Roll No. .....

Total Pages : 2

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BT-7/DX

STATISTICAL QUALITY CONTROL AND RELIABILITY

Paper : ME–405(E)

Time : Three Hours] [Maximum Marks : 100

Note : Attempt any *five* questions, selecting at least *one* question from each unit.

UNIT–I

1. (a) What do you mean by Quality control ? Explain the cost of quality in detail. 10

(b) Explain elements of TQM in detail. 10

2. (a) Explain Kaizen system used for the implementation of TQM. 10

(b) Explain Fishbone diagrams in detail. 10

UNIT–II

3. Construct control charts for $\overline{X}$ and R for the following data on the basis of samples of fuses, 5 being taken every hour (each set of 5 has been arranged in ascending order of magnitude). Comment on the state of control, assuming that these are the first data, what will be the future contorl limits on $\overline{X}$ and R charts. 20

42	42	19	36	42	51	60	18	15	69	64	61
65	45	24	54	51	74	60	20	30	109	90	78
75	68	80	69	57	75	72	27	39	113	93	94
78	72	81	77	59	78	95	42	62	118	109	109
87	90	81	84	78	132	138	60	84	153	112	136

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4. (a) Determine the control limits for $\overline{X}$ and R charts of $E\overline{X}$ = 357.50, ER = 9.90. Number of subgroups = 20. It is given that $A_2 = 0.18$, $D_3 = 0.41$, $D_4 = 1.59$ and $d_2 = 3.735$. Also find the process capability. 10

(b) A company manufacturing laminated spring wishes to use suitable control chart to maintain the quality of its product when produced by a new alternative process. The number of minor defects per spring detected on the first 50 springs produced, were as follows : 10

No. of Defects	0	1	2	3	5	6	4
No. of Springs	10	20	8	3	3	1	5

Use these data to set up an appropriate control charts.

UNIT–III

5. (a) What do you mean by OC curve ? Explain different quality indices for acceptance sampling plans. 10

(b) Explain multiple sampling plan in detail. 10

6. (a) What do you mean by acceptance sampling ? Explain its advantages and limitations. 10

(b) Explain the following terms :

(i) Acceptable Quality Level.

(ii) Rejectable Quality Level.

(iii) Indifference Quality Level.

(iv) Average Outgoing Quality. 10

UNIT–IV

7. (a) Explain reliability in its mathematical form. Explain cost of reliability. 10

(b) Explain measurements of reliability in detail. 10

8. (a) Explain different means to improve reliability. 10

(b) Explain different factors which affect to reliability. 10

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