

BSC(M.S.CS) STATISTICS - I YEAR (SEM-I)

Important Questions

UNIT - I & II

- ① Explain the methods of collecting primary & Secondary data.
- ② Define questionnaire and schedule.
- ③ Define classification and types, tabulation also.
- ④ Define central and non-central moments. In a distribution the first 4 moments about the point 5 are -4, 22, -117, and 560 respectively find the β and γ coefficients.
- ⑤ Establish the relationship between the moments about mean in terms of moments about any arbitrary point.
- ⑥ Show that $\beta_2 \geq 1$, $\beta_2 \geq \beta_1$.
- ⑦ State and prove Bayes theorem and its problems.
- ⑧ What is meant by skewness and explain various measures of coefficient of skewness.
- ⑨ Explain the concept of kurtosis and its types.
- ⑩ State and prove addition theorem of probability for 'n' events.
- ⑪ State and prove multiplication theorem of probability for 'n' events.
- ⑫ Write details about relative measures of dispersion.
- ⑬ Problems on mean, median, mode, discrete and continuous cases.
- ⑭ Problems on M.D., S.D., Q.D.
- ⑮ Cauchy Schwartz's inequality theorem and the first three moments about origin are $\frac{n+1}{2}$, $\frac{(n+1)(2n+1)}{6}$, and $\frac{n(n+1)^2}{4}$ then obtain variance β_1 and β_2 .
- ⑯ State the central moments are independent of change of origin but not scale.
- ⑰ State the non-central moments are independent of change of origin but not scale.

- 21) Define sheppard's corrections and problems on it
- 22) Define Random experiment, mutually exclusive event, exhaustive event, powerset, certain event
- 23) state and prove Boole's inequality theorem
- 24) Define independent events and mutually independent events
- 25) If E_1 and E_2 are independent events then $P(E_1 \cup E_2) = 1 - P(\bar{E}_1 \bar{E}_2)$
- 26) If E_1 and E_2 are independent events then E_1 & \bar{E}_2 are also independent events
- 27) If E_1 and E_2 are independent events then \bar{E}_1 & \bar{E}_2 are also independent events

Unit - III & IV

- 28) Define discrete random variable and probability mass function
- 29) state Cauchy Schwartz inequality theorem
- 30) Define moment generating function (m.g.f) of a random variable and state its properties
- 31) state and prove Chebyshev's inequality theorem
- 32) Define CGF, PGF and characteristic function
- 33) Define distributive function and its properties
- 34) Define continuous random variable and probability density function and problem and its properties

35) the R.V 'x' has PGF, $P_x(t)$ then $E(x) = P'_x(t)$ & $V(x) = P''_x(t)$

$$V(x) = P''_x(t) + P'_x(t) - [P'_x(t)]^2$$

- 36) prove multiplication theorem of expectations
- 37) Explain the relationship b/w the moment and cumulants
- 38) state and prove addition theorem of expectations
- 39) Problems on probability density function

40) A continuous R.V x has following Pdf $f(x) = \begin{cases} Ax^2 & 0 \leq x \leq 1 \\ 0 & \text{o.w} \end{cases}$

① then find A ② $P(0.2 \leq x \leq 0.5)$

41) A R.V x has following pmf $x: 0, 1, 2, 3, 4, 5, 6, 7, 8$

$$P(x): a, 3a, 5a, 7a, 9a, 11a, 13a, 15a, 17a$$

i) determine value of 'a' ii) $P(x < 3)$, $P(x \geq 3)$, $P(0 < x < 5)$

42) Define joint pmf and pdf and its properties

43) Define marginal pmf and pdf

44) Define conditional pmf and pdf and problems mit

45) $f(x, y) = \begin{cases} \frac{x^3 y^3}{16}, & 0 < x < 2, 0 < y < 2 \\ 0, & \text{o.w} \end{cases}$ i) find marginals
ii) Test independent or not

iii) conditional probabilities

46) The joint pdf of 2D R.V $f(x, y) = \frac{2}{3}(x+2y)$, $0 < x < 1, 0 < y < 1$

(i) marginal functions of x & y (ii) independent check

(iii) $E(x)$ & $E(y)$ (iv) $\text{Cov}(x, y)$ (v) $V(x)$, $V(y)$ also

47) $f(x, y) = \begin{cases} xy & 0 < x < 2, 0 < y < 1 \end{cases}$ (i) find marginal probability function

(ii) $E(x)$ & $E(y)$, (iii) $P(x < 1 / y < 1/2)$ (iv) if x & y are independent or not

48) If $f(x) = \begin{cases} 2x & 0 < x < 1 \\ 0 & \text{o.w} \end{cases}$ then find pdf of $y = 8x^3$

49) if 'f' is a uniformly distributed on $(0, 1)$ then find the density function of $y = 3x + 5$ also find mean & variance

50) Chebyshev's inequality problems

51) A-M, G-M, H-M merits and demerits