I. (S6.10) A process that is considered to be in control measures an ingreidnet in ounces. Below are the last 10 samples (each of size n =5) taken.

(Sample numbers in the columns and individual observation results below)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
| 10 | 9 | 13 | 10 | 12 | 10 | 10 | 13 | 8 | 10 |
| 9 | 9 | 9 | 10 | 10 | 10 | 11 | 10 | 8 | 12 |
| 10 | 11 | 10 | 11 | 9 | 8 | 10 | 8 | 12 | 9 |
| 9 | 11 | 10 | 10 | 11 | 12 | 8 | 10 | 12 | 8 |
| 12 | 10 | 9 | 10 | 10 | 9 | 9 | 8 | 9 | 12 |

a. What is the estimate of the process standard deviation?

b. What are the control limits for the mean chart? (assume 3 sigma limits)

c. What are the control limits for the range chart?

d. Is the process in control?

II. (S6.15) The results of inspection of DNA samples taken over the past 10 days are given below. Sample size is 100.

|  |  |
| --- | --- |
| **day** | **defective** |
| 1 | 7 |
| 2 | 6 |
| 3 | 6 |
| 4 | 9 |
| 5 | 5 |
| 6 | 6 |
| 7 | 0 |
| 8 | 8 |
| 9 | 9 |
| 10 | 1 |

a. Construct a 3-sigma p-chart using this information

b. If the number of defectives on the next three days are 12, 5, and 13, is the process in control?