

**Avinashilingam Institute for Home Science and Higher Education for Women  
(Deemed to be University) Coimbatore-641 043  
Bachelors Degree Examination November – 2018  
V Semester**

**Class : III UG  
Major : Mathematics**

**Time : 3 Hours  
Max Marks: 100**

**15BMAC16- STATISTICAL QUALITY CONTROL**

**PART-A**

**10X1=10**

**Choose the correct Answer**

1. Variation in the items produced in a factory may be due to  
a) Chance factors    b) assignable causes    c) both (a) and (b)  
d) None of the above
  
2. Control charts consist of d to be  
a) Three control lines                      b) upper and lower control limits  
c) the level of the process                d) all the above
  
3. The mean of the sample mean is  
a.  $\bar{\bar{X}} = \frac{\sum X}{n}$     b.  $\bar{X} = \frac{\sum x_{ij}}{n}$     c.  $\bar{X} = x_{ij}$     d. none
  
4. The  $3\sigma$  – limits for R-chart is denoted by  
a)  $E(R) + 3 \sigma_R$     b)  $E(R) - 3 \sigma_R$     c)  $E(R) \pm 3 \sigma_R$     d)  $E(R) \pm 3 S.E (t)$
  
5. In case of fraction defective , the variable under consideration is  
a) Dependent    b) Independent    c) Dichotomous    d) multinomial
  
6. ----- chart is used to control the percentage or proportion of defectives per sample  
a)  $\bar{X}$  - Chart    b) p- chart    c) C – Chart    d) R – Chart
  
7. The control limits delimited by the consumer are called  
a) Modified control limits  
b) Natural control limits  
c) Specification control limits  
d) None of the above
  
8. If  $\mu$  and  $\sigma$  are the process mean and SD, then the control limits  $\mu \pm 3\sigma$  are known as  
a. Modified control limits                      b). Natural control limits  
c Specification control limits                d) None of the above
  
9. Inspection by attributes over inspection by variables requires:  
a) Less time    b) less skill    c) less calculations    d) all the above

- 10 OC curve reveals that ability of the sampling plan to distinguish between:  
 a) Good and bad lots b) Good and bad sampling plans c) good and bad product d) None of the above

**PART – B**

**5X6= 30 Marks**

**Answer the following**

- 11 a) Distinguish between chance and assignable causes with examples.  
 OR  
 11. b) Delineate about SQC and its benefits.  
 12.a) Give a procedure to derive control limits for  $\bar{X}$  - Chart.  
 OR  
 12. b) With a sketch explain the major parts of a Control Chart.  
 13. a) Elaborate briefly about the control chart for attributes with a situation.  
 OR  
 13. b) Formulate control limits for number of defectives.  
 14. a) Write a short note on Natural and Specification limits.  
 OR  
 14. b) State the applications of C-chart.  
 15 a) Compare sampling inspection by variables and attributes.  
 OR  
 15. b) Brief about AQL, ASN and LTPD.

**PART – C**

**5X12=60**

**Answer the following**

**Answer the should not exceed 400 words or two pages**

16. a) What role does Statistical Quality Control play in maintaining the quality of a product? Discuss its benefits.  
 (OR)  
 16. b) With a flow chart, explain in detail about the techniques of SQC.  
 17. a) Describe the construction of  $\bar{X}$  - Chart and R - Chart with its interpretation  
 (OR)  
 17. b) Calculate the values for the central line and the control limits for mean chart and then comment on the state of control for the given information  
 A machine is set to deliver packets of a given weight, 10 samples of size 5 each were recorded.
- |             |    |    |    |    |    |    |    |    |    |    |
|-------------|----|----|----|----|----|----|----|----|----|----|
| Sample No : | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 |
| Mean :      | 15 | 17 | 15 | 18 | 17 | 14 | 18 | 15 | 17 | 16 |
| Range :     | 7  | 7  | 4  | 9  | 8  | 7  | 12 | 4  | 11 | 5  |
18. a) The following are the figures of defectives in 22 lots each containing 2000 units. 425, 430, 216, 341, 225, 322, 280, 306, 337, 305, 356, 402, 216, 264, 126, 409, 193, 326, 280, 389, 451, 420. Draw control chart for fraction defective and comment on the state of control of the process.  
 (OR)  
 18. b) How will you prepare the control charts for fraction defectives? – Discuss  
 19 a) With the assumptions and conditions discuss in detail about the control chart for number of defects per unit stating an example  
 (OR)  
 19. b) How will you differentiate modified control limits from other control limits? Explain.  
 20. a) Delineate single sampling inspection plan in reference to statistical quality control.  
 (OR)  
 20. b) Plot the OC curve for Single sampling plan where  $N = 5000$ ;  $n=100$ ;  $c= 1,2,3$ . Assuming  $P_c = 0.10$ , determine the lot tolerance fraction defective.