

BINGHAM UNIVERSITY
FACULTY OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF MATHEMATICS/STATISTICS
First Semester 2018/2019 EXAMINATION

Course Code: STA 203

Credit Unit: 2

TIME ALLOWED : 2 Hours

INSTRUCTIONS : Question Number ONE (1) is COMPULSORY and Any other THREE (3) questions

1 a) Below is a contingency table showing the frequencies of male and female adults who are of above average, about average, and below average height in a random sample of 250 adult workers in Bingham University

Gender	Height			Total
	Above Average	About Average	Below Average	
Male	40	50	10	100
Female	30	60	60	150
Total	70	110	70	250

b) If 10% of the students in level one are left handed, find the probability of getting exactly 3 left-handed students, given that there are 15 students in the class.

c) Compute the Pearson r between X and Y as given below

X	2	4	6	8	10	12	14	16	18	20
Y	2.8	3.2	4.8	5.2	6.0	6.4	7.8	8.2	9.4	10.6

d) A box contains 15 transistors, 5 of which are defective. If 5 are sold at random, find the probability that:

- I. Exactly 3 are defective
- II. Non is defective
- III. At least 2 are defective

$$n = 3 \quad \frac{15!}{12!3!} = 5^3 15^{12}$$

2 a) Given the following response of students in the Faculty of Science and Technology, Bingham University, Karu who agreed that the consumption pattern of students change as they move from one level to the other depending on their department. Represent the information in a Pie Chart.

DEPARTMENT

Mathematics
 Biological sciences
 Computer sciences
 Biochemistry
 Physics

RESPONSE OF STUDENTS

45
 33
 46
 96
 24

- b) When a die is cast twice, what is the probability that the sum of scores is:
- I. A multiple of four
 - II. At most 6
 - III. At least 10

BINGHAM UNIVERSITY
 LIBRARY

SHOT ON itel
 AI DUAL CAMERA



3 a) Compute the Spearson rho between X and Y as given below

X	15	09	12	13	06	10	05	11	08	07	14	10
Y	18	10	16	10	08	15	12	13	10	06	12	14

b) The distribution below shows the scores of students in STA 202.

95 90 85 80 75 70 65 60 55

Calculate the standard deviation for the distribution

4 a) The distribution below shows the masses of woman in a sport camp (kilogram)

60 64 14 17 48 58 60 43 44 15 32 47 21 23 37 51 26

10 36 22 24 43 45 29 33 46 38 19 38 36 40 31 72 57

41 44 54 24 26 41 22 25 35 35 37 36 51 52 19 62 41

- Prepare a frequency table with class intervals 10-19, 20-29,...
- Draw the frequency polygon
- What is the probability that a woman selected have mass above 49kg?

b) State the formula for Median of grouped data

5 a) The arrival rate of newly admitted students arriving at the school gate follows the Poisson distribution with a mean arrival rate of 4 per 10 minutes interval. Find the probability that:

- Exactly 0 students will arrive in 10 minutes interval
- Exactly two students will arrive in 10 minutes interval
- At most two students will arrive in 10 minutes interval
- At least three students will arrive in 10 minutes interval [Hint: $e = 2.71828$]

b) State the formula for Mode of grouped data

Handwritten notes:
4 1.3 2.2, 3.1
8 2.6 3.5 6.2, 4.4
12 6.6

BINGHAM UNIVERSITY
DEPARTMENT OF MATHEMATICS/STATISTICS
FACULTY OF SCIENCE AND TECHNOLOGY

STA 203: Statistics for physical sciences and Engineering

First Semester Examination, February, 2017 Session: 2016/2017

Instruction: Answer any four questions.

Time Allowed: 2hrs

1. The table below shows the amount of fertilizer X and the yield of tomatoes Y.

X	28	29	29	27	31	32	32	32	31	30
Y	83	85	88	80	98	95	97	94	78	87

(i) Estimate the linear regression equation of Y on X using Least square method

(ii) From your answer in (i), predict the yield of tomatoes Y when the quantity of fertilizer X=38 is applied.

(iii) Find the Spearman's rank correlation coefficient and interpret your result.

2. Let X be a random variable with pdf given by $f(x) = \frac{x^2}{2} dx$, $0 \leq x \leq 4$, 0 elsewhere;

Determine the following;

(i) $E(x)$ and $Var(x)$ (ii) $P(1 \leq x \leq 2)$ (iii) $P(x > 4)$

3. Suppose that in a large population of manufactured items, the proportion of defective items is 0.008.

(i) what is the probability that in a random sample of 1000 items, there will be 3 or more defective items

(ii) find the mean and standard deviation of the items.

4. If the probability of a team scoring a goal in a competition is $\frac{2}{5}$. Suppose they score 4 goals. Define X as the number of goals. Then;

(i) Generate the distribution of X.

(ii) Find the mean, and the variance of X.

5. Using the following distribution in the table below,

Class interval	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34
frequency	9	10	33	15	10	3

find;

(i) the mean (ii) the semi-interquartile range.