Vavuniya Campus of the University of Jaffna

First Examination in Information and Communication Technology- 2018

First Semester - September/October 2019

IT1152 Essential Statistics

Answer Four Questions only

Time Allowed : Two hours

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1. (a) A survrey of 128 smokers revealed the following frequency distribution of daily expenditure of smoking

Expenditure(Rs)	No.Of Smokers
10-20	23
20-30	44
30-40	35
40-50	12
50-60	9
60-70	3
70-80	2

i. Draw a Histogram?

ii. Calculate Mean, Median, Mode, Range, Standard deviation to above data [30%]

(b) Use the five number summary to determine if there are any outliers in the following data set 2, 5, 6, 9, 12 [30%]

(c) Two groups each of three children contains respectively two boys and one girl, and one boy and two girls.

[To be continued...]

One child is drawn at random from each group. Find the probability

i. both will boys;

ii. one boy and other girl;

iii. at least one boy will be selected. [40%]

2. (a) Define the terms "Mutually exclusive events", and "Independent Events" [20%]

(b) We have three lottery tickets one is a winning ticket and two are blanks. The three individuals Joe, Kim and Mary draw a ticket each in order.(Joe first and Mary last) What is the probability of

i. that Joe wins?

ii. that Kim wins?

iii. that mary wins? [40%]

(c) Assume that probability that a born baby is boy is 0.5 and gender is independent between births. A family has two children

i. Construct sample space for two children.

ii. Find the probability that they have one child of each gender?

iii. Find the probability that they have two children both are boys? [40%]

3. (a) What do you mean by Binomial distribution? State the main features of binomial distribution? [10%]

(b) The average percentage of failures in certain examinations is 40. What is the probability that out of 6 candidates at least 4 passed in examination? [30%]

(c) What do you understand by Poisson distribution? [10%]

[To be continued...]

(d) The mean number of bacteria per milliliter of a liquid is known to be 4. Assuming that the number of bacteria follows a Poisson distribution Find the probability in 1ml of liquid. There will be

i. No bacteria

ii. 4 bacteria

iii. fewer thn 3 bacteria

Find the probability that

A. in 3ml liquid there will be less than 2 bacteria

B. in 0.5ml of liquid there will be more than 2 bacteria [50%]

4. (a) Give three real-life examples of continuous variables? [10%]

(b) Entrance of a certain University is determined by a national test. The score of national test is normally distributed with mean of 500 and standard deviation of 100. Ravi wants to be admitted to his university and he knows that he must score better than at least 70% of the students who took the test. Ravi takes the test and scores 585. Will he be admitted to this university? [40%]

(c) The five cities with the most African-American owned business in USA are given in following table.

City	Number of African-American owned Business in thousands
A:Newyork	42
B:Washington	39
C:Los Angeles	36
D:Chicago	33
E:Atlanta	30

i. List all samples of size 4 out of the 5 cities and find the mean of each sample

ii. Construct sampling distribution of the sample mean

iii. Find the mean and variance of the sampling distribution of sample mean. Verify it with the population parameters [50%]

5. (a) State the bayes Theorem? [10%]

(b) An ice cream seller has to decide whether to order more stock for a bank holiday weekend. He estimates that if the weather is sunny he has 90% chance of selling at his stock, if it is cloudy his chance is 60% and if it is rain his chance only 20%. According to the weather forecasting probability of sunny is 30%, cloudy 45%, and rain 25%

i. What is the probability that the salesman will sell all his stock?

ii. Given that he sold all his ice cream, what is the probability that the weather was sunny ? [40%]

(c) Describe two tailed test and one tailed test in hypothesis? [10%]

(d) 50 smokers were questioned about the number of hours they sleep each day. Sample mean is 7.5 and population standard deviation is 0.5. Test the following hypothesis at 0.05 level of significance

H_0:μ=7.7, H_a:$\mu \neq 7.7$, where μ is the population mean. [40%]