



*(Knowledge for Development)*

**KIBABII UNIVERSITY**

**(KIBU)**

**UNIVERSITY EXAMINATIONS  
2019/2020 ACADEMIC YEAR**

**END OF SEMESTER  
YEAR TWO SEMESTER ONE  
SPECIAL/SUPPLEMENTARY EXAMINATION**

**FOR THE DIPLOMA  
(INFORMATION TECHNOLOGY)**

**COURSE CODE : DIT 072**

**COURSE TITLE : INTRODUCTION TO  
PROBABILITY AND STATISTICS**

**DATE: 11/02/2021 TIME: 8.00 A.M – 11.00 A.M.**

**INSTRUCTIONS**

**ANSWER QUESTIONS ONE AND ANY OTHER TWO.**

**QUESTION ONE (COMPULSORY) [24 MARKS]**

- a. State and briefly explain whether 1.001 can be a probability **[3 Marks]**
- b. Thirty farmers were asked how many farm workers they hire during a typical harvest season. Their responses were:
- 1, 2, 9, 5, 3, 2, 4, 5, 4, 6, 7, 8, 4, 3, 7, 9, 8, 6, 7, 0, 5, 4, 5, 4, 6, 3, 5, 4, 6, 8
- i. Outline the ordered data. **[1 Mark]**
- ii. What is the median? **[1 Mark]**
- iii. Find out the most common number of workers and state the frequency. **[2 Mark]**
- iv. What is the range of the number of workers **[1 Mark]**
- v. What is the value of the upper quartile? **[1 Mark]**
- vi. What is the interquartile range? **[2 Marks]**
- vii. What is the average number of workers hired in the farms? **[3 Marks]**
- viii. Determine the standard deviation **[4 Marks]**
- ix. Determine how skewed the number of workers is during a typical harvest season **[4 marks]**
- c. Contrast between correlation and regression **[2 Marks]**

**QUESTION TWO [18 MARKS]**

- a. Two fair coins are tossed:
- a. Generate the sample space for the two coins **[1 Marks]**
- b. Find the probability that two tails are obtained **[3 Marks]**
- c. Using the axiomatic approach, evaluate the probability of having at least a tail? **[4 Marks]**

- b. A die is thrown twice and the number on each throw is recorded. What is the probability of getting at least one six? **[5 Marks]**
- c. During a computer virus impact experiment, it was discovered that computer systems affected by a certain virus have a 75% likelihood of crashing. What is the probability that of six randomly selected computers infected with that virus, four will recover? **[5 Marks]**

**QUESTION THREE [18 MARKS]**

- a. A die is rolled and the number showing recorded. Given that the number rolled was even, what is the probability that it was a six? **[3 Marks]**
- b. Roll two dice and call the sum of the random uppermost numbers  $Z$ .
- Generate the sample space for  $Z$ . **[2 Marks]**
  - Generate the probability distribution table **[4 Marks]**
  - Calculate the expectation, variance and standard deviation of the data **[9 Marks]**

**QUESTION FOUR [18 MARKS]**

- a. You feel unwell and go to a clinic which offers you a free test for a very rare, but hideous disease. The test they offer is very reliable. If you have the disease it has a 98% chance of giving a positive result, and if you don't have the disease, it has only a 1% chance of giving a positive result. You decide to take the test, and find that you test positive. What is the probability that you have the disease? **[5 Marks]**
- b. Bag A contains 10 marbles of which 2 are red and 8 are black. Bag B contains 12 marbles of which 4 are red and 8 are black. A ball is drawn at random from each bag.
- Draw a probability tree diagram to show all the outcomes the experiment. **[4 Marks]**
  - Find the probability that:
    - both are red. **[2 Marks]**
    - both are black. **[2 Marks]**
    - one black and one red. **[3 Marks]**
    - at least one red. **[2 Marks]**

**QUESTION FIVE [18 MARKS]**

- a. The data below shows age of people sampled to be questioned for data collection process for an experiment. Ages: 36, 67, 25, 45, 38, 22, 46, 48, 55, 91, 68, 46, 72, 52, 55, 61, 36, 58, 38, 55. Make a table to summarize the data hence generate a histogram with each bin representing a 10-year period. **[6 Marks]**
- b. The grades of a group of 1000 students in an exam are normally distributed with a mean of 70 and a standard deviation of 10. A student from this group is selected randomly.
- a. Find the probability that his/her grade is greater than 80. **[3 Marks]**
  - b. Find the probability that his/her grade is less than 50. **[3 Marks]**
  - c. Find the probability that his/her grade is between 50 and 80. **[3 Marks]**
  - d. Approximately, how many students have grades greater than 80? **[3 Marks]**