



# MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

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## University Examinations 2015/2016

THIRD YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR  
OF SCIENCE IN INFORMATION TECHNOLOGY

### SMA 2103: PROBABILITY AND STATISTICS I

DATE: NOVEMBER 2015

TIME: 2 HOURS

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

#### QUESTION ONE (30 MARKS)

a) Explain the following terms:

- (i) Descriptive statistics. (1 Mark)
- (ii) Inferential statistics. (1 Mark)
- (iii) Sample. (1 Mark)
- (iv) Variable. (1 Mark)

b) Compute mode from the following data:

Marks	Frequency
0-10	2
10-20	7
20-30	11
30-40	6
40-50	4

(3 Marks)

- c) From the following observations, prepare a frequency distribution with 5-10(Inclusive method)

12	36	40	30	28	20	19	10	10	16
19	27	15	26	20	19	7	45	33	21
26	37	6	20	11	17	37	30	20	5

- d) If A denotes the event and  $A^C$  its compliment then  $P(A^C)=1-P(A)$ . (4 Marks)
- e) An examination of eight applicants for the clerical post was taken by firm. From the marks obtained by the applicants in the accountancy and statistics papers, compute rank coefficient of correlation

Applicant	A	B	C	D	E	F	G	H
Marks in accountancy	15	20	28	12	40	60	20	80
Marks in statistics	40	30	50	30	20	10	30	60

(5 Marks)

- f) The table below shows the distribution of pocket money on BIT students on a particular day

Class	200-300	301-400	401-500	501-600	601-700	701-800
Frequency	3	8	15	20	14	5

Compute:

- (i) Arithmetic mean and comment about it. (3 Marks)
- (ii) Standard deviation and comment about it. (5 Marks)

## QUESTION TWO (20 MARKS)

- a) Given the data below:

x	10	15	18	1	4	7	14
y	3	2	0	8	6	4	3

Compute:

- (i) The correlation coefficient. (6 Marks)
- (ii) The coefficient of determinant ( $r^2$ ) (2 Marks)

(iii) Comment on the relationship between  $x$  and  $y$  (2 Marks)

(iv) Determine  $\bar{x}$  and  $\bar{y}$ ,  $a$  and  $b$  for the equation  $y = a + bx$  (8 Marks)

(v) Write the prediction equation. (1 Mark)

(vi) Estimate  $y$  when  $x=12$  (1 Mark)

### QUESTION THREE (20 MARKS)

a) Draw a histogram and superimpose frequency polygon from the following statistical data of marks obtained from the end-of-semester examination of a Bachelor of Information

Technology: (6 Marks)

Marks	Frequency
0-5	7
5-10	8
10-15	15
15-20	16
20-25	19
25-30	13
30-35	12
35-40	10
40-45	5
45-50	2

b) The frequency distribution given below shows the daily wages of workers in a tea plantation

Wages	50-69	70-89	90-109	110-129	130-149
Frequency	4	8	12	20	6

(i) State the modal class. (1 Mark)

(ii) Compute:

i) Median (3 Marks)

ii) Quartile deviation (4 Marks)

- iii) 8<sup>th</sup> decile (3 Marks)
- iv) 50<sup>th</sup> percentile (3 Marks)

**QUESTION FOUR (20 MARKS)**

- a) Briefly explain the following concepts of probability:
- (i) Classical approach. (2 Marks)
  - (ii) Axiomatic approach. (2 Marks)
- b) (i) State the Baye’s Theorem. (2 Marks)
- (ii) Proof the Baye’s Theorem. (6 Marks)
- c) In a certain town, male and female each form 50 percent of the population. It is known that 20% of the males and 5% of the females are unemployed. a research student studying the employment situation selects an unemployed person at random. What is the probability that the person so selected is:
- (i) Male (3 Marks)
  - (ii) Female (3 Marks)
- d) Distinguish between dependent and independent events. (2 Marks)

**QUESTION FIVE (20 MARKS)**

- a) The following grouped frequency distribution shows a breakdown of students in an examination. Estimate the geometric mean and the median. (6 Marks)

Marks	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90
Frequency	8	3	9	10	20	6	5	15

- b) Compute the rank correlation coefficient for the following data; (5 Marks)

x	70	83	90	65	55	75	80	45
y	120	130	145	110	135	140	95	100

- c) Explain the following terms:
- (i) Leptokurtic distribution (1 Mark)
  - (ii) Mesokurtic distribution (1 Mark)
  - (iii) Platykurtic distribution (1 Mark)
- d) The first four central moments of a distribution are 0,16-36 and 120. Comment on the skewness and kurtosis of the distribution. (6 Marks)