped of strengthening and justification of need for training personnel in accordance with TQM, to overcome any skepticism about TQM, to promote considerable debate on this issue and to ensure that the improvement of individual projects activity can be measured. Data collected from the survey was introduced in a diagnostic report and seven improvement activities have been identified: 1. The way the employees view the

company's management; 2. Managerial style; 3. Implementation of changes; 4. Communication; 5. Systems and procedures; 6. Facilities and conditions; 7. Attitude of employees. They held some courses for managers for three days. These courses have conceptually explained TQM philosophy and revealed findings of the report. Managers were encouraged to submit ideas and action plans for staff involvement in improvement process. This required some changes in managing style. Similar courses were held for all employees. Delegates of each course were taken from different areas of workshops to facilitate the exchange of ideas between departments. Quality improving groups, each involving up to 12 people, actively conducted projects for improvement.

Examples of projects: improved methods for sorting aircraft test equipment to ensure ease localization and certification control, an improved library for storing approved technical publications and a design of new measures regarding the workshop performance, so that the figures which provide performance to be meaningful and easy to understand. British Airways Technical Workshops are recognized as the best in the aviation industry, by customers, competitors and even by British Airways itself. Benefits began to appear Two years after the launch of TQM. There have been positive changes in measures of higher level, which were used to report progress to the directorate. These measures included the proportion of components which are in good condition, the number of units that are not in good condition in the workshop and the number of units produced per month. British Airways launched their TQM program in September 1988 and by the end of 1999 the benefits of the program were visible. It is important to note that after implementation of TQM, British Airways continued to apply total quality management on employees, the processes and customers, and the result was successful, as shown in Table 1: turnover increased by 23%, the number of employees fell by 3.153 people, increased the number of passengers who used the company's services, passenger load factor increased from 79.1% to 81.3% and aircraft fleet has grown to 33 aircraft. Although profit has declined and losses were recorded in the period 2008 - early 2010, after this date there is an important increase of this indicator.

END OF EXAMINATION