U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

February / March 2023 Semester End Main Examinations

Programme: B.E. **Semester: VII**
Branch: Industrial Engineering and Management **Duration: 3 hrs.**
Course Code: 21IM7DESS **Max Marks: 100**
Course: Six Sigma **Date: 24.02.2023**

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

UNIT - I

1	a)	What is Six Sigma? Explain its benefits.	**08**
	b)	Explain the role of prioritization matrix in project selection.	**07**
	c)	Briefly discuss the evolution of Six Sigma concept.	**05**

UNIT - II

2	a)	Develop a Six Sigma SIPOC diagram for customer service of an automotive division.	**10**
	b)	What are the benefits of process mapping in a six sigma project?	**05**
	c)	List the steps involved in constructing the CTQ tree.	**05**

OR

3	a)	Discuss the scope of a six sigma project.	**10**
	b)	Explain the common financial measurements that are used to evaluate Six Sigma projects.	**10**

UNIT - III

4	a)	Enumerate a chance and assignable causes?	**05**
	b)	Distinguish between attribute and variable quality characteristics.	**05**
	c)	A stable normally distributed process has the specification 3.5+ 0.03. given μ = 3.51 and standard deviation = 0.016, determine Cp and Cpk. What conclusions can you draw about the capability of the process?	**10**

OR

5 a) The following are the X bar –R values for 20 subgroups with 5 readings each. The specification limits are 40.37+ 0.10. Establish the control limits for X bar and R charts. State the control limits for which the process will be able to meet the specifications. **15**

Sub group No.	X bar	R	Sub group No.	X bar	R
1	34	4	11	35.8	4
2	31.6	4	12	38.4	4
3	30.8	2	13	34	14
4	33	3	14	35	4
5	35	5	15	33.8	7
6	33.2	2	16	31.6	5
7	33	5	17	33	5
8	32.6	13	18	28.2	3
9	33.8	19	19	31.8	9
10	37.8	6	20	35.6	6

b) Discuss importance of attribute agreement analysis. **05**

UNIT - IV

6 a) Discuss the errors in hypothesis testing. **05**

b) In an attempt to determine why customer service is important to managers in the UK, researchers surveyed managing directors of manufacturing plants in Scotland. One of the reasons proposed was that customer service is a means of retaining customers. On a scale from 1 to 5, with 1 being low and 5 being high, the survey respondents rated this reason more high than any of the others with a mean response of 4.30. Suppose US researchers believe American manufacturing managers would not rate this reason as high and conduct a hypothesis test to prove their theory. Alpha is set at 5%. Data are gathered and the following results are obtained. Use these data to determine whether US managers rate this reason significantly lower than the 4.3 mean ascertained in the UK. Assume from previous studies that the population standard deviation is 0.574. **10**

3 4 5 5 4 5 5 4 4 4 4

4 4 4 4 5 4 4 4 3 4 4

4 3 5 4 4 5 4 4 4 5

c) List the properties of regression coefficients. **05**

UNIT - V

7 a) What is experimental design? How is it different from traditional approach with examples? **10**

b) Discuss the Goals in the Control Phase of DMAIC methodology. **10**

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