**Assignment-I (BATCH 2020)**

Submission Data &Time: Max. Marks: 2

**PROBABILITY & STATISTICS**

INSTRUCTIONS (i) All questions carry equal marks. (ii) Attempt all three questions

Q 1. Industrial engineers periodically conduct “work measurement” analyses to determine the time required to produce a single unit of output. At a large processing plant, the number of total worker-hours required per day to perform a task was recorded for 50 days. The data are shown below.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 128 | 119 | 95 | 97 | 124 | 128 | 142 | 98 | 108 | 120 |
| 113 | 109 | 124 | 132 | 97 | 138 | 133 | 136 | 120 | 112 |
| 146 | 128 | 103 | 135 | 114 | 109 | 100 | 111 | 131 | 113 |
| 124 | 131 | 133 | 131 | 88 | 118 | 116 | 98 | 112 | 138 |
| 100 | 112 | 111 | 150 | 117 | 122 | 97 | 116 | 92 | 122 |

a. Compute the mean, median, and mode of the data set.

b. Find the range, variance, and standard deviation of the data set.

c. Construct the intervals *y*  *s*, *y*  2*s*, *and*

*y*  3*s*, . Count the number of observations that fall within

each interval and find the corresponding proportions. Compare the results of the Empirical Rule

(Normal distribution). Do you detect any outliers?

d. Construct a box plot for the data. Do you detect any outliers?

e. Find the 70th percentile for the data on total daily worker-hours. Interpret its value.

Q. 2 Following are the marks (out of 100) obtained in a Mathematics course of the Engineering undergraduates.

(a) Determine the descriptive statistics of the data.

(b) Transform each mark according to the following grade ranges.

**A**: Marks + 2;

**B**: + Marks + 2 ;

**C**: Marks + ;

**D**: - Marks ;

**E**: - 2 Marks - ;

**F**: - 3 Marks - 2 ;

Where = mean and = Standard deviation

(c) Describe the result in your words with the help of  **bar graph** and **Pie chart** of grads

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Roll No. | Marks | Roll No. | Marks | Roll No. | Marks | Roll No. | Marks |
| 1 | 76 | 12 | 43 | 23 | 43 | 34 | 69 |
| 2 | 63 | 13 | 68 | 24 | 78 | 35 | 27 |
| 3 | 57 | 14 | 64 | 25 | 86 | 36 | 97 |
| 4 | 40 | 15 | 78 | 26 | 67 | 37 | 47 |
| 5 | 42 | 16 | 68 | 27 | 55 | 38 | 83 |
| 6 | 65 | 17 | 55 | 28 | 88 | 39 | 74 |
| 7 | 72 | 18 | 75 | 29 | 60 | 40 | 63 |
| 8 | 73 | 19 | 51 | 30 | 82 | 41 | 77 |
| 9 | 95 | 20 | 77 | 31 | 96 | 42 | 77 |
| 10 | 80 | 21 | 40 | 32 | 68 | 43 | 82 |
| 11 | 75 | 22 | 79 | 33 | 71 | 44 | 50 |