

UNIVERSITY OF REGINA
FACULTY OF ENGINEERING



ENIN 440
STATISTICAL QUALITY CONTROL

MIDTERM EXAMINATION

DATE: March 18, 1996
TIME: 90 mins.

INSTRUCTOR: D.G. Vandenberghe

MARKS

1. Data is obtained on the shear strength of a solder joint. After 30 samples of 3 specimens per group,

$$\Sigma \bar{X} = 12930 \text{ lbf}$$
$$\Sigma R = 1230 \text{ lbf}$$

(10) a) Develop a \bar{X} and R control chart for this process.

(20) b) If the minimum acceptable shear strength for the joint is 375 lbf, what is the expected percentage of defective joints in the population. What would be the effect of increasing the mean strength of the joint by 5% on the percentage of defective joints in the population.

(20) 2. A vacuum deposition process on the reflector surface of a headlamp was investigated. The percentage of defective headlamps from this process was found to be 5.9%. Assuming a sample size of $n = 200$, develop a p chart for this process. Determine the probability of acceptance for this control chart when the percentage defective is 0.5 and 10%.

(20) 3. The manager of an electronics plant believes that his company will lose an important contract if the defects per unit of product exceeds four for more than 2% of the time.

a) Determine the mean number of defects per unit of product that will just meet the manager's requirements.

b) Assuming a sample size of 5 units of product, develop a control chart for a manufacturing process that just meets the manager's requirements.

MARKS

4. Automotive radios are inspected as listed below:

(30)

<u>Lot Number</u>	<u>Radios</u>	<u>Defects</u>
1	6	25
2	3	10
3	4	18
4	5	17
5	6	22

Plot the data on a control chart and indicate whether the process is in control.