National University of Computer and Emerging Sciences, Lahore Campus

	Course:	Probability and Stats	Course Code:	MT 205
	Program:	BS CS	Semester:	4th
	Duration:	60 minutes	Total Marks:	40
	Paper Date:	February 25; 2020	Weight	15%
	Section:	[redacted]	Page(s):	02
	Exam:	Mid Term - 1	Roll No:	[redacted]
Instruction/Notes:	Attempt All the Questions. Question No. 1 should also attempt on the given answer sheet.			

Q1 Multiple choice questions (Chose the correct answer) **Points (5)**

(i) Find the best suitable average for the following data containing salaries of 5 men in an industrial concern: Rs. 950, Rs. 2100, Rs. 1500, Rs. 100, Rs. 10,000
(A) Arithmetic Mean
(B) Median
(C) Mode
(D) None of the above

(ii) The main disadvantage of the range is that
(A) It does not use all the observations in the calculation.
(B) It can be influenced by an extreme values.
(C) Both (A) and (B) are correct.
(D) None of the above.

(iii) Which of the following is not a measure of dispersion?
(A) Range.
(B) Standard deviation.
(C) Second quartile.
(D) Coefficient of variation.

(iv) The standard deviation is
(A) The square of the variance.
(B) Two times the Standard deviation.
(C) Half the variance.
(D) The square root of the variance.

(v) The standard deviation of a frequency distribution is 10, the mean is 250, the median is 250 and the mode is also 250. The coefficient of skewness is
(A) Zero.
(B) Positive.
(C) Negative.
(D) None of the above.

Q2 (a) Use definitions of Arithmetic Mean (AM) and Geometric Mean (GM) to show (in general) that there are no real numbers a and b such that their geometric mean is 10 and arithmetic mean is 8. **Points (5)**

(b) The sum of deviations of certain numbers of observations measured from 4 is 72, and the sum of deviations of observations measured from 7 is -3. Find the number of observations and their mean. **Points (5)**

(c) An instructor in a large class gave an exam to 1,386 students. The lowest grade was a 41. The mean was 78 and the median was 80. The standard deviation was 11.93. The interquartile range (IQR) was 16.5. The max was 100. How many students scored above the 92^{nd} percentile? **Points (5)**

Q3 (a) A manufacturer of television tubes has two types of tubes A and B. The tubes have respective mean life-time $\bar{x}_A = 1495$ hours and $\bar{x}_B = 1895$ hours, and standard deviations $S_A = 280$ hours and $S_B = 310$ hours. Which tube has the greater (i) absolute dispersion, (ii) relative dispersion? Justify your answer. **Points (5)**

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(b) Prove the following properties: **Points (5)**

(i) $\sum_{i=1}^{n}(x-\bar{x})^2 \leq \sum_{i=1}^{n}(x-a)^2$, where "$a$" is any arbitrary value from the data.

(ii) $V(X+a) = V(X)$

Q4 Given that $n = 8,\ \sum X = 16,\ \sum X^2 = 204,\ \sum X^3 = 582,\ \sum logY = 23,\ \sum X\, logY = 104.$ Fit a suitable curve by method of least square. **Points (10)**

Hint: Observe the given information and decide the suitable curve.

Good luck