B. Sc. (Honours) Semester-VI Examination 2017
Statistics (Honours)
Course: BSC-61
(Statistical Quality Control)

Time : Three Hours **Full Marks : 40**

Questions are of value as indicated in the margin

Answer **any four** questions

1. Distinguish between
   (a) Process control and Product control
   (b) Allowable variation and Assignable variation
   (c) Defects and Defectives
   (D) Acceptance rejection plan and Acceptance rectification plan $2\frac{1}{2}\times 4 = 10$

2. (a) Explain the basics of Shewart's control chart.
   (b) How do you construct a control chart for fraction defectives when sample size varies? 5+5=10

3. (a) What do you mean by process capability of a system? Suggest a measure by which process capability can be expressed.
   (b) What is specification limit? How does it differ from natural tolerance limit?
   (c) When do you use the concept of 6σ limit? Cite an example where it does not stand. (2+2)+(2+2)+2=10

4. (a) Discuss the following terms in sampling inspection plan.
   Consumer's risk, Producer's risk, AOQL.
   (b) "Steeper the OC curve, better is the consumer's protection" – comment. 6+4=10

5. (a) For a single sampling plan deduce the expressions of operating characteristic function and average total inspection, assuming a very large lot size.
   (b) Describe a double sampling plan for attributes, supported by a clear flow chart. 6+4=10

6. (a) Elucidate the motivation on using C_{pk} and C_{pkm} over C_p where the notations bear their usual meaning.
   (b) Suppose that a process has upper and lower specifications at 62 and 38. A sample of size 20 from this process reveals that the process mean is centered at the midpoint of the tolerance interval and sample standard deviation is 1.75. Construct a 95% confidence interval on C_p.
   [Given $\chi^2_{1-\alpha/2,n-1} = 8.91$ *and* $\chi^2_{\alpha/2,n-1} = 32.85$ where α = level of significance, n = sample size]. 6+4=10

7. Write short notes on the following :
   (a) Modified control limits
   (b) Variable inspection plan 5+5=10
