Exam Date & Time: 09-Dec-2023 (02:30 PM - 05:30 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

SEVENTH SEMESTER B.TECH END SEMESTER EXAMINATIONS, NOV-DEC 2023
TOTAL QUALITY MANAGEMENT [MME 4087]

Marks: 50   **Duration: 180 mins.**

A

Answer all the questions.

Instructions to Candidates: Answer ALL questions Missing data may be suitably assumed

1)

Discuss briefly the contributions of the following towards Total Quality Management:

A)
    (i)   Walter A. Shewhart
    (ii)   Armand V. Feigenbaum   (2)
    (iii) Kaoru Ishikawa
    (iv)   Ronald Fisher

B)   Sketch and explain the Scatter diagram with an example.

(3)

C)
Find mean and standard deviation of the following frequency distribution of certain measured quality characteristic. What percentage of the normal distribution falls outside the limits 106 mm and 186 mm?

Cell boundaries (mm)	Frequency
80-89	4
90-99	7
100-109	11
110-119	21
120-129	33
130-139	31
140-149	24
150-159	17
160-169	10
170-179	6
180-189	4
190-199	3

(5)

2)   Explain the need of teams in an organization. Describe any three types of teams with suitable examples to each.

(3)

A)

B)
Briefly explain any six points of Deming's philosophy with reference to any one of the business organizations listed below:

    (i)   Electronic goods manufacturing unit   (3)
    (ii)   An airline
    (iii) Car manufacturing facility

C)   Discuss the applications of Failure Mode and Effect Analysis technique. How the Risk Priority Number (4) is computed for a product or a process?

3)   Describe the Normal curve with a sketch. Discuss its significance in quality control.

(3)

A)

B)   Explain the Internal audit phase in the implementation of Quality management system with reference to any product or service sector organization.

(3)

C)
Control chart for $\bar{X}$ chart s have been run on a certain process for a long period of time. The subgroup size is 6. Assume an aimed-at mean $\bar{X}_0$ of 25.750 mm and a known standard deviation σ of 0.005 mm.
   (i)   Calculate the central lines and control limits for $\bar{X}$ and s control charts.
   (ii)   On a particular run of this process, the mean of the process shifts to 25.752 mm. Use normal curve table to find the probability that any one subgroup average $\bar{X}$ plotted during the run of the product will fall above the upper control limit found in part (i).

(4)

   (iii)   Compute the Natural tolerance limits of the process by considering the shift in the mean as mentioned in part(ii).

4)   Explain the three types of Sourcing employed for procurement of items by business organizations.

(3)

A)

B)
Discuss the following:
   (i)   Classification of causes of quality variation
   (ii)   Inequality theorems

(3)

C)
Describe p chart and np chart. Explain the effect variable subgroup size on p chart.

(4)

5)   Discuss the importance of QFD tool. With a block diagram describe the House of quality with reference to the development of any product.

(4)

A)

B)   How do you decide about what to benchmark in an organization? Explain the Planning phase in the implementation of Benchmarking process with examples.

(3)

C)   100% inspection of certain mechanical part reveals that a total of 400 items were defective in the first 20 lots of 200 each.
(i) Compute 3- sigma trial control limits for an np chart for this process.

(ii) If the process average (μ_{np}) remains unchanged what is the probability of Type I error?
(iii) If the process average increases by 2, what is the probability of not detecting the shift in the process average?

(3)

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