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University Examinations 2013/2014

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

STA 2100/ SMA 2103: PROBABILITY AND STATISTICS I

DATE: APRIL 2014

TIME: 2 HOURS

INSTRUCTIONS: Answer question one and any other two questions.

QUESTION ONE – (30 MARKS)

- (a) Distinguish between
- (i) Primary and secondary source of data. (2 Marks)
 - (ii) Discrete and continuous variables. (2 Marks)
- (b) Define the following terms:
- (i) Population
 - (ii) Sample
 - (iii) Outcome
 - (iv) Sample space (4 Marks)
- (c) Briefly explain the following levels (scales) of measurements;
- (i) Interval scale (2 Marks)
 - (ii) Ratio scale (2 Marks)
- (d) The data below represents the age of 30 students of BAS class in MUST.
- | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|
| 30 | 24 | 27 | 29 | 34 | 34 | 22 | 22 | 28 | 25 |
| 30 | 37 | 23 | 27 | 30 | 23 | 24 | 31 | 28 | 25 |
| 27 | 29 | 24 | 29 | 25 | 29 | 35 | 35 | 30 | 29 |

Group the data into 3 equal classes and construct the frequency distribution for the groups. (5 Marks)

- (e) A box contains 50 marbles, 13 blue, 10 red and 27 yellow. A marble is taken but not replaced. A second marble is then treated similarly and so on. Determine the probability that:
- (i) The first red, the second yellow and third is blue. (4 Marks)
 - (ii) A blue or yellow marble is picked. (3 Marks)
- (f) The table below shows the marks of students for Probability and Statistics I and Probability and Statistics II

Probability & Statistics I	Probability & Statistics II
80	80
60	50
65	60
50	55
35	46
30	30
90	95

Determine the Spearman Rank correlation coefficient for these marks and comment about their relationship. (6 Marks)

QUESTION TWO – (20 MARKS)

- (a) The following data shows the distribution of monthly profits in thousands of shillings of 100 randomly selected enterprises.

Profits (000 sh)	0 – 10	10-20	20-30	30-40	40-50	50-60
No. of enterprise	5	14	18	23	22	18

Use the above data to compute

- (i) Arithmetic mean (3 Marks)
- (ii) Median (3 Marks)
- (iii) Standard deviation (4 Marks)
- (iv) Coefficient of skewness (2 Marks)

- (b) The following data relates to the distribution of 150 workers in terms of sex, mean monthly savings and standard deviation

Sex	No. of employees	Monthly average savings	Standard deviation
Male	100	5000	50
Female	50	8000	85

Calculate the coefficient of variation for each sex and state which group has more variability in savings. (5 Marks)

QUESTION THREE – (20 MARKS)

The frequency distribution given below shows the daily wages of workers in a sisal farm

Wages	50-69	70-89	90-109	110-129	130-149	150-169	170-189
No. of workers	4	8	12	20	6	7	3

- (a) State the modal class. (1 Mark)
- (b) Draw the histogram and frequency polygon curve on the same axis. (5 Marks)
- (c) Using (b) estimate the mode. (2 Marks)
- (d) Construct the cumulative frequency (ogive) curve and use it to estimate
- Median
 - Quartile deviation
 - 6th decile
 - 70th percentile
- (12 Marks)

QUESTION FOUR – (20 MARKS)

- (a) A box contains 8 red, 3 white and 9 blue balls. If 3 balls are drawn at random without replacement determine the probability that
- All the three balls are red (4 Marks)
 - 2 red and 1 is white (3 Marks)
 - 1 ball is each colour (3 Marks)
- (b) In a certain town, the probability that a woman attends a family planning clinic is 0.4, and the probability that her husband attends the clinic is 0.1. The probability that a husband attends the clinic given the wife does is 0.08. Calculate the probability that
- Both the husband and wife will attend (3 Marks)
 - The wife will attend clinic given the husband does. (3 Marks)
 - Atleast one of the two persons will attend clinic. (4 Marks)