MASENO UNIVERSITY

THIRD YEAR FIRST SEMESTER

BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

CIR 305: DESIGN AND ANALYSIS OF ALGORITHMS

ASSIGNMENT(CAT 1)

DATE DUE: 15/11/2024

INSTRUCTIONS: Answer ALL Question.

Q1. (22 Marks)

a) Build Min_Heap from the list below. **(8 marks)**

21	4	45	12	6	18	10	60	15	80	30	70

b) Use a HeapSort to show how the Heap built above can be sorted. **(7 marks)**

c) Use a Binary Search algorithm to show the steps required to get 80 from the sorted list above. **(7 marks)**

Q2. (10 Marks)

Use Master's method to determine the running time of the following recurrences

a) $T(n) = 2T(n/2) + n^2$

b) $T(n) = 2T(n/2) + n$

Q2. (8 Marks)

Use Iterative substitution method to determine the running time of the following recurrence

$$T(n) = \begin{cases} 1 & , \quad n = 1 \\ 2T(n/2) + 9n & , \quad n > 1 \end{cases}$$