National University

of Computer & Emerging Sciences FAST Peshawar

Name: _____ Roll No: _____

Program: BS CS

Examination: Sessional - I

Semester: Fall – 2019

Total Marks : 50, Weightage: 15

Time Allowed: 1: 00 hour

Date: 25th September; 2019

Course: **Probability & Stats** (MT 206)

Instructor: **Mubashir Qayyum**

NOTE: *Attempt all questions.*

Q1 (a) Use definitions of Arithmetic Mean (AM) and Geometric Mean (GM) to show that there are no real numbers *a* and *b* such that their geometric mean is 10 and arithmetic mean is 8. **Points (5)**

(b) 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 92nd percentile? **Points (5)**

(c) You have been analyzing a dataset of the salaries of 367 municipal employees for the town of Weymouth, and have computed the following "Five Number Summary": **Points (5)**

min	1stQ	median	mean	3rdQ	max
18,367	27,800	30,106	34,787	32,666	97,800

After doing all this work, you learn that the salary data did not include a $600 bonus that all 367 employees received at the end of the year. Please recompute the table to include this extra income.

(d) PROVE that for any two arbitrary positive numbers *a* and *b*. **Points (5)**

$$A.M \geq G.M \geq H.M$$

Hint: Use basic definitions of means and prove the inequality.

Q2 (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)**

(b) What can you say of the skewness in each of the following cases? Justify your answer. **Points (5)**

(i) The median is 48.21 while the two quartiles are37.15 and 61.27.

(ii) Mean = 1403 and Mode = 1487

(iii) Mean = 1208, Median = 1208 and Mode = 1208.

(c) The mean and standard deviation of a sample of 20 observations were found to be 75 and 2.5 respectively. On checking the original figures, it was discovered that one observation which was actually 78, was copied down as 87. Find the correct mean and standard deviation. **Points (10)**

$$\bar{x} = \frac{\sum x}{n} \quad and \quad s = \sqrt{\frac{\sum x^2}{n} - \left(\frac{\sum x}{n}\right)^2} \quad or \; s = \sqrt{\frac{\sum (x-\bar{x})^2}{n}}$$

Q3 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)**

Good Luck