



THE CATHOLIC UNIVERSITY OF EASTERN AFRICA

A. M. E. C. E. A

MAIN EXAMINATION

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JANUARY – APRIL 2018 TRIMESTER

FACULTY OF ARTS AND SOCIAL SCIENCES

DEPARTMENT OF DEVELOPMENT STUDIES

ODEL PROGRAMME

MDS / MPM 516& 513: STATISTICAL TECHNIQUES

Date: APRIL 2018

Duration: 2 Hours

INSTRUCTIONS: Answer Question ONE and ANY OTHER TWO Questions

- Q1. Twelve students are ranked according to their cumulative grade point average and according to their grade point average for statistics course only. Their rankings are shown in the table below:

Cumulative GPA rank	Statistic GPA rank
1	2
2	5
3	4
4	1
5	6
6.5	3
6.5	7.5
8	10
9	9
10	12
11.5	7.5
11.5	11

- a) State the Null hypothesis and the alternative Hypothesis for the study
(2Marks)
- b) Calculate the Speraman's Rank order correlation coefficient for the given data and comment on the results
(6marks)

- c) State the conditions under which you would reject the null hypothesis
(4marks)
- d) Given $\alpha = 0.05$, determine whether there is significant positive correlation between those two sets of ranks?
(1mark)
- Q2. a) Make a distinction between
- i) Type I error and type II error **(2marks)**
 - ii) One tailed test and two tailed test **(2marks)**
 - iii) Population and sample **(2marks)**
- b) A professor administers a CAT in which the grades are normally distributed with a mean of 42 and a standard deviation of 18. If she plans to curve the grades in such a way that the top 20 % of the students receives A's, what is the lowest test score that will earn an A.
(4marks)
- c) Discuss the value of constructing of grouped frequency distribution
(5marks)
- Q3. a) Define a normal distribution. **(3marks)**
- b) State any three properties of a normal distribution **(3marks)**
- c) In an experiment, a sample of 2000 diodes was found to have an average life span of 2040 hours with a standard deviation of 60 hours. Given that the lifespan are normally distributed, Calculate:
- i) The number of diodes with lifespan of more than 2150 hours **(3marks)**
 - ii) The numbers of diodes with a lifespan less than 2150 hours **(3marks)**
 - iii) The number of diodes with lifespan of more than 1920 hours than 2160 hours **(3marks)**
- Q4. a) Describe the five steps for testing hypotheses **(5 marks)**
- b) ABC company prints gaming cards. The company claims that 30% of cards are rookies, 60% veterans and 19% are all stars. Suppose a random sample of 100 cards has rookies, 45 veterans, and 5 all-stars. Is this consistent with ABC's claim? Use a significance level of 5%.
(10marks)
- Q5. The following data pertains to 1,500 workers working in an industrial establishment. Their age is classified as follows:

Age (yrs)	No. of workers	Age (yrs)	No. of workers
18 – 22	120	38 – 42	184
22 – 26	125	42 – 46	162
26 – 30	280	46 – 50	86
30 – 34	260	50 – 54	75
34 – 38	155	54 – 58	53

Calculate:

- i) The median age. **(5marks)**
- ii) The number of workers whose age lie in the lower quartile **(5 marks)**
- iii) The number of workers whose age lie in the upper quartile **(5 marks)**

Q6. Given the following type of data set:

X	Y
2	89
10	66
15	60
18	52
27	47
33	53
35	27

- a) Determine the scatter plot and comment on the distribution displayed between X and Y **(4 marks)**
- b) Find the regression equation that relates X to Y **(6 marks)**
- c) Based on the regression equation, estimate the value of Y given X = 30. Is this a reasonable value? Explain your answer **(5 marks)**

END