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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 – 2015

HNDIT 12142/ IT 3001 – Statistics for IT / Probability and Statistics

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

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

(**1**) (i) Define, what statistics is ? (**1 Marks**)

(ii) Data collection is very important in a survey. List 3 data collection methods and mention advantages and disadvantages of them. (**6 Marks**)

(iii) Write the differences between **qualitative** and **quantitative** variables (**2 Marks**)

(iv) The following data are monthly steel production figures in millions of tons:

7.0	6.9	8.2	7.8	7.7	7.3	6.8
7.0	6.7	7.5	7.2	7.9	7.6	6.7
7.8	5.5	6.2	5.8	5.8	6.1	6.0
7.2	7.2	7.4	7.6	7.3	7.3	7.5
6.7	8.2	8.4	6.6	6.3	5.6	6.6

Using the above data,

(*a*) Construct a frequency distribution table with classes of equal width, where the first two classes are defined as (5.5 – 5.9) and (6.0– 6.4). (**4 Marks**)

(*b*) Draw a histogram and frequency polygon. (**6 Marks**)

(*c*) What is meant by "range"? Find range of above data. (**2 Marks**)

(v) Express following, using sigma notation

(*a*) 1 + 8 + 27 + 64 + 125

(*b*) 3 + 6 + 11 + 18 + 27 (**4 Marks**)

(**2**) DigitX Computer System Company has produced a **cumulative frequency distribution** of size of loans made to a randomly selected sample of 300 borrowers in selling computer parts.

Size of the loan (Rs)	No of Borrowers
Under 10000	39
Under 20000	139
Under 30000	217
Under 40000	259
Under 50000	285
Under 60000	300

(*a*) Redraft the data in the form of a grouped frequency distribution. (**4 Marks**)

(*b*) Why do we use charts without just go on the data? (**2 Marks**)

(*c*) Calculate the following for the above sample

(i) Mean (**3 Marks**)

(ii) Mode (**3 Marks**)

(iii) Median (**3 Marks**)

(iv) Standard deviation (**4 Marks**)

(v) Second quartile (**3 Marks**)

(vi) Inter quartile range (**3 Marks**)

(3) (*a*) Show that ${}^{n}c_{r} = {}^{n}c_{n-r}$. (**5 Marks**)

(*b*) Briefly explain the terms **Permutation** and **Combination**. (**4 Marks**)

(*c*) A zip code contains 5 digits. How many different zip codes can be made with the digits 0 – 9 if no digit is used more than once and the first digit is not 0? (**5 Marks**)

(*d*) In a lottery, each ticket has 5 one-digit numbers 0 – 9 on it.

(i) You win if your ticket has the digits in any order. What are your changes of winning? (**3 Marks**)

(ii) You would win only if your ticket has the digits in the required order. What are your chances of winning? (**3 Marks**)

(*e*) The Sri Lankan cricket team consists of 16 players. It includes 2 wicket keepers and 5 bowlers. In how many ways can a cricket eleven be selected if we have to select 1 wicket keeper and at least 4 bowlers? (**5 Marks**)

(4) (*a*) Define the following terms:

(i) Outcome. (**2 Marks**)

(ii) Mutually Exclusive Events. (**2 Marks**)

(iii) Independent Events. (**2 Marks**)

(*b*) State the rule of multiplication for the following:

(i) Independent events. (**2 Marks**)

(ii) Dependent events. (**2 Marks**)

(*c*) Amali and Nimali are friends who often go to the cinema together. On such visits there is a probability of 0.4 that Amali will buy popcorn. The probability that Nimali will buy popcorn is 0.7 and if Amali buys popcorn and 0.35 if she does not.

Find the probability that,

(i) both buy popcorn (**3 Marks**)

(ii) neither buy popcorn (**3 Marks**)

(iii) exactly one of them buys popcorn (**4 Marks**)

(*d*) A new Master Card has been issued to 2000 customers. Of these customers, 1500 hold a Visa card, 500 hold an American Express card and 40 hold a Visa card and an American Express card. Find the probability that a customer chosen at random holds a Visa card, given that the customer holds an American Express card. (**5 Marks**)

(**5**) (*a*) Discuss the difference between discrete and continuous probability distribution. (**2 Marks**)

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

x	-2	-1	0	1	2
P(X)	$\frac{1}{15}$	$\frac{4}{15}$	a	$\frac{5}{15}$	$\frac{2}{15}$

Find the followings:

(i) The value of ***a.*** (**2 Marks**)

(ii) $P(X \leq 0)$ (**2 Marks**)

(iii) Expected value (**4 Marks**)

(iv) Variance (**4 Marks**)

(c) Vehicles pass through a junction on a busy road at an average rate of 300 per hour.

(i) Find the probability that none passes in a given minute. (**3 Marks**)

(ii) What is the expected number passing in two minutes? (**3 Marks**)

(*d*) Entry to a certain University is determined by a national test. The scores on this test are normally distributed with a mean of 500 and a standard deviation of 100. Brian wants to be admitted to this university and he knows that he must score better than at least 70% of the students who took the test. Brian takes the test and scores 585. Will he be admitted to this university? (**5 Marks**)