Computer Science and Information Technology Department, UoB, Quetta
Course: Database Systems
Mid term Exam 2019

MSCS 2nd (2019-21) **Roll No: _____** **Max marks: 30**

Note: Do not write anything on question paper except your roll number. Attempt all questions.

Q No. 1: Is it sufficient for a given algorithm to be correct if it produces correct output for a single input?

Q No. 2: How do we prove that an algorithm is correct?

Q No. 3: What are hard problems, give at least one example of a hard problem?

Q No. 4: Computers are growing faster with the passage of time, why is it important to study algorithms?

Q No. 5: In Design and analysis of algorithm we are interested in efficient use of which computing resources?

Q No. 6: Suppose an implementation of insertion sort runs in $\mathbf{8n^2}$ steps, while merge sort runs in **64 * n * log(n)** steps. For which values of n does insertion sort beat merge sort? Assume log base 2.

Q No. 7: What is loop invariant? Why it is used?

Q No. 8: Express the function $2x^3 - 3x^2 + 100x + 5$ in terms of theta notation.

Q No. 9: Solve the summation $\sum_{x=3}^{n} x$

Q No. 10: In asymptotic notation write down the worst case running time of insertion and merge sort.