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Original



UNIVERSITY OF RUHUNA – FACULTY OF MEDICINE

ALLIED HEALTH SCIENCES DEGREE PROGRAMME

FIRST BPHARM PART II EXAMINATION - MAY 2015

PH 1262 - BIostatISTICS I

INDEX NO:

TIME: 2 HOURS

INSTRUCTIONS

- No paper should be removed from the examination hall.
- Marks will be penalized for illegible hand writing.
- Do not use any correction fluid.
- Calculators are allowed.
- **Answer all Questions.**

1.

The following are the body mass index values (kg/m^2) for 14 healthy adult men:

24.4 30.4 21.4 25.1 21.3 23.8 20.8 22.9 20.9 23.2 21.1 23.0 20.6 26.0

- Find the mean, variance and standard deviation.
- Find the five number summary values and Inter Quartile Range.
- Explain how to use five number summary values to find outliers in this data set and identify outliers.
- What percentage of the measurements are within two standard deviation of the mean?

(25 marks)

2.

(a) In an experiment to study the relationship of hypertension and smoking habits, the following data were collected from 180 individuals and a summary is given below:

	Nonsmokers	Moderate Smokers	Heavy Smokers
<i>H</i>	21	36	30
<i>NH</i>	48	26	19

where *H* and *NH* in the table stand for *Hypertensives* and *Nonhypertensives* respectively. If one of these individuals is selected at random, find the probability that the person is

- (i) having hypertension, given that the person is a heavy smoker.
- (ii) a nonsmoker, given that the person is not having hypertension.

(10 marks)

(b) Medical case histories indicate that different illnesses may produce identical symptoms. Suppose a particular set of symptoms, 'H' occurs only when one of three illness: A, B or C occurs. The probabilities of occurring illness A, B and C are 0.01, 0.005, and 0.02 respectively. The probability of developing the symptoms H, given that illness A, B, and C are 0.9, 0.95 and 0.75 respectively. Assuming that an ill person shows the symptoms H, what is the probability that a person has illness A?

(15 marks)

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3.

- (a) The probability that a person suffering from migraine headache will obtain relief with a particular drug is 0.9. Five randomly selected sufferers from migraine headache are given the drug. Find the probability that the number obtaining relief will be:
- (i) Exactly one
 - (ii) More than one
 - (iii) Two or fewer

(15 marks)

- (b) A local drugstore owner knows that, on average, 100 people enter his store each hour.
- (i) Find the probability that in a given 3-minute period nobody enters the store.
 - (ii) Find the probability that in a given 3-minute period more than 3 people enter the store.

(10 marks)

4. A soft-drink machine is regulated so that it discharges on an average of 200 milliliters per cup. If the amount of drink is normally distributed with a standard deviation equal to 15 milliliters,

- (a) what is the probability that a cup contains less than 170 milliliters?
- (b) what is the probability that a cup contain more than 224 milliliters?
- (c) what is the probability that a cup contains between 191 and 209 milliliters?
- (d) how many cups will probably overflow if 230 milliliter cups are used for the next 1000 drinks?
- (e) Find the value of the first quartile (Q_1)?

(25 marks)