

K.J. Somaiya Institute of Management studies & Research

MMS / PGDM – 2018 -20 BATCH

Total Quality Management

III TRIM – END TERM EXAM

Date : 29/03/2019

Marks : 50

Time : 3 Hours

Notes 1. Question No. 1 is compulsory & carries 14 Marks.

2. Out of the remaining six questions, attempt any four. Each of them carries 9 marks.

3. Statistical tables may be used if required.

Q1. Roger and Albert is a bicycle manufacturing company and is in the process of designing a bicycle for use by students on campus. Through a market survey, following attributes have been identified as the most important desired by the students:

- Easy to pedal
- Strong and durable
- Fast acceleration
- Low cost
- Nice looks
- Etc.

The relative importance of above attributes has been attributed as 10, 20, 15, 20, 10, 25 out of 100 points respectively.

To achieve the above attributes the following engineering characteristics have been figured out by the technical team;

- Number of gears
- Bicycle weight (lbs.)
- Strength of frame(ft/pound)
- Cruising Speed (mph)
- Coats of paint(numbers)

The customer's perception regarding Roger and Albert's bicycle against the customer attributes on a scale of 1 to 5 is 4, 2, 4, 2, 4. Similarly the same rating for the product of competitor A is 3, 3,3,3,3 respectively. For the product of competitor B the ratings are 3,4, 3, 4,2 respectively.

Engineering competitive evaluation for product of competitor A against the engineering attributes is 10, 40, 1000, 30, 2 respectively. Similarly the same readings for product of

competitor B are 10, 50, 1000, 25, 2 respectively. Units of all these values are the same as given for technical descriptors above.

What specifications should Roger and Albert decide for their product to be successful?

Q2. A process for producing electronic circuits has achieved very high yield levels. An average of only 10 defective parts per million is currently produced.

- a. What are the upper and lower control limits for a sample size of 100?
- b. Operations manager has however reconsidered the method of quality control and has decided to use process control by variables instead of attributes. For variables control a circuit voltage will be measured based on a sample of only five circuits. The past average voltage for samples of size 5 has been 3.1 volts and the range has been 1.2 volt. What would be the upper and lower control limits for the resulting control charts?
- c. Discuss the pros and cons of using variable control chart in (b) versus control chart used in (a) above. Which one do you prefer?

Q3. The operations manager of an insurance claim – processing department wants to determine the claim processing capability of the department. Claims usually take a minimum of four days to handle. The company has a commitment to handle all claims within 10 days. On the average, claims are processed in eight days and the processing has a standard deviation of one day.

- a. Should the claims department improve its process? Enumerate.
- b. If the claim processing time improves to seven days what will be its effect on capability?
- c. Using the original data, re compute capability but using standard deviation of $\frac{2}{3}$ of a day. Which change made the most improvement – the change in mean in part (b) above or the change in standard deviation? Explain the results.

Q4. A computer chip is designed so that the distance between the two adjacent pins has a specification of 2.000 +/- 0.002 millimeters (mm). The loss due to a defective chip is \$4. A sample of 25 chips was drawn from the production process and results, in mm, are shown below:

2.001	2.000	2.001	1.998	1.999
2.000	2.000	2.002	1.999	2.000
1.998	1.999	2.001	2.000	2.000
2.000	1.999	2.001	2.001	2.000
2.000	2.002	2.000	2.000	2.001

What is the expected loss from this process based on the sample data?

Q5. What is an Operating Characteristics Curve & how does it help to understand the Producer's Risk & Consumer's Risk? Is there any relationship between Acceptable Quality Level & Lot Tolerance Percent Defective with OC Curve? Draw the diagram & depict.

Q6. During your visit to Orlando USA, you have decided to visit Disneyland. One of the rides viz. Rollercoaster has impressed you due to its amazing speed and the zig-zag movement that it performs. You plan to take this ride but are also scared of the consequences should any mishap take place. How would you analyze the risks involved in this ride and what counter measures will you suggest to management of Disneyland?

Q7. You have been appointed as a Chief Information Officer by a start-up IT company. This company wants to undertake the journey of Capability Maturity Model integration. Prepare a roadmap of journey into this model with the help of a schematic diagram indicating characteristics and behavior of employees at each level.
