

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc DEGREE EXAMINATION MAY 2022
(Fourth Semester)

Branch – STATISTICS

STATISTICAL QUALITY CONTROL

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)

Answer ALL questions

ALL questions carry EQUAL marks (10 x 1 = 10)

1. Statistical quality control techniques are based on the theory of
(i) Probability (ii) Quality
(iii) Statistics (iv) Set theory
2. The control chart is used to obtain the number of defective per unit is
(i) C-chart (ii) P-chart
(iii) Range (iv) Mean
3. Control charts using R is for
(i) Variables (ii) Reliability
(iii) Attributes (iv) Maintainability
4. The maximum value of the average outgoing quality for all possible values of proportion defective is called
(i) Average outgoing quality (ii) Acceptable quality control
(iii) Average outgoing quality limit (iv) lot tolerance proportion defective
5. An operating characteristics curve is a plot between
(i) Consumer's risk and producers risk
(ii) Probability of acceptance and probability Rejection
(iii) Percentage of defective and probability of acceptance
(iv) average outgoing quality and probability of acceptance
6. The headquarters of the Indian organization Bureau of Indian Standard (BIS) is in.....
(i) Hyderabad
(ii) Chennai
(iii) New Delhi
(iv) Mumbai
7. In sequential sampling plan, the sample size is
(i) a discrete random variable
(ii) a continuous random variable
(iii) both (i) and (ii)
(iv) neither (i) and (ii)
8. The lot consists of defectives, the OC function for $P = 1$ is
(i) $L(P) = 0$
(ii) $L(P) = 1$
(iii) $L(P) = \infty$
(iv) None of the above
9. What is the mean time to failure, when time to failure of a gadget follows Weibull distribution with scale=1000 hours and shape=0.5?
(i) 2500 hours
(ii) 1500 hours
(iii) 3000 hours
(iv) 2000 hours

Cont...

10. In series systems of five components, the entire system will fail if
- (i) Any two components fail
 - (ii) Any three components fail
 - (iii) Any one of the components fail
 - (iv) Any four components fail

SECTION - B (Marks)

Answer ALL Questions (5 x 7 = 35)
ALL Questions Carry EQUAL Marks

- 11 a Distinguish between the control chart for variables and attributes.
OR
b Write the advantages and disadvantages of statistical quality control.
- 12 a Develop geometric moving average control charts.
OR
b Write the concept of V-Mask with neat diagram.
- 13 a State the list of acceptance sampling plans for Attributes.
OR
b Develop Dodge-Romig sampling plans.
- 14 a Outline acceptance sampling by variables. State the advantages of acceptance sampling by variables.
OR
b In variables acceptance plan when σ is known for an one-sided specification when $n=25$ and $k=1.97$. Compute the probability of acceptance at 3% defective per lot assuming that the frequency distribution in the lot is normal and estimate the σ .
- 15 a What is reliability function, and hazard function and derive the hazard rate for gamma distribution.
OR
b Describe series and parallel systems in reliability.

SECTION -C (30 Marks)

Answer ANY THREE Questions (3 x 10 = 30)
ALL questions carry EQUAL Marks

- 16 Explain in detail about \bar{X} and R charts and write the purpose of drawing the charts.
- 17 Discuss CUSUM chart for one sided and two sided test procedures.
- 18 Enumerate the procedure for CSP-I.
- 19 Elucidate chain sampling plan for variables.
- 20 Analyze MLE of complete sample when the life distribution is one parameter exponential.

Z-Z-Z

END