THE CATHOLIC UNIVERSITY OF EASTERN AFRICA

A. M. E. C. E. A

P.O. Box 62157
00200 Nairobi - KENYA
Telephone: 891601-6
Fax: 254-20-891084
E-mail:academics@cuea.edu

REGINA PACIS INSTITUTE OF HEALTH SCIENCES

MAIN EXAMINATION

JANUARY – APRIL 2018 TRIMESTER

FACULTY OF SCIENCES

DEPARTMENT OF NURSING

REGULAR PROGRAMME

UNUR / NUR 308: MEDICAL BIOSTATISTICS

Date: APRIL 2018	Duration: 3 Hours
INSTRUCTIONS: Answer ALL Questions	

PART -I: MULTIPLE CHOICE QUESTIONS (MCQs)   20 MARKS:

Q1.   The stages of a malignant disease (cancer) is recorded using the symbols 0, I, II, III, IV. We say that the scale used is:

   a) Alphanumeric
   b) Numerical
   c) Ordinal
   d) Nominal

Q2.   The fundamental statistical indicators are:

   a) Mean and median
   b) Median and Standard deviation
   c) Variance and Standard deviation
   d) Mean and Standard deviation

Q3.   If the average of a series of values is 10 and their variance is 4, then the coefficient of variation is:

   a) 40%
   b) 20%
   c) 80%
   d) 10%

Q4. The median of a series of numerical values is:

   a) A value for which half of the values are higher and half of the values are lower
   b) The value located exactly midway between the minimum and maximum of the series
   c) The most commonly encountered values among the series
   d) A measure of the eccentricity of the series

Q5. If a series of values consists of 21 numbers, then, for finding the median, we ordered the series ascending and we use:

   a) The 11th value in the ordered series
   b) The mean between the 10th and 11th values
   c) The mean between the 11th and 12th values
   d) The 10th value in the ordered series

Q6. The first quartile of a series of values is:

   a) The value of the ordered series located at 75% of the number of values in the series
   b) The value in the ordered series located at 25% of the number of values in the series
   c) The value of the ordered series located at 50% of the number of values in the series
   d) The numeric value for which a quarter of the series' values are higher

Q7. If on a group of 457 patients, for a risk factor we calculated a Relative Risk (RR)of12.74, the possibility of developing the disease being investigated is:

   a) Very high when exposed to the factor
   b) Very small when exposed to the factor
   c) The same in the case of exposure in the case of non-exposure
   d) Lower in the exposed than in the unexposed, RR being less than 100

Q8. Pearson correlation coefficient, denoted by r, measures:

   a) The scattering strength of data for a statistical series
   b) The strength of the correlation between the mean and median
   c) The strength of the association between the mean and median
   d) The strength of the correlation between two numerical parameters

Q9. The correlation coefficient computed for two parameters measured in 429 patients is r=0.829. This means that:

   a) The two parameters are directly correlated, and the link is weak, r is positive and close to 0

b) The two parameters are inversely correlated, and the link is strong, r is negative and close to 1
c) The two parameters are directly correlated, and the link is strong, r is positive and close to1
d) There are too few cases (under 30) and we do not trust this coefficient's value

Q10. The result of a statistical test, denoted by p, shall be interpreted as follows:

a) The null hypothesis (Ho) is rejected if $p < 0.05$
b) The null hypothesis (Ho) is rejected if $p > 0.05$
c) The alternate hypothesis (H$_A$) is rejected if $p > 0.05$
d) The null hypothesis (Ho) is accepted if $p < 0.05$

Q11. The mean of a distribution is 23, the median is 24, and the mode is 25.5. It is most likely that this distribution is:

a) Negatively skewed
b) Positively skewed
c) Normal
d) Symmetrical

Q12. The fasting blood level of glucose for a group of diabetic patients is found to be normally distributed with a mean of 105 mg per 100 ml of blood and standard deviation of 10 mg per 100 ml of blood. From this data, it can be inferred that approximately 95% of the diabetic patients will have their blood glucose within the limits of:

a) 75 and 135 mgs
b) 85 and 125 mgs
c) 95 and 115 mgs
d) 65 and 165 mgs

Q13. The mean of a distribution is 14 and the standard deviation is 5. What is the value of the coefficient of variation?

a)   60.4%
b)   48.3%
c)   27.8%
d)   35.7%

Q14. If a 95% confidence interval of prevalence of TB infection in pediatrics age group is 24% to 37%.The chance that the prevalence less than 24% is:

a)   1%
b)   4%
c)   2.5%

d)   5%

Q15. Suppose a random sample of 100 12-year-old boys were chosen and the heights of these 100 boys recorded. The sample mean height is 64 inches, and the sample standard deviation is 5 inches. You may assume heights of 12-year-old boys are normally distributed. Which interval below includes approximately 95% of the heights of 12-year-old boys?

a) 63 to 65 inches.
b) 39 to 89 inches.
c) 54 to 74 inches.
d) 59 to 69 inches.

Q16. A clinical researcher wishes to test the hypothesis that the incidence of arthritis in females aged>45is 12%, the null hypothesis that the incidence is:

a) Different from 12%
b) Equal to 12%
c) Less than 12%
d) More than 12%

Q17. The area under normal curve within 3 standard deviation (SD) of means is:

a)   99.99%
b)   99.73%
c)   68.26%
d)   95.44%

Q18. The value of χ^2 (chi-square) test is always:

a)   Negative
b)   greater than one
c)   less than zero
d)   Positive

Q19. Blood pressure of boys in a school is an example of:

a)   Ordinal data
b)   Continuous variable
c)   Discrete variable
d)   Random variable

Q20. The following are true about errors in clinical trials:

a)   Type I error is wrongly accepting the null hypothesis
b)   Type II error is accepting the null hypothesis when it is invalid
c)   Errors are more common when big samples are used
d)   Type II error is wrongly rejecting the null hypothesis

PART-II: SHORT ANSWER QUESTIONS (SAQs)   **(40 MARKS):**

Answer all the questions on the booklet.

Q1.   Calculate the relative risk of stroke for patients with high blood pressure according to the following data? High BP: Stroke = 20, No stroke = 53, Normal BP: Stroke = 9, No stroke = 63   **(6 marks)**

Q2.   The incubation periods of a randomly sampled of 10 HIV infected individuals is given below (in years):   **12,   10,   9,   5,11,   12,   6,   8,   10,   7**

   a) Calculate the sample mean   **(2 marks)**
   b) Calculate the sample median   **(2 marks)**
   c) Calculate the sample standard deviation   **(3 marks)**
   d) Calculate the coefficient of variation   **(2 marks)**

Q3.   A study is conducted concerning the blood pressure of 60 year old women with glaucoma. In the study 200, 60-year old women with glaucoma are randomly selected and the sample mean systolic blood pressure is 140 mm Hg and the sample standard deviation is 25 mm Hg.

   Calculate a 95% confidence interval for the true mean systolic blood pressure among the population of 60 year old women with glaucoma   **(5 marks)**

Q4.   Describe how health data can be used in evidence based decision making by Nurses in the clinical settings   **(5 marks)**

Q5.   The following data refers to Paediatrics-I final exam results for 22 students.

   48, 75, 66,58,78, 81, 57, 77, 82, 76, 67, 66, 71, 73, 83, 59, 76, 68, 72, 67, 69, 64.

   a) Calculate the median   **(2 marks)**
   b) Calculate the quartile deviation   **(3 marks)**
   c) The standard deviation   **(4 marks)**

Q6.   The following data refers to students' laboratory and theory results in microbiology.

S.No	Name	Laboratory result (10%)	Theory result (10%)
1.	Sharon	8	9
2.	Lucy	3	5
3.	Lilian	9	10
4.	Sarah	2	1
5.	Helen	7	8
6.	Francis	10	7

7.	David	4	3
8.	Simon	6	4
9.	Peter	1	2
10	Maina	5	6

Calculate the Rank correlation and comment on the result   **(6 marks)**

PART III: LONG ANSWER QUESTIONS (LAQs)   40 MARKS:
Answer all the questions on the booklet.

Q1.   The following data refers to final exam results for Biochemistry-II for 80 students.

41	25	50	61	36	58	51	75
59	70	93	60	49	55	64	46
85	57	26	43	70	57	51	77
39	62	53	83	48	73	28	31
21	67	34	57	53	25	43	63
95	54	64	39	82	54	49	45
48	22	53	65	26	65	87	43
51	66	34	78	55	44	28	74
89	46	67	45	30	57	97	81
43	28	99	47	77	56	68	38

Using the above information:
 a) Arrange the data in the form of group distribution with a class interval of 10
   (2 marks)
 b) Calculate the mean, median and mode   **(9 marks)**
 c) Calculate the standard deviation   **(9 marks)**

Q2. The following table refers to Number of children who use drinking water from river, well and tap and episodes of diarrhea attack.

	River	well	Tap	total
No diarrhea	39	14	12	65
Diarrhea episode	49	6	4	59
total	88	20	16	124

Using the above data:
 a) Analyze the results using chi-square test   **(18 marks)**
 b) What do you conclude from this result   **(2 marks)**

END