RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

FIRST YEAR [2019 - 22]

B.A./B.Sc. FIRST SEMESTER (July – December) 2019

Mid-Semester Examination, September 2019

Date : 18/09/2019 **STATISTICS (General)**

Time : 11 am - 12 noon **Paper: I** Full Marks: 25

(Use a separate Answer Book for each group)

Group : A

1. Choose the correct alternative (**Answer any five**) (5×1)

   i) The Standard Deviation (SD) of first n natural numbers is

   a) 0 b) $\sqrt{\left(\frac{n+1}{12}\right)}$ c) $\sqrt{\left(\left(n^2-1\right)/12\right)}$ d) $\sqrt{\left(\left(2n^2-1\right)/8\right)}$

   ii) If the relationship between U and V are given by $2U+V+7=0$ and if the arithmetic mean of U is 10 then arithmetic mean of V is

   a) 17 b) -17 c) 27 d) -27

   iii)There are 25 teachers in a school whose mean age was 30 years. A teacher retired at the age of 60 years and a new teacher was appointed in his place. The mean age of teachers in the school was reduced by one year. The age of the new teacher was

   a) 25 years b) 30 years c) 35 years d) 40 years

   iv)Extreme values has no effect on

   a) Average b) Median c) Geometric Mean d) Harmonic Mean (HM)

   v) Histogram is useful to determine graphically the value of

   a) Mean b) Median c) Mode d) All of them

   vi)The Mean Deviation (MD) from median is

   a) Greater than that measured from any other value.

   b) Less than that measured from any other value

   c) Equal to that measured from any other value

   d) Maximum if all observations are positive.

Answer **any two** questions of the following : (2×5)

2. Prove that the Standard Deviation(SD) calculated from two values x_1 and x_2 of a variable x is equal to half their difference i.e. SD= $\frac{1}{2}|x_1-x_2|$ (5)

3. If $\overline{X}$ is the mean of X_1, X_2, X_3 and x_1, x_2 and x_3 are the deviations of X_1, X_2, X_3 from $\overline{X}$ respectively, then prove that $x_1^2 + x_2^2 + x_3^2 = X_1^2 + X_2^2 + X_3^2 - 3\bar{X}^2$ (5)

4. For two observations only, prove $\frac{AM}{GM} = \frac{GM}{HM}$ (5)

Group : B

Answer **any two** questions of the following: (2×5)

5. The last three digits of a telephone number beginning with 584 have been erased. Assuming all combination of last three digits are equally likely, find the probability of the following events : A = {distinct digits different from 5,8,4 have been erased} ; B = {identical digits have been removed} (2+3)

6. A coin is tossed, and a die is thrown. Show that the events 'head' and 'six' are independent. [The independence of the toss and the throw of a die is intuitionally obvious. However, the idea here is to re-inforce this belief by using the suitable probability law.] (5)

7. A and B alternatively throw a fair die. He who throws the first 6 wins the game. If A has the first throw, what is the chance of his winning the game? (5)

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