

NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY <u>DEPARTMENT OF APPLIED CHEMISTRY</u> <u>BACHELOR OF SCIENCE HONOURS DEGREE</u> <u>END OF SECOND SEMESTER EXAMINATIONS – MAY 2014</u> <u>QUALITY ASSURANCE MANAGEMENT AND CONTROL – SCH 2211</u> <u>TIME: 3 HOURS</u>

Instructions to candidates

Answer <u>All</u> Questions from Section A and <u>any three</u> (3) 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 4 printed pages.

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

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

- Analyse the dilemma at Chochma Coal (Pvt) Ltd giving reasons why you think the company is in this mess. (14 marks)
- 2. Develop a SWOT analysis for Chochoma Coal (Pvt) Ltd. (10 marks)
- 3. You are Mr Orgon Moyo. Explain your first actions at the company.
- What system/s are you going to put in place to monitor your progress in implementing your plans?
 Explain in detail. (6 marks)

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

- 1. Discuss the following statements citing relevant examples:
 - (a) "TQM requires a different kind of thinking about customers, suppliers and shareholders/owners." (7 marks)
 - (b) "Born in Japan, the concept of Quality Circles is culture-specific and may therefore not work in another country." (7 marks)

(c) "Quality is free"

(6 marks)

(10 marks)

2. You have been appointed Quality Assurance Manager of a small chemical manufacturing company in Bulawayo. Upon assumption of duty you are shocked at the apparent disregard for laid down procedures in the production department. This is particularly noticeable amongst the younger and newer members of the workforce.

Outline your responsibility as regards to quality in the production department and describe and justify your actions in response to this challenge. (20 marks)

- 3. (a) Compare and contrast the approaches to quality by the three Japanese quality gurus (Ishikawa, Shingo and Kondo) (14 marks)
 (b) What lessons were leant from each of these gurus (6 marks)
- 4. (a) What risks are associated with acceptance sampling? (3 marks)
 (b) In an acceptance sampling plan developed for lots containing 1,000 units, the sample size *n* is 85 and *c* is 3. The percent defective of the incoming lots is 2%, and the probability of acceptance, which was obtained from an OC curve, is 0.64.

What is the average outgoing quality? Show your working.

(b) Compare and contrast the student's t-test and chi (χ^2) – squared test as methods of data analysis in quality assurance. Comment on suitability of each method for a selected quality data.

(10 marks)

(7 marks)

.....*THE END*.....

CASE STUDY

CHOCHOMA COAL (PVT) LTD

Chochoma Coal (Pvt) Ltd is a company established in the early 1940s. Its core business is the conversion of mainly bituminous coal into metallurgical coke for use in blast furnaces and cupolas in the iron and steel industry. The following shows the organisational structure of the company:



The company operates on a two 12hr shift system continuously. The raw material is coal obtained from Wankie Colliery some 300km away.

Chochoma coal is designed to process in excess of 4000 tons of coal per day utilising 4 coke oven batteries each comprising 50 ovens. The company has hit a bad patch in recent years as shown by the performance indicators for the last 12 months in fig.1.



Fig. 1 Performance indicators for the last 12 months

The company is currently in the middle of a myriad of problems with Wankie Colliery refusing to supply it with coal due to non-payment of debts. One coke oven that had recently been refurbished was damaged beyond repair due to negligence. As the shortage of raw materials bites the company has had to operate the ovens on a

prolonged regime of as much as 60hrs instead of the normal 17 hrs. This has strained the coke ovens and the 3 remaining batteries leak air terribly. Coke yields have come down from the normal 70% to 45% due to improper operation. Corruption is rampant in the management and thefts are the order of the day among the workforce.

Absenteeism and ineptitude is on the increase. The company even failed to honour its wage commitments last month and has been battling to raise the required funds well into middle of the subsequent month.

A management shake up has now occurred with Mr Brian Lingro being replaced by Mr Orgon Moyo.