22657

22223

3 Hours / 70 Marks   Seat No.

Marks

1.   **Attempt any <u>FIVE</u> of the following:**   **10**

a) State the basic procedure of Method study.

b) State the objectives of Quality control. (Any four)

c) Define six sigma with an example.

d) Enlist the consideration in Display design.

e) State the term Supply Chain Management.

f) State variable and attribute measurement done in SQC.

g) State the application of 'p' chart and 'C' chart.

Marks

2.   **Attempt any THREE of the following:**   12

   a) Explain multiple activity chart with example.

   b) Explain the criteria's for selecting a manufacturing process.

   c) Apply Anthropometric data for designing an adult male as an operator to control a machine.

   d) Differentiate between process inspection and final inspection.

3.   **Attempt any THREE of the following:**   12

   a) Differentiate between flow process chart and travel chart.

   b) Prepare a two handed process chart for a task of cutting glass tubes using appropriate process chart symbols.

   c) Explain Heuristic approach of Line Balancing.

   d) Explain compatibility in the design of Toggle switch and Push button.

4.   **Attempt any THREE of the following:**   12

   a) A project consists of 8 activities. Precedence relation and activity times are given. Draw the network and compute the critical path.

Activity	Immediate Predecessor	Activity time (Weeks)
P	-	12
Q	-	20
R	-	28
S	R	12
T	P, Q	28
U	T, S	12
V	S	8
W	U, V	8

   b) Apply ergonomics aspect for designing a Hand Wheel for driving a car.

   c) Apply ergonomics aspect for designing displays.

   d) Show the following elements on OC curve and explain it.

   $\alpha = 0.10$ $AQL = 0.01$ $\beta = 0.05$ $LTPD = 0.25$

e) The record of number of defectives on daily samples of size 300, for 24 days is given below. Prepare a control chart for number of defectives (np) and establish revised control limits (Assume 3 σ limits).

Day	1	2	3	4	5	6	7	8	9	10	11	12
No. of defects	10	5	10	12	11	9	22	4	12	24	21	15
Day	13	14	15	16	17	18	19	20	21	22	23	24
No. of defects	8	14	4	10	11	11	26	13	10	9	13	12

5. Attempt any TWO of the following: 12

a) A worker operating on a machine performs the following elements. The description of element, their observed time and rating are given. Compute the standard time for the component.

Element	Description	Observed time	Rating	Relaxation Allowance
A	Position the job	0.25	80%	10%
B	Switch 'ON' and lower drill	0.09	100%	11%
C	Drill hole	2.8	90%	12%
D	Raise drill and switch 'OFF'	0.05	80%	10%
E	Remove job from jig	0.15	110%	11%

b) Draw and explain histogram, scatter diagram and Pareto chart with suitable examples.

c) The following tensile strength readings were taken from a line processing a heap of steel after heat treatment :

Date	1	2	3	4	5	6	7	8	9
Reading	95.5	93.0	96.5	87.5	90.5	96.0	100.0	98.0	97.0
Date	10	11	12	13	14	15	16	17	18
Reading	96.0	93.5	98.0	90.0	94.0	89.5	96.5	92.0	98.5
Date	19	20	21	22	23				
Reading	96.5	92.0	97.0	99.5	91.0				

Construct a two days moving average and range chart for the data. Analyse the results.

6. **Attempt any TWO of the following:** 12

a) Apply 5's for Automobiles Service Station.

b) The following details collected from 100 metre pieces of woollen cloth :

Purchaser's inspection no.	1	2	3	4	5	6	7	8	9	10	11	12	13
No. of defects	15	5	1	4	3	0	3	1	6	1	3	5	7

Purchaser's inspection no.	14	15	16	17	18
No. of defects	4	10	5	0	1

   i) Compute the value of $\overline{C}$ and its control limits.

   ii) Draw C chart.

   iii) Compute value of $\overline{C}$ for the future production, if you deem it necessary.

c) An inspection results of 10 typical samples, for establishing a P chart are-

Sample No.	1	2	3	4	5	6	7	8	9	10
No. of defectives	10	12	8	9	11	8	10	11	9	12
No. of inspected defectives (%)	90	110	90	100	130	100	80	110	110	80

Compute trial control limits, plot P chart and establish the value of $\overline{P}$ and control limit for future production.

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