



JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE & TECHNOLOGY
SCHOOL OF BIOLOGICAL AND PHYSICAL SCIENCES
UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR SCIENCE IN
BIOLOGICAL SCIENCES

3rd YEAR 2nd SEMESTER 2018/2019 ACADEMIC YEAR

MAIN CAMPUS - REGULAR

COURSE CODE:	SBI 3326	
COURSE TITLE:	BIOSTATISTICS I	
EXAM VENUE:	BIO LAB	STREAM (BIO)
DATE: 25/04/2019	EXAM SESSION:12.00-2.00PM	

TIME: 2 HOURS

Instructions:

- 1. Answer ALL questions in Section A and Any two questions in Section B**
 - 2. Candidates are advised not to write on question paper**
 - 3. Candidates must hand in their answer booklets to the invigilator while in the examination room**
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SECTION A: SHORT ANSWER QUESTIONS (30 MARKS)

1. Outline any six important characteristics of normal distribution. (3 marks)
2. Suppose that in a certain malarious area past experience indicates that the probability of a person with a high fever will be positive for malaria is 0.7. Consider 3 randomly selected patients (with high fever) in that same area.
 - a) What is the probability that no patient will be positive for malaria? (1 mark)
 - b) What is the probability that exactly one patient will be positive for malaria? (1 mark)
 - c) What is the probability that exactly two of the patients will be positive for malaria? (1 mark)
3. Giving examples, describe any three types of variables. (3 marks)
4. A random sample of 100 drug-treated patients has a mean survival time of 46.9 months. If the SD of the population is 43.3 months, find a 95% confidence interval for the population mean. (3 marks)
5. Outline any six steps involved in hypothesis testing. (3 marks)
6. Assume that in a certain district the mean systolic blood pressure of persons aged 20 to 40 is 130 mm Hg with a standard deviation of 10 mm Hg. A random sample of 64 persons aged 20 to 40 from village x of the same district has a mean systolic blood pressure of 132 mm Hg. Does the mean systolic blood pressure of the dwellers of the village (aged 20 to 40) differ from that of the inhabitants of the district (aged 20 to 40) in general, at a 5% Level of significance? (3 marks)
7. A pharmaceutical company claims that a drug which it manufactures relieves cold symptoms for a period of 10 hours in 90% of those who take it. In a random sample of 400 people with colds who take the drug, 350 find relief for 10 hours. At a .05 level of significance, is the manufacturer's claim correct? (3 marks)
8. State the difference between type I and type II errors. (3 marks)
9. Among a large group of coronary patients it is found that their serum cholesterol levels approximate a normal distribution. It was found that 10% of the group had cholesterol levels below 182.3 mg per 100 ml where as 5% had values above 359.0 mg per 100 ml. What is the mean, SD and variance of the distribution? (3 marks)
10. To assess whether or not saccharine is carcinogenic, a researcher feeds 25 mice daily doses of saccharine, after 2 months 10 out of 25 mice develop tumors. Explain the defects in this experimental set up and how these defects can be rectified. (3 marks)

SECTION B: ESSAY QUESTIONS (40 MARKS)

11.
 - a) State any three characteristics of χ^2 distribution (6 marks)
 - b) In an experiment with peas one observed 360 round and yellow, 130 round and green, 118 wrinkled and yellow and 32 wrinkled and green. According to the Mendelian theory of heredity the numbers should be in the ratio

9:3:3:1. Is there any evidence of difference from the plants at 5% level of significance? (14 marks)

12. Giving specific examples where they are used, describe any five research designs. (20 marks)

13. With specific examples, describe probability sampling methods. (20 marks)

14.

a) State the necessary assumptions that must be satisfied before performing unpaired t-test (6 marks)

b) If we have 20 study participants, all males between the ages 25 and 35 who volunteer for our experiment. One half of the group was given coffee containing caffeine; the other half was given decaffeinated coffee as the placebo control. Then measurement of the pulse rate after the study participant drunk their coffee. The results are:

Pulse rates in beats / minute	
Placebo	Caffeine
72	76
76	80
66	78
68	84
68	72
74	66
60	68
64	76
72	76
60	74

I. Test the hypothesis that caffeine has no effect on the pulse rates of young men ($\alpha = .05$). (10 marks)

II. Find the 95% C.I. for the population mean difference. (4 marks)