Sta 301

Important Formulas

(i) **Population Mean:-**

$$M = \frac{\Sigma fx}{\Sigma f}$$

(ii) **Range**

$$= x_m - x_0$$
$$= max - min$$

3) **Mode:-**

- جو سب سے زیادہ بار آئے (i
(ii

$$\hat{x} = l + \frac{f_m - f_e}{(f_m - f_{e_1}) + (f_m - l_2)}$$

4) **Sampling Error:-**

$$\bar{X} = M$$

5) **Arithmetic Means: AM**

اوپر والے سارے نمبرز کو جمع کر کے ٹوٹل نمبرز کی تعداد ÷ کرنا ہوتا ہے۔

مثال 9 6 3 6 2

$$\frac{9+3+2}{3} = \frac{14}{3}$$

6) **Harmonic Means:-**

$$HM:- \frac{n}{\Sigma(\frac{1}{x})}$$

for ungrouped data

7) **HM for grouped data**

$$HM = \frac{n}{\Sigma f(\frac{1}{x})}$$

8) **Mid-Point**

$$= \frac{x_0 + x_m}{2}$$

$$Example = \frac{5+2}{2} = \frac{7}{2}$$

9) **Median**

$$\tilde{x} = 5, 14, \hat{18}, 23, 34, 43$$

Median means middle values.

$$= \frac{18+23}{2}$$
$$= 20^2$$

10) **First Quastile**

$$Q_1 = l + \frac{h}{f}(n/4 - C)$$

11) **2nd Quastiles (I.E Median)**

$$Q_2 = l + \frac{h}{f}(n/2 - C)$$

11) **3rd Quastiles**

$$Q_3 = l + \frac{h}{f}(3n/4 - C)$$

12) First Deciles :-

$$D_1 = l + \frac{h}{f}\left[\frac{n}{10} - C\right]$$

13) 2nd Deciles:-

$$D_2 = l + \frac{h}{f}\left[\frac{2n}{10} - C\right]$$

14) 3rd Deciles

$$D_3 = l + \frac{h}{f}\left(\frac{3n}{10} - C\right)$$

15) Percentiles First

$$P_1 = l + \frac{h}{f}\left(\frac{n}{100} - C\right)$$

16) 2nd Percentile

$$P_2 = l + \frac{h}{f}\left(\frac{2n}{100} - C\right)$$

17) 3rd Percentile

$$P_3 = l + \frac{h}{f}\left(\frac{3n}{100} - C\right)$$

18) Geometric Mean

$$G = \text{antilog}\left[\frac{\Sigma \log x}{n}\right]$$

19 Percentile Distribution Median

$$\tilde{x} = l + \frac{h}{f}\left(\frac{n}{2} - C\right)$$

20) Class-Mark (Mid-Point) for grouped data means:-

$$\bar{X} = \frac{\Sigma fx}{\Sigma f}$$

21) Weighted Mean

$$\bar{X}_w = \frac{\Sigma w_i x_i}{\Sigma w_i}$$

22) Quartiles Desivation

$$Q.D = \frac{Q_3 - Q_1}{2}$$

23) Coefficient of Dispersion:-

$$= \frac{x_m - x_0}{x_m + x_0}$$

24) Mid-Quartile Range:-

$$\frac{Q_1 + Q_3}{2}$$

25) Mean Deviation:-

$$M.D = \frac{\Sigma |d_i|}{n}$$

26) Coefficient of Quartile deviation:-

$$= \frac{Q_3 - Q_1}{Q_3 + Q_1}$$

27) Variances:-

$$S^2 = \frac{\Sigma(x - \bar{x})^2}{n}$$

28) Chebychev's theorm

$(\bar{x} - ks), (\bar{x} + ks)$

29) Empirical roles:-

(i) Interval (1)

$(\bar{x} - s, \bar{x} + s)$

(ii) interval (2)

$(\bar{x} - 2s, \bar{x} + 2s)$

(iii) Interval (3rd)

$(\bar{x} - 3s, \bar{x} + 3s)$

30) A five Number Summary Consist of x_0, Q_1, Median, Q_3, x_n

31) Pearson's Coefficients of Skewness

$$= \frac{3(\text{mean} - \text{median})}{\text{Standard deviation}}$$

32) Equation of Stright-line

$$Y = a + bx$$

33) Pearson's Coefficient of Correlation

$$\text{Cov}(x, y) = \frac{\Sigma(x - \bar{x})(Y - \bar{Y})}{n}$$

34) Short Cut formula for Pearson's Coefficient of Correlation

$$r = \frac{\Sigma XY - (\Sigma X)(\Sigma Y)/n}{\sqrt{\left[\Sigma X^2 - (\Sigma X)^2/n\right]\left[\Sigma Y^2 - (\Sigma Y)^2/n\right]}}$$

34) Rule of Permutation:-

$$= \frac{n!}{(n-r)!} = \frac{3!}{(3-3)!} = \frac{3}{3 \times 2 \times 1} = 6 \text{ Ans.}$$

35) Permutation:-

$$P = \frac{n!}{n_1! n_2! \cdots n_k!} \quad (\text{where } \Sigma n_i = n)$$

$$= \frac{9!}{1 \times 1 \times 2 \times 1 \times 1 \times 2 \times 1 \times 2 \times 1} = \boxed{45360} \text{ Ans}$$

$$= \frac{9 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1}{1 \times 1 \times 2 \times 1 \times 1 \times 2 \times 1 \times 2 \times 1}$$

Rule of Combination:-

37) $\binom{n}{r}$ or ^nC_r — Important

and is given by

$$\binom{n}{r} = \frac{n!}{r!(n-r)!}$$

38) Fair Coin is tossed
Appear is 1/2
Drawn is 1/52
} MCQs.

39) Probability :-

$$P(A) = \frac{m}{n}$$

= Numbes of favourable outcomes / Total number of possible outcomes.

40) If A and B are Mutually Exclusive Events (Subset of S), then

$$P(A \cap B) = P(A) + P(B)$$

41) If A And B are Not-Mutually Exclusive Events then the

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

↓

* Addition Law

42) Conditional Probability :-

$$P(A/B) = \left[\frac{P(A \cap B)}{P(B)} \right]$$

$$P\left(\frac{B}{A}\right) = \left[\frac{P(A \cap B)}{P(A)} \right]$$

43)

$$P(W) = P(A_1 \cap W) + P(A_2 \cap W) + P(A_3 \cap W)$$

44) INDEPENDENT EVENTS :-

$$P(A \cap B) = P(A) \times P(B)$$

Dependent Event :-

$$P(A \cap B) \neq P(A) \times P(B)$$

45) Bayes Theorem :-

$$P(A_i/B) = \frac{P(A_i)P(B/A_i)}{\sum_{i=0}^{k} P(A) \times P(B/A_i)}$$

for $i = 1, 2, \dots k$.