Attempt ALL questions

Q1. Theory for Inference Procedures (4 Marks)

Answer the four short questions. Each correct answer will be awarded 1 mark.

   i. What is a $p-$value?

  ii. Briefly describe how $p-$value is used in hypothesis testing

 iii. What is meant by a Type I error?

  iv. What is meant by a Type II error?

Q2. Paired t-Test (11 Marks)

The typing speeds for one group of eight IT students were recorded both at the beginning of year 1 of their studies and at the end of year 4. The results (in words per minute) are given below:

Subject	A	B	C	D	E	F	G	H
Year 1	173	183	176	191	184	177	175	177
Year 4	172	184	180	190	191	187	181	183

   A study was carried out to determine whether students improve in terms of typing speed over the four years of their university studies. A significance level of 5% is used.
There are 11 questions listed below, with 1 mark awarded for each correct answer.

   i. Briefly explain the difference between paired samples and independent samples.

  ii. Compute the case-wise differences.

  ii. Compute the mean of the case-wise differences.

  iv. Compute the standard deviation of the case-wise differences.

   v. Formally state the null hypothesis.

  vi. Formally state the alternative hypothesis.

 vii. Compute the standard error for mean of case-wise differences.

viii. Compute the Test Statistic.

  ix. What is the appropriate value for *degrees of freedom*?.

   x. What is the Critical Value?

  xi. Discuss your conclusion to this test, supporting your statement with reference to appropriate values.

Formulae