SIX SIGMA – TEST I

1) a) Briefly state the important stages in a Six Sigma project process. (2 marks)
   b) It has been realised that the energy consumption of a company is very high compared to its competitors. Define a Six Sigma project to bring down the energy consumption. Assume suitable data. (1 mark)
2) Improving the Sigma level of a process helps in reducing the cost of the product. Explain how. (2 marks)
3) The time to failure in hours of an electronic component subjected to an accelerated life test is shown below:

127	125	131	124	129	121	146	149	153	125
124	123	120	119	128	133	137	124	142	123
121	136	140	137	125	124	128	129	130	122
118	131	125	133	141	125	140	131	129	126

   a) Construct a stem-and-leaf plot. (1 mark)
   b) Construct a box plot. (3 marks)
   c) Comment on the data. (1 marks)
4) The tensile strength of a steel is known to normally distributed with an average of 330MPa and a standard deviation of 9MPa. What is the probability that the sample standard deviation of 5 samples will be greater than 14.97Mpa? (2 marks)
5) The diameter of a sample of 5 shafts had a standard deviation of 2.5 microns. What is the probability that another sample of 10 shafts will have a standard deviation of 1.312 microns? Assume that all the shafts are from the same normally distributed population. (3 marks)
6) The shelf life of a carbonated beverage is of interest. Ten bottles are randomly selected and tested, and the following results are obtained: 108, 124, 124, 106, 115, 138, 163, 159, 134, 139.
   a) Determine a 95% confidence interval for the mean life. (5 marks)
   b) We would like to demonstrate that the mean shelf life exceeds 120 days. Set up appropriate hypotheses and investigate the claim. Use a significance level of 0.01. (5 marks)