**ChE 320 Spring 2017**

**Practice Exam 1 (100pts)**

**Instructions: Please read the questions carefully and plan accordingly before answering.**

Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Signature:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Question 1. (20 pts)

A study was performed on wear of a bearing *y* and its relationship to *x1* = oil viscosity and *x2* = load. The following data were obtained.

|  |  |  |
| --- | --- | --- |
| ***y*** | ***x1*** | ***x2*** |
| 193 | 1.6 | 851 |
| 230 | 15.5 | 816 |
| 172 | 22.0 | 1058 |
| 91 | 43.0 | 1201 |
| 113 | 33.0 | 1357 |
| 125 | 40.0 | 1115 |

Create two scatter diagrams of the data (use approximate scale). What do you anticipate will be the sign of each sample correlation coefficient?

Question 2. (30 pts)

The inside diameter (in inches) of 20 lightweight snaps used in assembling computer cases are measured and sorted with the following resulting data:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 39.5 | 44.3 | 45.0 | 45.9 | 47.0 |
| 48.5 | 48.6 | 48.7 | 48.9 | 49.6 |
| 49.9 | 50.0 | 50.3 | 50.4 | 50.4 |
| 51.6 | 52.9 | 54.2 | 55.0 | 57.1 |

Obtain a box plot for the data using an approximate scale and point out if any outlier is present.

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Question 3. (20 pts)

The life of a semiconductor laser at a constant power is normally distributed with a mean of 7000 hours and a standard deviation of 600 hours.

1. (15 pts) What is the probability that a laser fails before 5000 hours?
2. (15 pts) What is the life in hours that 95% of the lasers exceed?

Question 4. (30 pts)

The length of time (in seconds) that a user views a page on a Website before moving to another page is a lognormal random variable with parameters θ = 0.5 and ω2 = 1.

1. (10 pts) What is the probability that a page is viewed for more than 10 seconds?
2. (10 pts) What is the length of time that 50% of users view the page?
3. (10 pts) What is the mean and standard deviation of the time until a user moves from the page?