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**University Examinations 2014/2015**

FIRST YEAR, SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF COMMERCE

**SMB 3113: INTRODUCTION TO BUSINESS STATISTICS**

**DATE: AUGUST, 2016 TIME: HOURS**

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

**QUESTION ONE - (30 MARKS)**

1. Define the following terms:
2. Statistics (1 Mark)
3. Statistic (1 Mark)
4. Parameter (1 Mark)
5. Explain the difference between descriptive and inferential statistics. (2 Marks)
6. Briefly describe the following types of data measurement;
7. Ordinal measurement (2 Marks)
8. Interval measurement (2 Marks)
9. The table below shows an incomplete distribution.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Variable | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 |
| Frequency | 10 | 20 | - | 40 | - | 25 | 15 |

1. Given that the median is 35, find the missing values of the frequency when the total frequency is 170. (4 Marks)
2. Calculate the arithmetic of the above data. (4 Marks)
3. The table below shows the distribution of marks attained by students of a BCOM class in MUST in a statistic exam.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Marks | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 | 80-90 | 90-100 |
| No. of Students | 3 | 5 | 7 | 10 | 12 | 15 | 12 | 6 | 2 | 8 |

Calculate the mode of the marks. (3 Marks)

1. (i) Calculate the trend by four yearly moving average of the data given below;(3 Marks)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 2002 | | | | 2003 | | | | 2004 | | | | 2005 | | | |
| 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| 60 | 65 | 20 | 44 | 62 | 58 | 28 | 50 | 85 | 42 | 33 | 44 | 78 | 71 | 20 | 58 |

(ii) Draw the graph of the raw data and moving average of the above data on the same axis. (3 Marks)

1. The weight of 20 children who visited a clinic are measured and the results in kg are as shown below;

7.3,7.1 ,6.6, 7.0, 7.8 , 7.3, 7.5, 6.2, 6.9, 6.7, 6.5, 6.8, 7.2, 7.4, 6.5, 6.9, 7.2, 7.6, 7.0, 6.8

Determine;

1. Lower class boundary of the first class. (1 Mark)
2. Upper class boundary of the last class. (1 Mark)
3. The number of classes desired. (1 Mark)
4. The class width. (1 Mark)

**QUESTION TWO – (20 MARKS)**

Construct fisher’s ideal index number of price from the following data:

|  |  |
| --- | --- |
| 2006  Price Quantity | 2007  Price Quantity |
| A 2 8 | 4 6 |
| B 5 10 | 6 5 |
| C 4 14 | 5 10 |
| D 2 19 | 2 13 |

b) Define the following terms as used in decision theory;

1. States of nature (1 Mark)
2. Payoff (1 Mark)

c) Consider a decision analysis problem whose payoffs (in units of thousand dollars) are given by the following payoffs table.

|  |  |  |
| --- | --- | --- |
| Alternative | States of nature | |
| S1 |  |
|  | 80  30  60 | 25  50  40 |
| Prior probability | 0.4 | 0.6 |

Which alternative should be chosen under the criterion of;

1. Maximin payoff criterion (2 Marks)
2. Maximaxi criterion (2 Marks)
3. Bayes Decision rule (4 Marks)

d) Briefly explain three components of time series. (3 Marks)

**QUESTION THREE – (20 MARKS)**

1. Briefly explain three importance of regression analysis. (3 Marks)
2. The following table shows the data on the number of hours x which the person studied for a statistical test and their scores y on the test.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| x | 4 | 9 | 10 | 14 | 4 | 12 | 22 | 1 | 17 |
| y | 31 | 58 | 65 | 73 | 37 | 60 | 91 | 21 | 84 |

1. Find the normal regression model y = x that approximates the scores.

(7 Marks)

1. Determine the score y when the student studies for 12 hours. (3 Marks)
2. The following data relates to the monthly distribution of wages in ( sh 000) of the similar firms;

Firm Number of employees Mean wage Standard deviation

A 150 22 5

B 200 25 4

1. Determine the combined mean (3 Marks)
2. Which of the firm shows greater variability in monthly wages. (4 Marks)

**QUESTION FOUR – (20 MARKS)**

The following table gives the frequency distribution of 291 workers of a factory according to their average monthly income in 2015.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Income group in $ | 30-50 | 50-70 | 70-90 | 90-110 | 110-130 | 130-150 | 150-170 | 170-190 | 190-210 | 210-230 | 230-250 |
| No. of workers | 1 | 16 | 39 | 58 | 60 | 46 | 22 | 15 | 15 | 9 | 10 |

For the data, determine;

1. Median wage (4 Marks)
2. Standard deviation of the income (7 Marks)
3. Coefficient of variation (2 Marks)
4. Karl Pearson’s coefficient of skewness and interprete the value. (4 Marks)

b) A bag contains 10 white and black balls. Two balls are successively drawn out and not replaced. Determine the probability that they are both of different colours. (3 Marks)

**QUESTION FIVE (20 MARKS)**

1. Define the terms;
2. Event (1 Mark)
3. Sample space (1 Mark)
4. Mutually exclusive (disjoint) events (1 Mark)
5. The data pertained to hearing impairment due to injury reported by individuals 17 years of age and older are shown below. The 163167 persons included in the study were subdivided into three mutually exclusive categories; the currently employed, the currently unemployed, and those not in the labour force.

|  |  |  |
| --- | --- | --- |
| Employment Status | Population | Impairment |
| Currently employed | 98,917 | 552 |
| Currently unemployed | 7462 | 27 |
| Not in labour force | 56778 | 368 |
| Total | 163157 | 947 |

Let E1 be the event that an individual included in the survey is currently employed, E2 be event that he or she is currently unemployed , and the event that the individual is not in the labour force.

Further, let H be the event that an individual has a hearing impairment due to injury. Determine the probability that:-

1. An individual has a hearing impairment due to injury. (2 Marks)
2. An individual has a hearing impairment given that he or she is currently unemployed. (3 Marks)
3. An individual has a hearing impairment given that he or she is currently unemployed. (8 Marks)
4. An individual has a hearing impairment, using the conditional probability(3 Marks)
5. A bag contains 20 fruits of which 15 are ripe and 5 unripe. A BCOM student picked a fruit at random and gives it out to be sold at Ksh 10 if it is ripe otherwise the student returned it into the bag.
6. Represent this information on a tree diagram when the student repeats the procedure three times. (2 Marks)
7. Find the probability that the student make Ksh. 20 in this transaction.(3 Marks)