UNIVERSITY OF RUHUNA – FACULTY OF ALLIED HEALTH SCIENCES

DEPARTMENT OF PHARMACY

FIRST BPHARM PART II EXAMINATION – SEPTEMBER/OCTOBER 2020

PH 1262 BIOSTATISTICS I (SEQ)

TIME: TWO HOURS

INSTRUCTIONS
- There are four questions in this paper.
- Answer all questions.
- No paper should be removed from the examination hall.
- Do not use any correction fluid.
- Marks will be penalized for illegible hand writing.
- Calculators are allowed.

01.

1.1 Discuss the general shapes of the distribution.

1.2 State the empirical rule for data having a bell-shaped distribution.

1.3 The age (in years) of a sample of 20 motor cyclists killed in road traffic accidents is given below.

18	41	24	28	71	52	15	20	21	31
16	24	33	44	20	24	16	64	24	32

    1.3.1   Construct a stem-and-leaf display for these data.

    1.3.2   Find the mean and the standard deviation.

    1.3.3   Find the five number summary values and inter quartile range.

    1.3.4   Sketch a boxplot of these data.

    1.3.5   Discuss the shape of the distribution of these data.

(100 marks)

02.

2.1 In an experiment to study the relationship of hypertension and smoking habits, the following data are collected for 180 individuals:

	Nonsmokers	Moderate Smokers	Heavy Smokers
H	21	36	30
NH	48	26	19

where *H* and *NH* in the table stand for *Hypertension* and *Non-hypertension*, respectively.

If one of these individuals is selected at random, find the probability that the person is

2.1.1 experiencing hypertension, given that the person is a heavy smoker.

2.1.2 a nonsmoker, given that the person is experiencing no hypertension.

(40 marks)

2.2 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 a 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?　　　　　　　　*(60 marks)*

03.

3.1 One prominent physician claims that 60% of those with lung cancer are smokers. If his assertion is correct,

    3.1.1 If 10 such patients recently admitted to a hospital, find the probability that at least two patients are smokers;

    3.1.2 using an appropriate approximation, find the probability that of 20 such patients recently admitted to a hospital, at most 10 are smokers.

　　　　　　　　　　　　　　　　　　　　　　　　　　(60 marks)

3.2 A local drugstore owner knows that, on average, 100 people enter his store each hour.

    3.2.1 Find the probability that in a given 3-minute period nobody enters the store.

    3.2.2 Find the probability that in a given 3-minute period more than 5 people enter the store.

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04. A psychologist has devised a stress test for dental patients sitting in the waiting rooms. According to this test, the stress scores (on a scale of 1 to 10) for patients waiting for root canal treatments are found to be approximately normally distributed with a mean of 7.59 and a standard deviation of 0.73.

4.1 What is the percentage of such patients have a stress score lower than 6.0?

4.2 What is the probability that a randomly selected root canal patient sitting in the waiting room has a stress score between 7.0 and 8.0?

4.3 What is the first quartile of the stress score distribution?

4.4 The psychologist suggests that any patient with a stress score of 9.0 or higher should be given a sedative prior to treatment. What percentage of patients waiting for root canal treatments would need a sedative if this suggestion is accepted?

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