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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 – 2018

HNDIT1214 – Statistics for IT

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

No. of questions: 05
No. of pages : 05
Time : 02 hours

Question 01.

(i) Read the following information about grade 10 student results and attendance average for 04 months in Royal School.

Month	Class attendance average	No of student who pass the monthly test
January	60.3%	70
February	80.5%	85
March	50.5%	45
April	70.3%	65

(*a*) What are the variables under study? **(3 marks)**

(*b*) Are descriptive, inferential, or both types of statistics used? **(1 mark)**

(*c*) Categorize each variable as quantitative or qualitative. **(3 marks)**

(*d*) Categorize each quantitative variable as discrete or continuous. **(2 marks)**

(*e*) Identify the level of measurement for each variable. **(3 marks)**

(*f*) From the information given, comment on the relationship between the variables. **(1 mark)**

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(ii) The data shown here represent the number of km per day that a sample of 30 runners are running in a city.

11 17 12 14 16 18 16 18 12 16 17 15 15 16 12
21 16 16 12 14 15 12 15 15 19 13 16 18 16 14

(*a*) State advantages of visualizing data **(1 mark)**

(*b*) Construct a frequency distribution by selecting class width as 2. **(2 marks)**

(*c*) Draw a histogram for the above data. **(6 marks)**

(iii) In year 2018, a student has bought 10 novels. In each year, this student will expect to buy two novels more than the number of novels available with him in previous year. Write a sigma notation expression to calculate the number of total novels available with him in year 2050.

(3 marks)

(Total 25 marks)

Question 02.

(i) Write down:

(*a*) Two types of central tendency. **(2 marks)**

(*b*) Two types of measures of dispersion. **(2 marks)**

(ii) The profit level of 50 companies in electronic industry is shown in below table.

Profit	Frequency
$-2 \le x < 0$	4
$0 \le x < 2$	11
$2 \le x < 4$	17
$4 \le x < 6$	12
$6 \le x < 8$	4
$8 \le x < 10$	2

For the above information find the following:

(*a*) Mean **(3 marks)**

(*b*) Median **(3 marks)**

(*c*) Mode **(3 marks)**

(*d*) Quartile deviation **(5 marks)**

(*e*) Variance **(3 marks)**

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(iii) The salaries for the staff of ABC Manufacturing Co. in descending order are given in the following table.

Position of the Staff	Manager	Engineer	System Analyst	Technician	Receptionist	Driver
Salary in Rupees	30,000	25,000	x	15,000	12,000	y

If this company has to pay Rs. 19,000 average and Rs. 20,000 median salary for the staff, then calculate Drivers' and System Analysts' salary. **(4 marks)**

(Total 25 marks)

Question 03.

(i) What is the difference between 'Permutation' and 'Combination' **(2 marks)**

(ii) A team leader in a musical group of 10 players wants to select 2 musical players to present a TV program.

(*a*) How many different possibilities are there without any priority? **(2 marks)**

(*b*) One will be presented in the morning program, and one will be presented in the evening program. How many different possibilities are there to present the TV program by them? **(2 marks)**

(*c*) Each week, the team leader must send 2 players to the TV program. One player is selected for the TV program and this player resigns from the team. How many different ways to select the players for the TV program in second weeks? **(3 marks)**

(*d*) The team leader must send 2 players to the TV program. One player is selected for the TV program and this player resigns from the team. In next week, the leader give the priority to send a player who was unable to select in previous week. How many different ways to select the players for the TV program in second week? **(3 marks)**

(iii) A particular cell phone company offers 4 models of phones, each in 6 different colours and each available with any one of 5 calling packages.

(*a*) How many combinations of colours and calling packages are possible for the model one cell phone? **(2 marks)**

(*b*) The manufacturer has to select 3 colours and 5 calling packages to model a phone. How many combinations of colours and calling plans are possible for the model one cell phone? **(3 marks)**

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(iv) How many different ways can 5 people (Rosi, Kamal, Sarath, Kumara, and Janith) sit in a row at a class, if

(*a*) Rosi and Kamal must sit together **(2 marks)**

(*b*) Rosi in first place in the row and Janith in last place of the row **(2 marks)**

(c) Rosi and Janith will not sit next to each other? **(2 marks)**

(*d*) Rosi and Janith will sit next to each other? **(2 marks)**

(Total 25 marks)

Question 04.

(i) What is meant by two events being statistically independent? **(2 marks)**

(ii) Give an example for mutual exclusive events **(1 mark)**

(iii) A garment factory employees 10,000 men. 1% of all employees have a minor accident in a given year. ***Of these, 40%*** had safety instructions. 90% of all employees had no safety instructions.

(*a*) Calculate number of accidents in a given year. **(1 mark)**

(*b*) Calculate no of employees who had not safety instructions **(1 mark)**

(*c*) Fill in the following table according to the above information **(7 marks)**

	Safety Instructions	No Safety Instruction	**Total**
Accident			
No Accident			
Total			

(*d*) What is the probability of an employee being accident–free, given that he had not safety instructions? **(2 marks)**

(*e*) What is the probability of an employee being accident-free, given that he had safety instructions? **(2 marks)**

(iv) The production of three machines produce, X, Y and Z produce is 60%, 30% and 10% respectively, of the total production. The percentage of defective production of the machines are 1%, 2% and 3% respectively.

(*a*) Draw a tree diagram to illustrate above all outcome of X, Y and Z machines.

(3 marks)

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(*b*) If an item is selected at random find the probability that the item is defective (1 mark)

(*c*) Assuming an item is selected at random and is found to be defective, find the probability that the item was produced on machine X. (2 marks)

(*d*) If item is found to be defective, find the probability that the item was made by machine X. (3 marks)

(Total 25 marks)

Question 05.

(i) What is meant by discrete probability distribution? **(2 marks)**

(ii) A baseball team from Sri Lanka played 40 games which award more than one medal in an International Competition in 2018. The team won number of games with medals 4, 5, 6 and 7. The following table shows the performance in 2018.

No of medals (X)	4	5	6	7
No of Games	8	7	9	16

(*a*) Find the probability P(X) for each X and construct a probability distribution. **(2 marks)**

(*b*) Draw a graph to represent P(X) for the above data **(2 marks)**

(*c*) Find the probability of number of games that team won more than 5 medals **(3 marks)**

(*d*) Find the expected value and variance **(6 marks)**

(ii) If a factory produces electronic items with defective rate of 10% and samples of 5 are taken from the production. For this information,

(*a*) Write corresponding probability distribution and its' density function. **(2 marks)**

For a randomly selected sample find the probability of getting,

(*b*) One defective item. **(2 marks)**

(*c*) At least one defective item. **(3 marks)**

(*d*) Between 2 and 4 defective items. **(3 marks)**

(Total 25 marks)

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