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University Examinations 2012/2013

FIRST YEAR, SECOND SEMESTER EXAMINATIONS FOR THE DEGREE OF, BACHELOR OF SCIENCE IN COMPUTER SCIENCE, BACHELOR OF SCIENCE IN ACTUARIAL SCENCE AND BACHELOR OF SCIENCE IN STATISTICS, BACHELOR OF SCIENCE AND BACHELOR OF SCIENCE IN MATHEMATICS AND COMPUTER SCIENCE

SMA 2103/STA 2100: PROBABILITY AND STATISTICS I

DATE: APRIL 2013 **TIME: 2 HOURS**

INSTRUCTIONS: *Answer question **one** and any other **two** questions*

QUESTION ONE (30 MARKS)

a) Define the following terms; (3 Marks)
   i. Data
   ii. Statistic
   iii. Quantitative variable

b) Construct stem and leaf plot from the following data. (5 Marks)

45 65 66 72 74 79 69 57 58
65 58 65 66 70 69 49 50 52
51 70 79 84 49 52 55 63 64
85 90 87 81 82 68 69 58 60

c) Given below is the frequency distribution of students performance in a psychology test at the end of the semester. Their marks are out of 50.

Marks	Frequency
1-10	4
11-20	9
21-30	16
31-40	24
41-50	7

Find the geometric mean of the frequency distribution. (5 Marks)

d) Calculate the standard deviation of the following data. (4 Marks)

9, 2, 3, 4, 5, 5, 7, 8, 1

e) From the following data given below calculate the first moment. (3 Marks)

X	1	2	3	4	5
Frequency	5	2	5	4	4

f) If 10% of the rivets produced by a machine are defective, what is the probability that out of 5 rivets chosen at random;

i. None will be defective. (2 Marks)

ii. One will be defective. (2 Marks)

iii. At least two will be defective. (2 Marks)

g) Compute rank correlation for the following data. (4 Marks)

X	20	25	33	17	38	60	25	70
Y	35	30	45	30	20	109	30	50

QUESTION TWO (20 MARKS)

a) i) Distinguish between primary source of data and secondary sources of data. (2 Marks)

ii) Outline the main stages involved in any statistical investigation. (5 Marks)

b) Using the data given below comment on the symmetry and the peakedness of the distribution. (7 Marks)

Marks	1-10	11-20	21-30	31-40	41-50	51-60
Frequency	6	5	8	10	12	17

c) The figures below depict the production in sugar factory.
Calculate the lines of regression. (6 Marks)

X	2	4	5	8	10
Y	3	7	8	13	17

QUESTION THREE (20 MARKS)

The table below shows scores of forty students in an examination test

50 63 70 30 22 25 82 30

43 47 65 32 27 60 50 52

30 55 29 80 58 46 72 24

35 50 33 36 44 28 63 73

40 42 50 41 80 30 65 75

i. Construct a frequency distribution table for these data. (8 Marks)

ii. Calculate the range of the marks. (2 Marks)

iii. Calculate the mean mark. (5 Marks)

iv. Calculate the standard deviation. (5 Marks)

QUESTION FOUR (20 MARKS)

a) Explain the following terms associated with approaches to the concept of probability. (3 Marks)

i. Classical approach
ii. Axiomatic approach
iii. Relative frequency approach

b) If A denotes the events and A^C its compliments then proof $P(A^C) = 1 - P(A)$. (4 Marks)

c) A bag contains 8 white, 6 red and 6 black balls. A ball is draw at random. Find the probability it will be red. (2 Marks)

d) State and proof Bayes Theorem. (6 Marks)

e) Calculate the median, the first and third quartiles for the following data.

Height	145-149	150-154	155-159	160-164	165-169	170-174	175-179
Frequency	2	5	16	9	5	2	1

(5 Marks)