



MERU UNIVERSITY COLLEGE OF SCIENCE & TECHNOLOGY

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University Examinations 2010/2011

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

SMA 2103: PROBABILITY AND STATISTICS I

DATE: DECEMBER 2010

TIME: 2 HOURS

INSTRUCTIONS: Answer Questions *One* and any other *Two* Questions

QUESTION ONE – (30 MARKS)

- (a) The distribution below shows the heights of employees chosen at random in an organization.

Height/cm	151-155	156-60	160-165	166-170	171-175	176-180	181-185
No. of employees	4	7	18	30	23	10	8

Calculate the following:

- Mean
 - Median
 - Mode
 - Variance
 - Upper quartile
- (10 Marks)
- (b) Explain the precautions one needs to take before using secondary data in his/her study.
(3 Marks)
- (c) At a certain gas station 40% of the customers request regular gas, 35% request unleaded gas and 25% request premium gas. Of these customers requesting regular gas, only 30% fill their tanks. Of these customers requesting unleaded gas, 60% fill their tanks, while of those requesting premium 5 % fill their tank. Calculate the.
- Probability that the next customer will request unleaded gas and fill her tank.
(5 Marks)
 - Probability that next customer fills her tank

- (iii) Probability that if the next customer fills her tank, she requested regular gas. (7 Marks)

(d) The table below shows data on the cost of advertisement and circulation (x) and return on inquiry cost (y) for a sample of 9 magazines.

x	4.1	5.6	3.8	2.5	1.3	3.3	1.3	1.5	2.7
y	17.4	36.0	29.7	22.2	90.8	92.0	65.8	78.6	98.6

Calculate the spearman's rank correlation coefficient. (5 Marks)

QUESTION TWO – (20 MARKS)

(a) The following table gives the quantities of four commodities sold and the corresponding values for the years 2008 and 2009.

2008			2009	
Commodity	Quantity	Total Value (Shs)	Quantity	Total Value
1	350	1050	500	2000
2	400	1600	600	1800
3	200	1600	350	1400
4	300	1800	250	2000

Calculate, using 2008 as base year

- (i) Laspeyres price index.
 (ii) Paasche price index. (7 Marks)
- (b) To investigate the relationship between the level of advertising in local newspapers and the level of sales the marketing manager of a national firm in the consumer-products field applies different amounts of advertising in 10 randomly selected geographic areas. The results are shown below:

Area	1	2	3	4	5	6	7	8	9	10
Level of Advertising (000)x	10.5	6.0	8.7	9.3	11.8	7.5	15.0	6.3	8.5	5.4
Level of sales (000,000/t)y	17.3	14.0	19.1	14.5	20.0	16.3	23.8	14.0	17.3	13.3

- (i) Determine the regression equation for the data. (9 Marks)
- (ii) Estimate the level of sales for an area in which 10,000/= is spend on advertising. (2 Marks)
- (c) List four methods of carrying out a survey. (2 Marks)

QUESTION THREE – (20 MARKS)

- (a) Briefly explain the components of a time series. (6 Marks)
- (b) The following data represent the sales, in millions shillings, of a company for a period of 5 years for a 4 – quarter period.

Quarter				
Year	I	II	III	IV
2000	19	31	62	9
2001	20	32	65	17
2002	24	36	78	14
2003	24	39	83	20
2004	25	42	85	24

- (i) Determine a three-quarter moving average for the data. (6 Marks)
- (ii) Plot both the original and three-quarter moving averages on the same set of axes. (4 Marks)
- (c) Point out the limitations of statistics. (4 Marks)

QUESTION FOUR – (20 MARKS)

- (a) A company has 100 employees of which 60 are male and 40 are female. On average each male employee write 52 e-mails per month with variance 48 while the female averages 47 e-mails per month with variance 38. Determine the:
- (i) Average number e-mails written by all employees per month.

(ii) Combined variance. (6 Marks)

(b) A committee of three is to be chosen from a group consisting of 4 men and 5 women. If the selection is made at random, find the probability that.

(i) All three are women

(ii) Two are men. (6 Marks)

(c) The data below show the wages earned by workers in a factory.

Wages (000)	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5
No. of workers	35	40	48	100	125	87	43	22

Calculate the coefficient of skewness.

(6 Marks)