

- Q-1 (a) i) Primary data is more reliable than Secondary data (2)
 ii) Coeff. of association is +1 (2)
 iii) Median is calculated using ogive curve (2)
 iv) Median is required (2)
 v) Median divide the data into two equal parts (2)

- (b) i) +vely associated -vely associated independent (2)
 ii) simple random sampling without replacement - Selected items are not replaced back to population (2)
 iii) $\bar{x} = 15$ $\Sigma X = 135$ $n = 9$ (2)
 iv) $a.d = (Q_3 - Q_1) / 2 = 5$ (2)
 v) Kurtosis - ~~peak~~ of curve \wedge \cap \sqcap (2)
 Lepto Meso Platykurtic curve

Q-2 (a) Components of ideal Table - Table Number, Title, Caption, stub, Body of the Table, Unit of Measurement, Foot note (5)
 source note (one line explanation each)

Types of Table - simple & complex Table - General & special purpose Table (5)
 (Explanation ~~or~~ Example of blank Table)

(b)
$$Q = \frac{(AB)(\alpha\beta) - (A\beta)(\alpha B)}{(AB)(\alpha\beta) + (A\beta)(\alpha B)} = \text{Yule's coeff. of Asso.}$$

$$Y = \frac{\sqrt{(AB)(\alpha\beta)} - \sqrt{(A\beta)(\alpha B)}}{\sqrt{(AB)(\alpha\beta)} + \sqrt{(A\beta)(\alpha B)}} = \text{coeff. of colligation}$$
 } (5)

Derivation of $Q = \frac{2Y}{1+Y^2}$ (5)

(c) Primary data - Defⁿ - are always collected from direct source collected by investigator himself or through his agents more reliable, expensive, time consuming etc. (4)

Methods - 1) Direct personal observation (3)
 (Explanation) 2) mailed questionnaire (3)

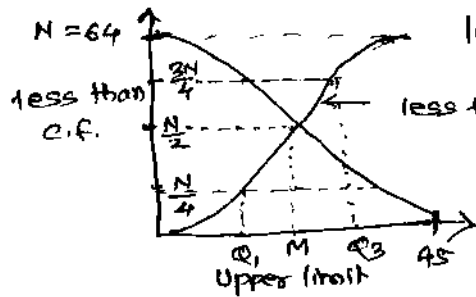
(d) Independent Attrn. $(AB) = \frac{(A)(B)}{N}$
 positively Associated $(AB) > \frac{(A)(B)}{N}$
 Negatively Associated $(AB) < \frac{(A)(B)}{N}$ } (5)

Derivation of $\text{Max}\{0, (A)+(B) - N\} \leq (AB) \leq \text{Min}\{(A), (B)\}$ (5)

Q-3 (a) class 15-20 20-25 25-30 30-35 35-40 40-45 Total

freq 3 7 15 21 12 6 64

2



Frequency curve (2)
 Ogive (2)
 M = Median (2)
 Q1 = First Quartile (2)
 Q3 = Third Quartile (2)

(b) Bivariate freq. Distn - Explanation with example (4)

conditional — ti — — — — ti — (3)
 Marginal — ti — — — — u — (3)

(c) Measures of Central Tendency - A.M., G.M., H.M., mode, median, Q1, Q3, deciles, Percentiles. one line explanation of each (6)

Requisite of good measures of Central Tendency (4)

(d) (1) $A.M. \geq G.M. \geq H.M.$ Derivation (5)

(2) $G.M.^2 = A.M. \times H.M.$ Derivation (5)

$$AM = \frac{a+b}{2} \quad GM = \sqrt{ab} \quad HM = \frac{2}{\frac{1}{a} + \frac{1}{b}} = \frac{2ab}{a+b}$$

Q-4 (a) Concept of skewness - Explanation & diagram (4)

Measures of skewness - 1) Karl Pearson's Mean-Mode = 3 (Mean-Mode) (2)
 (Absolute)

2) Bowley's = $(Q_3 - Q_2) - (Q_2 - Q_1)$ (2)

(Relative) 1) $\frac{\text{Mean} - \text{Mode}}{S.D.}$

2) $\frac{Q_3 + Q_1 - 2Q_2}{Q_3 - Q_1}$

Interpretation (2)
 > 0 +vely skewed
 < 0 -vely skewed
 $= 0$ symmetric

(b) combined Mean = $\frac{n\bar{x} + m\bar{y}}{n+m} = 68.83 = \bar{z}$

combined S.D. = $\frac{n(G_1^2 + d_1^2) + m(G_2^2 + d_2^2)}{n+m} = 31.22$

$d_1 = \bar{x} - \bar{z}$ $d_2 = \bar{y} - \bar{z}$

Q-4 (c) Defn or formula 1) Variance

$$\textcircled{2} \quad V(x) = \frac{\sum (x - \bar{x})^2}{n}$$

2) S.D.

$$\textcircled{2} \quad V(x) = \frac{\sum f(x - \bar{x})^2}{N}$$

3) C.V.

$\textcircled{2}$

$$S.D = \sqrt{V(x)}$$

Property of variance (Any two) $\textcircled{2}$

Use of C.V. - To compare data set $\textcircled{2}$

$$C.V. = \frac{S.D}{\text{Mean}} \times 100$$

(d) Defn of Raw Moments about a

$$\mu'_r = \frac{\sum (x - a)^r}{n} \quad r=0,1,2,\dots$$

central Moments - four

$$\mu_r = \frac{\sum (x - \bar{x})^r}{n} \quad \textcircled{3}$$

Relation

$$1) \mu_2 = \mu_2' - \mu_1'^2 \quad \textcircled{2}$$

$$2) \mu_3 = \mu_3' - 3\mu_2'\mu_1' + 2\mu_1'^3 \quad \textcircled{2}$$

$$3) \mu_4 = \mu_4' - 4\mu_3'\mu_1' + 6\mu_2'\mu_1'^2 - 3\mu_1'^4 \quad \textcircled{3}$$

Q-5 (a) Yule's coeff. of Association =

$$\frac{(AD)(CB) - (AB)(CD)}{(AD)(CB) + (AB)(CD)} \quad \textcircled{5}$$

$$= \frac{40000 - 90000}{40000 + 90000} = -0.3846$$

(b) Qualitative

- 1) Measured as presence or absence
cannot measured Numerically
- 2) Ex. Colour of eye
blood group

Quantitative

- 1) Measured Numerically
- 2) Ex Height, weight
Income in Rs.

(c) secondary data - Defn & example $\textcircled{3}$

Merits of Secondary data $\textcircled{2}$

(d) Types of Kurtosis - 1) Leptokurtic

2) Platy kurtic $\textcircled{2}$

3) Meso kurtic

Measures of Kurtosis - $\beta_2 = \frac{\mu_4}{\mu_2^2}$ & $\gamma_2 = \beta_2 - 3$

1) $\beta_2 < 3$ or $\gamma_2 < 0$ Platy $\textcircled{3}$

2) $\beta_2 > 3$ or $\gamma_2 > 0$ Lepto

3) $\beta_2 = 3$ or $\gamma_2 = 0$ Meso