

### Example of c- Chart

- ❖ 22 samples of bundles of a dozen of match boxes were selected at regular intervals. The match boxes in each sample were inspected and the no of defects were noted down with regard to the no. of broken sticks, box shape, the labeling and paste on the sticks etc. The no of defects were as follows:

Sample No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
No. of defects	5	7	8	4	2	5	7	3	0	2	4	9	6	7	3	5	1	4	5	6	3	12

Construct the c - chart.

- The control limits for c-chart are,

$$UCL = \bar{c} + 3\sqrt{\bar{c}}$$

$$LCL = \bar{c} - 3\sqrt{\bar{c}}$$

$$CL = \bar{c}$$

where,  $\bar{c} = \frac{\sum c_i}{k}$

#### Calculation:

Sample No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	Total
No. of defects (c)	5	7	8	4	2	5	7	3	0	2	4	9	6	7	3	5	1	4	5	6	3	12	$\sum c_i = 108$

Thus,

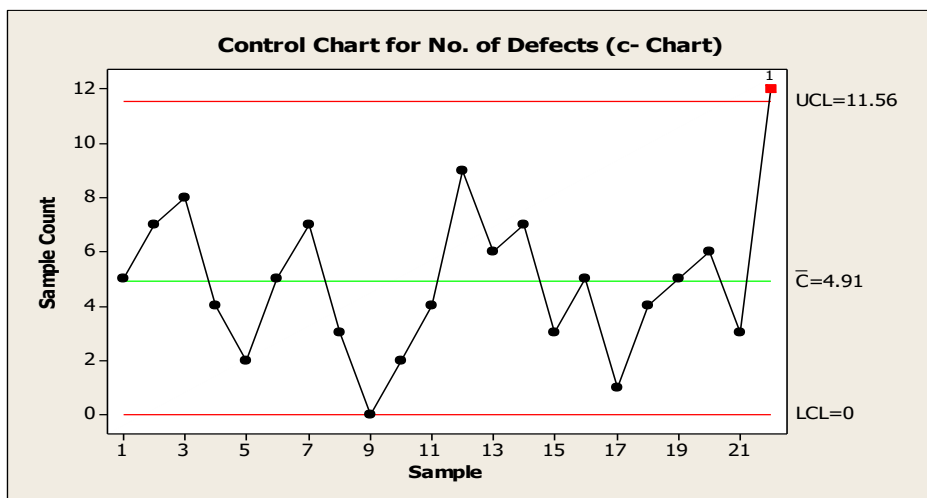
$$\bar{c} = \frac{\sum c_i}{k} = \frac{108}{22} = 4.909$$

and,

$$UCL = 4.909 + 3\sqrt{4.909} = 11.5558$$

$$LCL = 4.909 - 3\sqrt{4.909} = -1.7378 \approx 0 \quad (\text{since } c \text{ can't be negative})$$

$$CL = 4.909$$



**Conclusion:** Since LCL is negative, it is taken as zero. From the above c-chart, we see that 22<sup>nd</sup> point lie outside the upper control limit. So we conclude that the process is out of control.

- ❖ Draw a suitable control chart for the following data pertaining to the no. of coloured thread in 15 pieces of cloth in a certain no. of synthetic fibre and state your conclusions.

No. of defects: 7 12 3 20 21 5 4 3 10 8 0 9 6 7 20