BOWEN UNIVERSITY, IWO, NIGERIA
COLLEGE OF AGRICULTURE, ENGINEERING AND SCIENCE
STATISTICS PROGRAMME

B.Sc DEGREE 2022/2023 SECOND SEMESTER EXAMINATION
COURSE CODE: STA 232   COURSE TITLE: Statistics for Life Sciences
DATE: 17/06/2023   **TIME ALLOWED:** 2 Hours   **CREDIT:** 2

INSTRUCTION: Answer **QUESTION ONE** and any other two Questions

1 (a) An experiment was carried out in which the result can either be "Success" or "failure". If the probability of success is 0.7 and the experiment is repeated 7 times, what is the probability that the number of successes will be (i) 3 (ii) at least 1 (iii) At most 2 and (iv) between 2 and 5.   (10 marks)

1(b) The data below was obtained in a study aimed at estimating the Body Mass Index (BMI) of an individual based on the age. The data below was obtained:

S/N	1	2	3	4	5	6	7	8	9	10
Age (X)	30	32	25	29	32	25	30	32	25	35
BMI (Y)	28.91	15.24	28.04	25.00	22.76	31.79	29.78	27.41	35.67	35.67

Fit a simple linear regression model to the data provided and estimate the BMI of an individual with age 50 years.   (10 marks)

(c.)   The following table gives data on the growth of a certain bacteria population with time

Time (X)	1	3	5	6	6	8	10	12	15	16
Bacterial count (Y)	6	13	20	20	23	30	23	30	25	29

Use the data provided to compute rank correlation coefficient   (10 marks)

2(a) The following data are the left ventricle ejection fraction (LVEF) for a group of 100 heart transplant patients.

LVEF	Frequencies
21-30	10
31-40	2
41-50	12
51-60	6
61-70	10
71-80	25
81-90	35

Use the data provided to compute the (i) mean (ii) mode (iii) median (iv) standard deviation   (12 .5 marks)

2(b) Write short notes on each of the following (i) Null hypothesis (ii) Alternative hypothesis (iii) Rejection region (iv) independent events (v) mutually exclusive events   (5 marks)

3(a) Five hundred persons were selected for an experiment on cholesterol level in the blood. The cholesterol level in the blood of each of them was measured and classified as high, normal and low. The following are the results tabulated by sex.

Cholesterol level in blood	Obesity	
	Obese	Not obese
High	75	33
Normal	157	142
Low	93	17

Can we conclude at the 5% level of significance that the cholesterol in the blood is related to obesity? (Chi-calculated =5.99). (10 marks)

3(b) Consider an experiment involving tossing a pair of die, what is the probability of obtaining (i) sum 10 (ii) sum 9 (iii) sum 7. (10 marks)

4 (a) A census was conducted in a community, the proportion of adults of 18 years and above in the population for various marital status categories were 10%, 20%, 20%, 25% and 25% for married, single, divorced separated, and widowed respectively. It is postulated that 10 years after, the percentages for the various categories are still valid. Test at 5% level the null hypothesis that these percentages are still valid given the following results of a current sample survey.

Marital status	No of adults of 18 years and above
Married	200
Single	300
Divorced	250
Separated	400
Widowed	250

(Chi-square calculated = 9.49) (10 marks)

4(b) The melting point of an alloys used in formulating soldier were investigated by melting 35 samples of each material. The following were the distribution of the readings

Melting point (^{0}F)	Frequency
260 – 264	8
265 – 269	12
270 – 274	5
2 75 – 279	10

Use the information above to obtain (i) Q_1 (ii) Q_2 and (iii) Q_3 (10 marks)