

UGANDA MARTYRS UNIVERSITY

FACULTY OF BUSINESS ADMINISTRATION AND MANAGEMENT

UNIVERSITY EXAMINATIONS
SEMESTER I, 2012/13

FIRST YEAR EXAMINATIONS FOR BACHELOR OF BUSINESS
ADMINISTRATION AND MANAGEMENT

BUSINESS STATISTICS

DATE: 12TH DECEMBER 2012

TIME: 9:00 – 12:00 NOON

Instructions:

- i) Attempt question one and any other four questions.
 - ii) Question one is compulsory
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Instructions :

Attempt Question 1 and any other four questions.

Question 1 is compulsory.

Question 1 (Compulsory)

(a) Define the following concepts as used in Business Statistics:

- i) a sample (2 marks)
- ii) a parameter (2 marks)
- iii) numerical data (2 marks)

(b) Using relevant examples give a clear distinction between the following concepts:

- i) independent events and mutually exclusive events (3 marks)
- ii) discrete data and continuous data (3 marks)

(c) On a scale of 7, ten students representing Uganda in the International Mathematics Olympiad got the following scores:

4, 0, 3, 1, 5, 3, 4, 2, 3, 2.

Prepare a report summarising and or presenting these results.

(hint: the report should have the mean, mode, range and a bar chart)

(2,1,1,3 marks)

If the passmark was 4, what percentage passed this contest? (1 mark)

Question 2

The following table summarizes the number of days taken by 60 customers to pay what they owe to a certain company.

31	30	36	39	31	36	34	37	33	34	27	22
31	18	38	19	40	25	29	45	31	29	32	23
28	32	28	32	30	31	29	28	29	41	30	41
32	29	33	46	44	28	21	22	52	42	14	29
23	37	38	21	37	33	32	29	35	35	24	26

- i) Construct a frequency distribution for the dataset starting with 10–14.
(5 marks)
- ii) Draw a cumulative frequency curve for the dataset and use it to estimate the median.
(5 marks)
- iii) What is the mean number of days taken by a customer to pay a debt?
(5 marks)
- iv) Compute the mean deviation of this data.
(5 marks)

Question 3

- (a) Define the following concepts as used in Business Statistics:
 - i) statistical experiment (1 mark)
 - ii) union of events (1 marks)
- (b) The probability that a regular scheduled flight departs on time is $P(D) = 0.95$. The probability it arrives on time is $P(A) = 0.92$. The probability that it both departs and arrives on time is $P(A \cap D) = 0.89$. What is the probability that a plane:

- i) arrives on time given it departed on time. (2 marks)
 - ii) departed on time or arrived on time. (2 marks)
- (c) It was observed from the Business Statistics group that out of 170 students, 140 had answered question 1 correctly, 148 had answered question 2 correctly and 120 had answered both questions 1 and 2 correctly. If a student is chosen at random from this group, find the probability that he or she:
- i) answered question 1 correctly (2 marks)
 - ii) failed both questions (3 marks)
 - ii) answered only one question correctly (3 marks)
- (d) Family A has two daughters and one son. Family B has three daughters and two sons. One child is chosen at random from each family. Draw up a probability tree. (2 marks)
Find the probability that:
- i) one boy is chosen (2 marks)
 - ii) atleast one girl is chosen (2 marks)

Question 4

- (a) State the following as used in Statistics
- i) axioms of probability (2 marks)
 - ii) multiplicative rule (2 marks)
- (b) A discrete random variable X has a probability mass function defined by

$$P(X = x) = \begin{cases} 2tx, & \text{for } x = 2, 3, 4, 5 \\ 0, & \text{elsewhere.} \end{cases}$$

Find:

- i) the value of t (2 marks)
 - ii) $P(X > 3)$ (2 marks)
 - iii) the Expectation of X . (3 marks)
- (c) Using relevant examples explain the difference between a Bernoulli distribution and a Binomial distribution. (3 marks)
- (d) A large chain retailer purchases a certain kind of electronic device from a manufacturer. The manufacturer indicates that the defect rate of the device is 20%. The inspector of the retailer randomly picks 20 items from a shipment. What is the probability that among these 20 items:
- i) five will be defective? (2 marks)
 - ii) atleast one will be defective? (2 marks)
 - iii) more than sixteen will be defective (2 marks)

Question 5

- (a) We can generate random variables from the following experiments. Classify them as either continuous random variables, or discrete random variables or neither.
- i) Measuring heights of UMU staff (1 mark)
 - ii) Tossing a coin twice (1 mark)
- (b) A continuous random variable Y is defined by function p as follows:

$$p(y) = \begin{cases} \frac{1}{5}, & \text{for } 1 < y < 6 \\ 0, & \text{elsewhere.} \end{cases}$$

- i) Draw the graph of p . (2 marks)
- ii) Show that p is a probability density function for Y . (1 mark)
- ii) Compute $P(2 < Y < 5)$. (2 marks)

$$\begin{array}{r} 24.10 \\ 23 \\ \hline 1.10 \end{array}$$

26

$$\begin{array}{r} 52 \\ 27 \\ \hline 25 \end{array}$$

- (c) According to the records of UMEME servicing one town, the mean electric consumption for all households during the month of October is 1650 kilowatts. Assume that the monthly electric consumption during this month by all households in this area have a normal distribution and a standard deviation of 320 kilowatt. What is the probability that electric consumption for a randomly selected household in this area have a monthly electric consumption of

- i) less than 1000 kilowatts (2 marks)
- ii) more than 1100 kilowatts (3 marks)
- iii) 900 to 1340 kilowatts? (3 marks)

It is known that there are 1,200 households in this area. Find the number of households that:

- iv) use less than 1000 kilowatts (2 marks)
- v) between 1330 to 1900 kilowatts. (3 marks)

Question 6

- (a) The correlation coefficient r can take on a value between -1 and 1 inclusive. Write brief notes about the following values of r

- i) $r = 1$ (1 mark)
- ii) $r < 0$ (2 marks)

- (b) Seven pairs of observations on the variables X and Y are given below.

X	1.0	2.2	2.8	3.2	3.7	4.4	5.1
Y	3.1	12.5	12.4	7.6	9.3	14.6	13.0

- i) Plot a scatter diagram with values of X on the horizontal axis. (4 marks)
- ii) Calculate: Σx , Σx^2 , Σy and Σxy . (5 marks)
- iii) Find the equation of the regression line of Y and X (4 marks)
- iv) Draw the regression line on the scatter diagram in part *bi*) above. (2 marks)

- (c) The table below shows positions given to four participants (A,B,C and D) by two different judges X and Y in a music competition:

X	D	B	A	C
Y	D	A	B	C

Compute Kendall's rank correlation coefficient.

(2 marks)

END