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University Examinations 2023/2024

THIRD YEAR SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF MEDICAL MICROBIOLOGY
FOURTH YEAR SECOND SEMESTER BACHELOR OF SCIENCE IN EDUCATION

HML 3323/SZL 3401: BIOSTATISTICS

DATE: APRIL 2024   TIME: 2 HOURS

INSTRUCTIONS: *Answer question **one** and any other **two** questions*

QUESTION ONE (30 MARKS)

a) Giving examples, explain the difference between the following terms

i)   Discrete and continuous variables   (2 marks)

ii)   ii) Null and alternative hypothesis   (2 marks)

iii)   iii) Census and sampling   (2 marks)

b) At an outpatient testing centre, the number of cardiograms performed each day for 20 days is as follows

25	31	20	32	13	14	43	02	57	23
36	32	33	32	44	32	52	44	51	45

i)   Construct a stem and leaf plot for the data and comment on your findings (3 marks)

ii)   Compute the mean and standard deviation   (5 marks)

c) Explain two uses of statistics in health sciences   (4 marks)

d) If the probability that a man selected at random is a smoker is 0.35, determine the probability that in a sample of 6 students selected at random
i) Three are smokers   (2 marks)
ii) At least 2 are smokers   (4 marks)

e) A Hospital wants to test the claim that expectant mothers using their hospital facility take less than 40 hours for normal delivery. Using a simple random sample of 15 patients, a mean of 44.9 hours, with a standard deviation of 8.9 hours is obtained. Test this claim using a significance level of 0.05   (6 marks)

QUESTION TWO (20 MARKS)

a) Give two reasons for sampling against the Census   (2 Marks)

b) Explain any 2 probability sampling methods applicable in your field of study
                                                                            (6 marks)

c) The age of 30 patients visiting a clinic were recorded as follows;

28 29 34 31 35 35 27 32 38 37

1735 31 36 3941 38 31 33 41

19 39 31 46 36 32 30 39 45 32

i)   Construct a grouped frequency distribution using FIVE Classes   (4 marks)

ii)   What is the mean, lower quartile and standard deviation for variable age
                                                                            (6 marks)

iii)   Present the data using an Ogive   (4 marks)

QUESTION THREE (20 MARKS)

a)   Distinguish between primary and secondary data, give examples   (4 marks)

b)   An experiment was conducted to study the effect on sleeping time of in-creasing the dosage of a certain barbiturate, a class of drug used to treat seizure disorder, and the following results were obtained.

Sleeping in time (hrs) 4	5	6	9	8	7	11	13
Dosage (um/Kg) 2	3	3	7	8	10	12	15

  i)   Use a scatter chart to represent the data   (3 marks)

  ii)   Compute the moment correlation coefficient and interpret   (6 marks)

  iii)   Fit a simple linear regression model   (5 marks)

  iv)   Predict the sleeping time for 9um/kg dosage   (2 marks)

QUESTION FOUR (20 MARKS)

a)   Describe 4 data collection method in your field of study   (8 Marks)

b)   The length of human pregnancies from conception to birth approximates a normal distribution with a mean of 266 days and a standard deviation of 16 days.

i)   What is the probability that a pregnancy will last between 240 and 270   (2 marks)

ii)   In a sample of 90 mothers how many would you expect to their pregnancies last less than 260 days   (3 marks)

c)   The life time use of a certain medical machine produced by a company is known to be normally distributed with mean 8500 miles and standard deviation 2000 mile. A chemical is added to the rubber compound, which is thought to increase the life time of these machines. Forty new machines with the chemical added to the rubber are now tested. Their mean lifetime use was 9394 hours. Determine, at the 5% level of significance, whether there is adequate statistical evidence that the mean lifetime of the machines is now higher than 8500 hours.   (5 Marks)

QUESTION FIVE (20 MARKS)

a)   Explain any two principles of experimental design   (4 marks)

b)   The following data shows the number of new cancer cases in three districts in 3 months.

District A	District B	District C
15	19	40
14	27	36

	21	20	32

Is there sufficient evidence to prove that the number of new cancer cases is significantly different in the three districts? State and test the necessary hypothesis at 5% level of significance   (16 Marks)

Appendices Use $F_{(3,1)} = 5.91$