



Avinashilingam Institute for Home Science and Higher Education for Women
(Deemed to be University under Category 'A' by MHRD, Estd. u/s 3 of UGC Act 1956) Re-
accredited with 'A+' Grade by NAAC. Recognised by UGC Under Section 12B Coimbatore
- 641 043, Tamil Nadu, India

Continuous Internal Assessment Test II – October 2024
Semester V

Class : III UG
Major : Mathematics

Time : 2 Hours
Max. Marks : 60

21BMAC16 - Statistical Quality Control

Course Outcomes:

- CO1: Recognize the basis concepts of quality improvement.
CO2: Design, use and interpret control charts for variables and attributes.
CO3: Expose the statistical methods used to measure quality characteristics.
CO4: Construct and interpret the control chart for number of defects (c-chart) and number of defects per unit (u – chart).
CO5: Describe the process of acceptance sampling by attributes.

PART A

6 x 1 = 6

Choose the Correct Answer

- UCL for number of defects per unit is given by CO4K2
a. $\lambda + 3\sqrt{\lambda}$ b. $\lambda - 3\sqrt{\lambda}$ c. $\lambda + \sqrt{3\lambda}$ d. $\lambda + \sqrt{3\lambda}$
- The standard error of the average number of defects per unit is given by CO4K2
a. $\sqrt{u/N}$ b. $\sqrt{\bar{u}/n}$ c. $\sqrt{c/N}$ d. $\sqrt{\bar{c}/N}$
- The number of defects per unit of a casting process output, is plotted on _____ CO4K1
a. s – chart b. \bar{x} - chart c. u – chart d. p – chart
- The average quality of the product after sampling and 100% inspection of rejected lots, called CO5K2
a. AOQ b. AOQL c. AQL d. 4 ASN
- In destructive testing situation _____ curve is/are used. CO5K3
a. ASN and ATI b. ASN c. ATI d. either ASN or ATI
- Consumer's risk is equal to CO5K2
a. $P(\text{accepting a lot of quality } p_t)$ b. $P(\text{rejecting a lot of quality } p_t)$
c. $P(\text{accepting a lot of quality } \bar{p})$ d. $P(\text{rejecting a lot of quality } \bar{p})$

Part B

3 x 6 = 18

Answer ALL questions

- a. Mention the application of c-chart. CO3K3
(or)
- b. Explain modified control limit. CO3K3
- a. Derive the control limit for c- chart. CO4K3
(or)
- b. Explain lot tolerance proportion or percentage defective and Process average fraction defective. CO4K2
- a. Write a note on rectifying inspection plans. CO5K2
(or)
- b. Explain the procedure of single sampling plan. CO5K4

Part C

3 x 12 = 36

Answer ALL questions

- a. The number of defects in 20 pieces of cloth of 100 metres length is given below :
1, 3, 3, 1, 6, 4, 3, 7, 10, 2, 2, 6, 4, 3, 2, 7, 1, 5, 6, 4. Draw appropriate chart and say
whether the process can be considered to be in control. CO4K3
(or)
- b. The following number of defects were found on articles being produced, when inspected
eight times a day on three days : 2, 4, 7, 3, 1, 4, 8, 9; 5, 3, 7, 11, 6, 4, 9,9; 6, 4, 3, 9,7, 4, 7,
12. Draw the control chart and comment on your findings. CO4K3
- a. Write a note on natural tolerance limit and specification limit. CO4K4
(or)
- b. Derive AOQL for single sampling plan.

12. a. Determine sample size n and acceptance number c for single sampling plan. CO5K3
 (or)
 12. b. Determine the lot tolerance fraction defective for single sampling plan where $N=5,000$; $n=100$; $c=1,2,3$. Assuming $P_c=0.10$. Also determine AOQL.

CO5K4

np	P_a		
	$c = 1$	$c = 2$	$c = 3$
.01	1.00	1.00	1.00
.20	.98	.99	1.00
.25	.97	.99	1.00
.3	.96	.99	1.00
.8	.81	.95	.99
1.0	.74	.92	.98
1.4	.59	.83	.95
1.9	.43	.70	.87
2.4	.31	.57	.78
2.8	.23	.47	.69
3.1	.18	.40	.62
4.3	.07	.20	.38
4.9	.04	.13	.28
5.6	.02	.08	.19
5.8	.02	.07	.17

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