UNIVERSITY COLLEGE TATI

# UNIVERSITY COLLEGE TATI (UC TATI)

## FINAL EXAMINATION QUESTION BOOKLET

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| COURSE CODE | : BME 3043 |
| COURSE | : QUALITY MANAGEMENT |
| SEMESTER/SESSION | : 1-2022/2023 |
| DURATION | : 3 HOURS |

Instructions:

1. This booklet contains **4** questions. Answer **all** questions
2. All answers should be written in answer booklet.
3. Write legibly and draw sketches wherever required.
4. If in doubt, rise up your hand and ask the invigilator.

**DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO**

**THIS BOOKLET CONTAINS 7 PRINTED PAGES INCLUDING COVER PAGE**

**Answer all four (4) questions.**

## QUESTION 1

The purpose of Total Quality Management (TQM) is to provide a quality product and or service to customers, which will, in turn, increase productivity and lower cost.

a) Some Japanese companies have started to use a newer definition of quality as "providing extraordinary customer satisfaction". With reference to Figure 1, state **evidence** to prove that term. (4 marks)

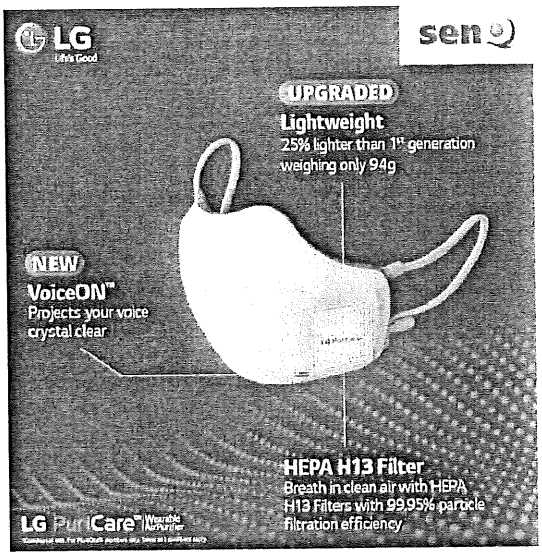


Figure1: LG face mask

b) The term concept of 'zero defects' and 'do it right the first time' was developed by Philip Bayard Crosby (1926–2001). **Present** the importance of that term. (4 marks)

c) **Analyse** five (5) barriers to implementations of TQM and effects to the company from product quality and customer satisfaction. (10 marks)

d) Six Sigma is a business process for improving quality, reducing costs and increasing customer satisfaction. You have been appointed as a quality engineer to lead one project of quality improvement in your organization using DMAIC concept. **Summarise** the breakthrough strategy using the DMAIC concept to make your project successful. (10 marks)

## QUESTION 2

Manufacturers use quality control and quality assurance in order to maintain or enhance the quality of the offerings. These two practices ***"work together"*** to make sure that the end product or the service meets the quality requirements and standards defined for the product or the service.

a) Based on your understanding, briefly **explain** the phrase "work together" as in statement above. Your explanation must include example of defective item. (5 marks)

b) **Differentiate** between quality control and quality assurance in term of purpose, goals, planning, and results, including example process of the products. Your explanation can use any product in the production area as an example. (15 marks)

c) **Differentiate** between centralized inspection and on-site inspection.

(7 marks)

## QUESTION 3

One of the best technical tools for improving product and service quality is statistical process control (SPC) while process capability studies are carried out to measure long term performance level of the processes under statistical control.

a) Seven Quality Tools (7 QC Tools) are the most fundamental quality control (QC) tools. **Present** the application of seven QC tools. (6 marks)

b) Suppose a laser cutting process produce a workpiece with the specified tolerance=8$\pm$ 0.002cm, average of range,R=0.004cm, number of subgroups, n=5 pieces/hour. **Calculate** the process capability ($C_p$) value. (Given that $d_2$ =2.326). (6 marks)

c) Refer to Table 1, **construct** X bar and R charts using all sample points. You should show and explain that both X bar and R charts out-of-control. (15 marks)

Table 1 : Sample's data from production

| Sample | $X_1$ | $X_1$ | $X_1$ |
|---|---|---|---|
| 1 | 0.0629 | 0.0636 | 0.0640 |
| 2 | 0.0630 | 0.0631 | 0.0622 |
| 3 | 0.0628 | 0.0631 | 0.0633 |
| 4 | 0.0634 | 0.0630 | 0.0631 |
| 5 | 0.0619 | 0.0628 | 0.0630 |
| 6 | 0.0613 | 0.0629 | 0.0634 |
| 7 | 0.0630 | 0.0639 | 0.0625 |
| 8 | 0.0628 | 0.0627 | 0.0622 |
| 9 | 0.0623 | 0.0626 | 0.0633 |
| 10 | 0.0631 | 0.0631 | 0.0633 |
| 11 | 0.0635 | 0.0630 | 0.0638 |
| 12 | 0.0623 | 0.0630 | 0.0630 |
| 13 | 0.0635 | 0.0631 | 0.0630 |
| 14 | 0.0645 | 0.0640 | 0.0631 |
| 15 | 0.0619 | 0.0644 | 0.0632 |
| 16 | 0.0631 | 0.0627 | 0.0630 |
| 17 | 0.0616 | 0.0623 | 0.0631 |
| 18 | 0.0630 | 0.0630 | 0.0626 |
| 19 | 0.0636 | 0.0631 | 0.0629 |
| 20 | 0.0640 | 0.0635 | 0.0629 |
| 21 | 0.0628 | 0.0625 | 0.0616 |
| 22 | 0.0615 | 0.0625 | 0.0619 |
| 23 | 0.0630 | 0.0632 | 0.0630 |
| 24 | 0.0635 | 0.0629 | 0.0635 |
| 25 | 0.0623 | 0.0629 | 0.0630 |

## QUESTION 4

The International Organization for Standardization (ISO) was founded in 1946. It is mandate to promote the development of international standards to facilitate the exchange of goods and services worldwide. You have been appointed as the Quality Management System (QMS) consultant at a food and beverage company located at Kuala Nerus, Terengganu. The company plans to sell the product locally and internationally. **Outline** the essential steps approach for the company to implement ISO 9001 quality management system successfully. (18 marks)

**----------End of questions ----------**

## RUBRIC

| Criteria | Marks |
|---|---|
| All question answered will be marked according to the answer schema | /100 |

## Appendixes

### Summary of Key Formulas

*Process Capability Ratio*

$$C_p = \frac{upper\ specification\ limit - lower\ specification\ limit}{6\sigma}$$

*Process Capability Index*

$$C_{pk} = \text{minimum}\left(\frac{\bar{\bar{x}} - lower\ specification}{3\sigma}, \frac{upper\ specification - \bar{\bar{x}}}{3\sigma}\right)$$

| Subgroup Sample Size, n | d2 | A2 | E2 |
|---|---|---|---|
| 2 | 1.128 | 1.880 | 2.659 |
| 3 | 1.693 | 1.023 | 1.772 |
| 4 | 2.059 | 0.729 | 1.457 |
| 5 | 2.326 | 0.577 | 1.290 |
| 6 | 2.534 | 0.483 | --- |
| 7 | 2.704 | 0.419 | --- |