M.Prod.E 1st Year 1st Semester 2024

Ref. No.: Ex/PG/ProdE/T/116B/2024

Sub: Productivity and Quality Management

Time: 3 hours Marks:100

Answer any five questions

1. a) Expound synergistic productivity triangle. (6)

b) Elucidate the principles of productivity growth with suitable examples. (14)

2. a) Differentiate between partial productivity measure and total productivity measure through a suitable example. (14)

b) Outline the steps in relation to theory of constraints (TOC) (6)

3. Briefly elucidate Total Quality Management (TQM), highlighting the role of Deming, Juran and other quality gurus. (20)

4. a) Distinguish between KAIZEN and Innovation. Explain. (10)

b) Why is KAIZEN so important? (5)

c) What is robust design? (5)

5. a) Explicate the basic steps involved in Six Sigma. (10)

b) Explain Quality Function Deployment (QFD) with an example. (10)

6. Elucidate the importance of studying AI & ML in the context of productivity and quality management. (20)

7. The following data are coded observations on the yield of a chemical process using five batches of raw materials selected randomly:

Batches				
1	2	3	4	5
9.7	10.4	15.9	8.6	9.7
5.6	9.6	14.4	11.1	12.8
8.4	7.3	8.3	10.7	8.7
7.9	6.8	12.8	7.6	13.4
8.2	6.8	7.9	6.4	8.3
7.7	9.2	11.6	5.9	11.7
8.1	7.6	9.8	8.1	10.7

Perform the analysis of variance (ANOVA) at the 0.05 level of significance and make necessary interpretation of the results. (20)

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8. An engineer takes experimental data on the radius of a propellant grain Y as a function of powder temperature (X_1), extrusion rate (X_2) and die temperature (X_3). The data are given as follows:

Powder temperature (X_1)	Extrusion rate (X_2)	Die temperature (X_3)	Grain Radius (Y)
150	12	220	82
190	12	220	93
150	24	220	114
150	12	250	124
190	24	220	111
190	12	250	129
150	24	250	157
190	24	250	164

Perform an analysis of variance (ANOVA) at 0.05 level of significance and interpret the results

(20)