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

BACHELOR OF SCIENCE HONOURS IN NURSING
BSU5335 – HEALTH STATISTICS - LEVEL 5
CONTINUOUS ASSESSMENT II (NBT II)   DURATION: ONE HOUR

DATE: 27th DECEMBER 2018   TIME: 09.00 AM – 10.00 AM

REGISTRATION NO: ....

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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BSU5335 – HEALTH STATISTICS – LEVEL 5
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. Type I error occurs when,
   a) rejecting a false null hypothesis
   b) rejecting a true null hypothesis
   c) accepting a false null hypothesis
   d) accepting a true null hypothesis

2. The shape of the t-distribution depends on
   a) sample size
   b) population size
   c) parameters
   d) degrees of freedom

3. What is the method used to predict the value of a dependent variable based on independent variables?
   a) Correlation
   b) Regression
   c) ANOVA
   d) Hypothesis testing

4. Standard deviation of a sampling distribution is called a,
   a) standard error
   b) sampling error
   c) type I error
   d) type II error

5. Chi-squared distribution is,
   a) normally distributed.
   b) uniformly distributed
   c) positively skewed.
   d) negatively skewed

6. Pearson correlation coefficient *(r)* is equals zero (0) indicates that,
   a) there is a negative relationship between the two variables.
   b) there is a positive relationship between the two variables.
   c) there is no relationship between the two variables.
   d) there is a weak negative relationship between the two variables.

7. The slop and the intercept of a linear regression line are calculated as 2.5 and 16. What is the value of the dependent variable (Y) when the independent variable (X) is 4?
   a) 16
   b) 66.5
   c) 116
   d) 26

8. What is the method that can be used to compare three or more population means?
   a) Paired t test
   b) Z test
   c) ANOVA
   d) Regression

9. From a population of 500 elements, a sample of 225 elements are selected. Variance of the population is 900. The standard error of the mean is approximately
   a) 1.3
   b) 2
   c) 40.2
   d) 60

10. From the following cases, select the case where we can use paired t-test.
    a) When comparing men and women's scores
    b) When comparing the same participants performance before and after training
    c) When comparing the means of three or more groups
    d) When assessing relationships between two groups

Part B –Structured Essay Questions

(80 marks)

Write answers in the space provided. Use the necessary information given in the table below.

Test	Test Statistic	Table value/Critical value $(\alpha = 0.05)$
Chi-squared test	$x^2 = \dfrac{(Observed\ value - Expected\ value)^2}{Expected\ value}$	$(df = 1, \propto) = 3.84$ $(df = 2, \propto) = 5.99$

1. Suppose 340 randomly selected cancer patients were asked whether their primary diagnosis was a Brain cancer and whether they owned a cell phone **before** their diagnosis. The results are presented in the table below.

	Brain Cancer	
	Yes	No
Cell Phone Yes	158	80
No	7	95

i. Calculate the marginal frequencies and total frequency.

	Brain Cancer		
	Yes	No	
Cell Phone Yes	158	80	
No	7	95	

(05 marks)

ii. Write the hypothesis to determine whether there is any association between the two variables.

(02 marks)

5

iii. What is the statistical test that is used to test above hypothesis?

(02 marks)

iv. Calculate the expected frequencies

(08 marks)

v. Calculate the test statistic.

(15 marks)

vi. Test the hypothesis at 5% of significance level.

(06 marks)

vii. What is the conclusion?

(02 marks)

2. A research group conducted a small study involving 10 patients to investigate the association between cholesterol level in blood (in milligrams per deciliter, mg/dL) and the Body Mass Index (BMI, measured as the ratio of weight in kilograms to height in meters). In this study, cholesterol level was considered as the dependent variable (Y), and the BMI value was considered as the independent variable(X). Summary of the data are given below.

$$\bar{x} = 27.15$$

$$\bar{y} = 213.2$$

$$\sum (x - \bar{x})(y - \bar{y}) = 256.1$$

$$\sum (x - \bar{x})^2 = 23.1$$

$$\sum (y - \bar{y})^2 = 4659.6$$

i. Calculate the correlation coefficient using given information.

$$r = \frac{\sum(x-\bar{x})(y-\bar{y})}{\sqrt{[\sum(x-\bar{x})^2 \sum(y-\bar{y})^2]}}$$ (Standard notations have been used)

(04 marks)

ii. What is the strength of the relationship according to the correlation coefficient that you obtained in part (a)?

(04 marks)

iii. They want to test whether the observed correlation coefficient is different from zero. Null hypothesis of the test is given below.

H0: The population correlation coefficient is not significantly different from zero

a) Calculate the test statistic?

$$t = r\sqrt{\frac{n-2}{1-r^2}}$$ (Standard notations have been used)

b) Test the hypothesis at 5% of significance level. (Table value at 5% significance level with 8 degrees of freedom is 3.35)

(04 marks)

c) What is the conclusion according to the hypothesis?

(02 marks)

iv. Furthermore they want to predict the Cholesterol level based on the BMI value. They try to fit least squares linear regression line for the data. $Y = a + bX$

$$b = \frac{\sum(x-\bar{x})(y-\bar{y})}{\sum(x-\bar{x})^2} \quad \text{(Standard notations have been used)}$$

$$a = \bar{y} - b\bar{x}$$

a) Calculate the slope of the fitted line.

(05 marks)

b) Calculate the intercept of the fitted line.

c) Write down the fitted regression equation.

d) Estimate the cholesterol levels of patients whose BMI values are 26 and 28 using the fitted regression equation.

Reg. No:...

Name:..

Address:...

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