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 – 2019

HNDIT1214 – 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 : Two (02) hours

Question 01.

(i). What is meant by statistics? (2 Marks)

(ii). Distinguish between primary and secondary data. Describe the various methods of collecting primary and secondary data. (6 Marks)

(iii). A sample of 30 persons is showed their ages as follows:

20	18	25	68	23	25	16	22	29	37
35	49	42	65	37	42	63	65	49	42
53	48	65	72	69	57	48	39	58	67

a) Construct a frequency distribution for this data by selecting class width as 10. (5 Marks)

b) Represent the above data in a histogram and an ogive. (8 Marks)

(iv). Evaluate

$$\sum_{m=1}^{4} (-1)^{m+1}(m^2 + 2m)$$

(4 Marks)

(Total 25 Marks)

Question 02.

(i). The lengths of a certain production in a factory are as follows:

Length	No. of items
60 – 64	20
65 – 69	50
70 – 74	120
75 – 79	130
80 – 84	110
85 – 89	70

They hope to sell 50% of the shortest in Sri Lanka and to export remaining 50%. They hope to export 15% of the longest to USA. Find the followings:

a) Mean (4 Marks)

b) Mode (4 Marks)

c) Maximum length of the production that they sell in Sri Lanka (4 Marks)

d) Minimum length that they export to USA. (4 Marks)

(ii). a) The mean of the weekly salary paid to all employees of a company was Rs.5000.

The mean of the weekly salaries paid to male and female employees were Rs.5200 and Rs.4200 respectively. Determine the percentage of males and females employed by the company. (4 Marks)

b) A student while calculating the mean and the standard deviation on 25 observations, obtained the following values:

mean = 56 standard deviation = 2

It was discovered later at the time of checking that he had wrongly copied down according to an observation it was 64. What is the mean and standard deviation if correct value is omitted? (5 Marks)

(Total 25 Marks)

Question 03.

(i). Define the following terms:

a) Permutations (3 Marks)

b) Combinations (3 Marks)

(ii). Show that ${}^{n}C_{r} = {}^{n-1}C_{r} + {}^{n-1}C_{r-1}$ (4 Marks)

(iii). Out of five mathematicians and seven physicists, a committee consisting of two mathematicians and three physicists is to be formed. In how many ways can this be done if

a) any mathematician and any physicists can be included? (3 Marks)

b) one particular physicists must be in the committee? (3 Marks)

c) two particular mathematicians cannot be in the committee? (3 Marks)

(iv). Four different mathematics books, six different physics books, and two different chemistry books are to be arranged on a shelf. How many different arrangements are possible if

a) the books in each particular subject must all keep together? (3 Marks)

b) only the mathematics books must keep together? (3 Marks)

(Total 25 Marks)

Question 04.

(i). What is meant by probability? (2 Marks)

(ii). Assuming the probability of event, A is P(A) = 0.5 and probability of event B is P(B) = 0.3, find

a) If A and B are mutually exclusive events, the probability that both events can happen. (3 Marks)

b) If A and B are independent events, the probability that either of these can happen. (3 Marks)

(iii). The probability that a student passes a test in Statistics which is 2/3, and the probability that he passes both a test in Statistics and a test in Mathematics is 14/45. The probability that he passes in at least one test is 4/5. What is the probability that he passes the test in Mathematics? (5 Marks)

(iv). A market research firm is interested in surveying certain attitudes in a small community. There are 125 households broken down according to income, ownership of a telephone, and ownership of a TV.

	Households with annual income of Rs.8000 or less		Households with annual income of more than Rs.8000	
	Telephone Subscriber	No Telephone	Telephone Subscriber	No Telephone
Own TV Set	27	20	18	10
No TV Set	28	10	12	10

a) What is the probability of obtaining a TV owner in drawing randomly? (3 Marks)

b) If a household has income over Rs.8000 and is a telephone subscriber, what is the probability that TV set has? (3 Marks)

c) What is the conditional probability of drawing a household that owns a TV, given that the household is a telephone subscriber? (3 Marks)

d) Are the events 'ownership of a TV' and 'Telephone subscriber' statistically independent? (3 Marks)

(Total 25 Marks)

Question 05.

(i). A discrete random variable has the following probability distribution.

x	1	2	3	4	5	6
$P(X = x)$	k	k	2k	2k	3k	k

a) Find the following:

a. The value of k. (3 Marks)

b. P $(2 \leq x \leq 5)$ (3 Marks)

c. Expected value (3 Marks)

d. Variance (4 Marks)

(ii). A 5-litre bucket of water is taken from a swamp. The water contains 75 mosquito larvae. A 200ml flask of water is taken form the bucket for further analysis. What is

a) the expected number of larvae in the flask? (3 Marks)

b) the probability that the flask contains at least one mosquito lava? (3 Marks)

(iii). The finishing times for marathon runners during a race are normally distributed with a mean of 195 minutes and a standard deviation of 25 minutes.

a) What is the probability that a runner will complete the marathon within 3 hours? (3 Marks)

b) What proportion of the runners will complete the marathon between 3 hours and 4 hours? (3 Marks)

(Total 25 Marks)