

MBB College
Department of Statistics
Assignments for 1st Semester (Honours Course) - 2018

Answer the following questions

1. Define central tendency and describe different measures of central tendency with merits and demerits.
2. Define dispersion and describe different measures of dispersion with merits and demerits.
3. Describe different relative measures of dispersion. Distinguish between absolute and relative measure of dispersion.
4. In case of grouped frequency distribution derive the formula of median.
5. In case of grouped frequency distribution derive the formula of mode.
6. Obtain the values of AM, GM and HM of the GP series: a, ar, ar^2, \dots upto $2n$ terms.
7. For n observations, show that $AM \geq GM \geq HM$. When does the equality sign hold?
8. Show that if the variable takes the value $0, 1, 2, \dots, n$ with frequencies ${}^n C_0, {}^n C_1, {}^n C_2, \dots, {}^n C_n$ respectively then the mean is $n/2$ and variance is $n/4$.
9. What do you understand by Skewness. Describe different measures of Skewness.
10. Show that the Pearson's Beta coefficients satisfy the inequalities:

(i) $\beta_2 \geq \beta_1 + 1$

(ii) $\beta_2 \geq 1$

11. Write a short-note on Kurtosis.
12. If n_1, n_2 are the sizes; \bar{x}_1, \bar{x}_2 the means, and σ_1, σ_2 the standard deviations of two series, then the standard deviation σ of the combined series of size n_1+n_2 is given by
$$\sigma^2 = \{n_1 \sigma_1^2 + n_2 \sigma_2^2 + n_1 n_2 (\bar{x}_1 - \bar{x}_2)^2 / (n_1 + n_2)\} / (n_1 + n_2)$$
13. Prove that for any discrete distribution SD is not less than MD (about mean).
14. Find the MD (about mean) and SD of the AP $a, a+d, a+2d, \dots, a+2nd$ and verify that the latter is greater than the former.
15. Show that in a discrete series if deviations $(x-M)$ are small compared with mean (M) so that $\{(x-M)/M\}^2$ and higher powers of $(x-M)/M$ are neglected, prove that
 - (i) $MH = G^2$
 - (ii) $M - 2G + H = 0$
 - (iii) $CV = 2(M-G)/M$

Where G is GM, H is HM & CV is coefficient of variation.

16. For a discrete series, show that mean deviation about the median is least.
17. Define raw and central moments of a frequency distribution. Obtain the relation between the central moments of order r in terms of the raw moments.
18. Write a short-note on Sheppard's correction for moments.