Q. A manufacturer supplies the rear axles for U.S. Postal Service mail trucks. These axles must be able to

With stand 80,000 pounds per square inch in stress tests, but an excessively strong axle raises production costs significantly. Long experience indicates that the standard deviation of the strength of its axles is 4,000 pounds per square inch. The manufacturer selects a sample of 100 axles from production, tests them, and finds that the mean stress capacity of the sample is 79,600 pounds per square inch.

Q. supposes a hospital uses large quantities of packaged doses of a particular drug. The individual dose of this drug is 100 cubic centimetres (100 cc). The action of the drug is such that the body will harmlessly pass off excessive doses. On the other hand, insufficient doses do not produce the desired medical effect, and they interfere with patient treatment. The hospital has purchased this drug from the same manufacturer for a number of years and knows that the population standard deviation is 2 cc. The hospital inspects 50 doses of this drug at random from a very large shipment and finds the mean of these doses to be 99.75 cc.

Q. Hinton Press hypothesizes that the average life of its largest web press is 14,500 hours. They know that the standard deviation of press life is 2,100 hours. From a sample of 25 presses, the company finds a sample mean of 13,000 hours. At a 0.01 significance level, should the company conclude that the average life of the presses is less than the hypothesized 14,500 hours?

Q. American Theatres knows that a certain hit movie ran an average of 84 days in each city, and the corresponding standard deviation was 10 days. The manager of the south eastern district was interested in comparing the movie’s popularity in his region with that in all of American’s other theatres. He randomly chose 75 theatres in his region and found that they ran the movie an average of 81.5 days.

(a) State appropriate hypotheses for testing whether there was a significant difference in the length of the picture’s run between theatres in the south eastern district and all of American’s other theatres.

(b) At a 1 per cent significance level, test these hypotheses.