SLIATE

SRI LANKA INSTITUTE OF ADVANCED TECHNOLOGICAL EDUCATION

(Established in the Ministry of Higher Education, vide in Act No. 29 of 1995)

Higher National Diploma in Information Technology
First Year, Second Semester Examination – 2016
HNDIT 1214/ IT 12142 – Statistics for IT

Instructions for Candidates:
Answer four (04) questions only
Non Programmable calculators are allowed

No. of questions : 05
No. of pages : 04
Time : 02hrs

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(1) (i) Give two examples for

(*a*) Qualitative variables

(*b*) Quantitative variables **(4 Marks)**

(ii) There are 8 schools in a city and each school has 3000 boys and 4500 girls. You need to select a sample of 70 students from this collection. Describe the methods of sampling if you want to select only two schools. **(6 Marks)**

(iii) Downloading time of 10 files (in min) is 20, 25, 25, 30, 25, 30, 20, 25, 30 and 20. Represent this in a frequency table. **(3 Marks)**

(iv) The following data represent file size (in MB) 48 reports:

87	56	56	56	77	68	58	73
72	60	47	74	85	87	42	43
57	51	63	63	67	49	68	59
41	78	53	54	53	44	67	41
71	74	48	53	46	51	66	84
63	59	89	61	81	70	62	60

For the above data,

(*a*) Construct a frequency distribution starting from multiple of 10 and by selecting class width as 10. **(6 Marks)**

(*b*) Find the error of the sum of numbers between 40 and 49 due to arranging the data in a frequency distribution. **(2 Marks)**

(v) Let $x_1 = 10$, $x_2 = 15$, $x_3 = 13$ and $x_4 = 20$. Evaluate the following:

(a) $\sum_{i=1}^{4} (x_i + 4)$

(b) $\sum_{i=1}^{4} (2x_i^2 - 3)$ **(4 Marks)**

(2)   The following table represents study time (per day) of HNDIT students.

Time(hours)	No of Students
1.0 – 1.2	12
1.2 – 1.4	18
1.4 – 1.6	6
1.6 – 1.8	24
1.8 – 2.0	30
2.0 – 2.2	5
2.2 – 2.4	17
2.4 – 2.6	28

For the above information

(i)   Calculate the most expected study time.   **(4 Marks)**

(ii)   From this collection, according to the study time, 50% of them are categorized as good and the others as poor. What is the minimum study time of a good student?   **(4 Marks)**

(iii) Represent the above data in a histogram.   **(7 Marks)**

(iv) Calculate the average study time.   **(5 Marks)**

(v)   When we examine later we found that, number of students 24 for 1.6 -1.8 study time and number of students 30 for 1.8-2.0 study time have been entered by mistake. They should be interchanged as 30 for 1.6 -1.8 and 24 for 1.8-2.0. Calculate new average study time.

                                                          (5 Marks)

(3)   (i) Find (a) Variance (b) Standard deviation for 10, 12, 18, 20 and 25.   **(4 Marks)**

(ii) In a collection of data $\bar{x} = 100$ and S = 3. If data in the range $\bar{x} \pm 2S$ we consider as a good item. Find the range of good items.   **(4 Marks)**

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(iii) Show $\dfrac{(n+1)!}{n!} - \dfrac{n!}{(n-1)!} = 1$. (4 Marks)

(iv) By considering A, 3, 4 and 8 you need to generate a password (by using all) without repeating the letter or numbers. For this data,

    (*a*) How many different passwords can be formed? (2 Marks)

    (*b*) How many different passwords can be formed by starting with the text? (3 Marks)

    (*c*) How many different passwords are there without starting with the text? (3 Marks)

(v) You are given a collection of 5 laptops and 6 dongles, you need to select 2 laptops and 2 dongles. In how many ways can you do this? (5 Marks)

(4) (i) Let S = { TT, TH, HT, HH} be the sample space of when we toss a coin twice and E_1 = event with exactly one head E_2 = event with first attempt head. For this show that $P(E_1 \cup E_2) = P(E_1) + P(E_2) - P(E_1 \cap E_2)$. (7 Marks)

(ii) Through a die and toss a coin together. By taking E_1 = the event with head in the coin and E_2 = the event with 3 or 5 in the die find the followings:

    (*a*) Sample space. (2 Marks)

    (*b*) Elements of E_1 and E_2. (2 Marks)

    (*c*) $P(E_1 \cap E_2)$ (2 Marks)

    (*d*) $P(E_1 \cup E_2)$ (2 Marks)

(iii) Let S be the sample space of an experiment and let A and B be events of S. If

$$P(A' \cap B) = \frac{3}{7}, \ P(A \cap B') = \frac{2}{7} \text{ and } P(A' \cap B') = \frac{1}{7} \text{ then the followings:}$$

    (*a*) P(A) (2 Marks)

    (*b*) P(B) (2 Marks)

    (*c*) $P(A \cap B)$ (2 Marks)

    (*d*) $P(A \cup B)$ (2 Marks)

    (*e*) $P[(A \cap B)']$ (2 Marks)

(5) (i) Write a name of a discrete probability distribution and a continuous probability
distribution (2 Marks)

(ii) Let $P(X = m) = \dfrac{1}{14} \times m$, where m is a natural number and $2 \leq m < 6$, be a discrete
probability distribution. For this find the followings:

(a) Probability distribution table (4 Marks)

(b) $P(X \leq 2)$ (2 Marks)

(c) Expected value (3 Marks)

(d) Variance (5 Marks)

(iii) Kamal a student of SLIATE sleeps well and misses 8.30 a.m. lecture for oversleeping.
The probability that he oversleep is 0.4. Every Sunday from 8.30 a.m. to 11.30 a.m. he
has lectures in Mathematics in the semester. The semester includes 15 weeks. Find the
probability of Mathematics lectures he misses

(a) exactly two days (3 Marks)

(b) less than or equal 3days (3 Marks)

(c) more than 3 days (3 Marks)

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