THE OPEN UNIVERSITY OF SRI LANKA
FACULTY OF HEALTH SCIENCES
DEPARTMENT OF BASIC SCIENCES
ACADEMIC YEAR 2018/2019 – SEMESTER I

BACHELOR OF PHARMACY HONOURS – LEVEL 4
BACHELOR OF MEDICAL LABORATORY SCIENCES HONOURS – LEVEL 4
BSU4230 – BASIC STATISTICS
CONTINUOUS ASSESSMENT II (NBT II)   **DURATION: ONE HOUR**

DATE: 02nd JANUARY 2019   TIME: 11.00AM-12.00NOON

IMPORTANT INSTRUCTIONS/ INFORMATIONS TO CANDIDATES

- This question paper consists of **10 pages** with **10 Multiple Choice Questions (Part A)** and **02 Structured Essay Questions (Part B)**.

- Write your Registration Number in the space provided.

- Answer **ALL** questions.

- **Multiple Choice Questions (Part A):** Indicate answers in the answer sheet provided by placing a cross (X) in **INK** in the relevant cage. (answers in pencil will **NOT** be marked)

- **Structured Essay Questions (Part B):** Write answers within the space provided.

- Do not remove any page/part of this question paper from the examination hall.

- Mobile phones and any other electronic equipment are **NOT** allowed. Leave them outside.

- **Please fill the address sheet. (See last page)**

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CONTINUOUS ASSESSMENT II (NBT II)

REGISTRATION NO: ....

ANSWER SHEET FOR PART A

Q. No.	(a)	(b)	(c)	(d)
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				

Part A – Multiple Choice Questions

(20 marks)

Choose the most suitable/best answer and indicate with a 'X' in the answer sheet

1. Which one of the following is a probability sampling method?
   a) Quota sampling
   b) Purposive sampling
   c) Convenience sampling
   d) Systematic random sampling

2. Any numeric quantity based on a sample is called,
   a) statistic
   b) parameter
   c) estimate
   d) estimator

3. In inferential statistics,
   a) sample data are explored using tables or graphs.
   b) unknown parameters are estimated using sample data.
   c) describe how to select a representative group of subjects from the entire population.
   d) sample data are summarized.

4. Variability of a sampling distribution of means is called as,
   a) standard error of mean
   b) sampling error of mean
   c) standard deviation
   d) variance

5. The crude birth rate of a country was 40 per 1000 in a particular year. In the same year, the proportion of women in the age group15 to 49 years was 20%. The general fertility rate for that country will be,
   a) 300
   b) 80
   c) 20
   d) 200

6. In 1970, a study was begun with a group of 5000 adults who were questioned about their alcohol consumption. The occurrence of cancer was studied in this group between 1990-1995. This is an example of
   a) cross-sectional study
   b) retrospective cohort study
   c) prospective cohort study
   d) case-control study

7. Cross-sectional data are,
   a) collected over time.
   b) collected over a single period of time.
   c) collected from a single subject.
   d) collected from a particular group.

8. A screening test for brain cancer was administered to 400 women with biopsy-proven brain cancer and to 400 women without brain cancer (normal). The test results were positive for 100 of the proven cases and 50 of the normal women. The predictive value of a positive test is
   a) 88%
   b) 33%
   c) 25%
   d) 67%

9. Average resting pulse rate of 16 women is 76 beats per minute, and the variance is 25. The standard error of the sample mean is
   a) 1.25
   b) 0.31
   c) 1.56
   d) 6.25

10. Which of the following is not an observational design?
    a) Case-control study
    b) Cohort study
    c) Cross sectional study
    d) Experimental study

Part B –Structured Essay Questions

(80 marks)

Write answers in the space provided.

1.

a) Use the information in the table below to answer the questions.

Age Interval	Town X			Town Y		
	Mid-year Population	Number of Deaths	Death rate per 1000	Population	Number of Deaths	Death rate per 1000
0-20	**A**	4	2	**F**	15	5
21-40	4000	**B**	2.5	4000	**G**	3
41-60	10000	25	**C**	15000	30	**H**
61-80	**D**	75	6.25	20000	**I**	6
80+	4000	70	**E**	**J**	75	37.5

i. Calculate the appropriate values for the highlighted letters in the cells as shown above.

A. ....

B. ....

C. ....

D. ....

E. ....

F. ....

G. ....

H. ....

I. ....

J. ....

(30 marks)

ii. Compute and compare the crude death rates (per 1000) of town X and Y.

iii. Compute the age specific death rates (per 1000) in age group 21-60 in town X and town Y.

(10 marks)

b) To assess the association between Lung Cancer and smoking status, an investigator conducted a study with randomly selected 100 people with lung cancer and another 100 people without lung cancer. Suppose in the group of people with lung cancer, there were 42 smokers and in the group of people without lung cancer there were only 21 smokers.

i. What type of study was this?

ii. Compute the odd ratio (OR) and interpret it.

iii. Determine whether smoking is a risk factor or not. Give the reason.

(10 marks)

2. A study was carried out to compare two new screening tests with two different cut-off levels for diabetes. 10,000 people were screened. People who scored above the cut-off level were classified as positive for diabetes and below the cut-off level were classified as negative for diabetes. The results of the screening tests were compared against Diagnostic test (Gold standard test) for diabetes which is considered to be completely valid.

a) The following table shows the results obtained in a first screening test (Test I) with the cut-off level of 180 mg of blood glucose per 100 ml.

Screening test	Diagnosis		Total
	Disease	No Disease	
Positive	125	25	150
Negative	375	9475	9850
Total	500	9500	10000

i. Calculate sensitivity as a percentage.

ii. Calculate specificity as a percentage.

iii. Calculate PPV (Positive Predictive Value) as a percentage.

iv. Calculate NPV (Negative Predictive Value) as a percentage.

v. Calculate the prevalence of the disease as a percentage.

(10 marks)

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b) In second screening test (Test II), the cut-off point was lowered to 130 mg of blood glucose per 100 ml. With this cut-off point, 230 people were detected as positive on the screening test. Out of these 230 people, 66 were detected as negative in the diagnostic test (Gold standard test). Diagnostic test for diabetes remained same as above (9500 disease free patients)

i. Fill the frequency table according to the second screening test.

Screening test	Diagnosis		Total
	Disease	No Disease	
Positive			
Negative			
Total			

(10 marks)

ii. Calculate sensitivity as a percentage.

iii. Calculate Specificity as a percentage.

iv. Calculate PPV (Positive Predictive Value) as a percentage.

(06 marks)

v. Calculate NPV (Negative Predictive Value) as a percentage.

vi. What would be the best screening test for diabetes? Why?

(04 marks)

Reg. No:...

Name:...
Address:...
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