



# MACHAKOS UNIVERSITY

University Examinations 2018/2019

SCHOOL OF EDUCATION

DEPARTMENT OF EDUCATIONAL MANAGEMENT AND CURRICULUM STUDIES

FIRST YEAR FIRST SEMESTER EXAMINATION FOR

DOCTOR OF PHILOSOPHY EDUCATION

EMP 923: ADVANCED EDUCATIONAL STATISTICS

DATE: 7/5/2019

TIME: 8.30-11.30 AM

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## INSTRUCTIONS

- 1) Answer Question ONE and any other THREE questions
- 2) Do not write on the question paper

## QUESTION ONE (20 MARKS)

- a) By the use of suitable examples, distinguish the following terms as they are used in statistics
- i. Independent Variable and Dependent variable (2 marks)
  - ii. Descriptive and Inferential Statistics (2 marks)
  - iii. Measures of central tendency and Measures of variability (2 marks)
- b) By the use of relevant examples, explain the characteristics of the mean as applied in educational statistics (6 marks)
- c) The following data represent the number of students in 10 schools who study Computer Science.

| School | Number of Students |
|--------|--------------------|
| A      | 62                 |
| B      | 36                 |
| C      | 9                  |
| D      | 37                 |

|   |    |
|---|----|
| E | 18 |
| F | 8  |
| G | 38 |
| H | 11 |
| I | 36 |
| J | 39 |

Use the data to compute

- i. the mean (2 marks)
  - ii. The Median (2 marks)
  - iii. Standard Deviation (4 marks)
- d) At Machakos University, the 340 students in the school of education took a final exam on which the mean score was 70% and the standard deviation was 8. The grades of some 10 students were: 60, 57, 55, 67, 70, 72, 78, 82, 90, 95.  
Determine the number of students who scored lower than each of the 10 students.  
(10 marks)

## QUESTION TWO (20 MARKS)

- a) Suppose you have developed a questionnaire to measure 'burn out' among lecturers in Machakos University. A random sample of 100 lecturers working in Machakos University has an average score of 10.3, with a standard deviation of 2.7. What is your estimated average 'burn out' score for the population as a whole? Use both the 90 and 95 confidence level  
(10 marks)
- b) The average income of a certain community is USD 453 with a standard deviation of 95. A random sample of 150 community members shows a mean score USD 502. Is there a significance difference?  
(10 marks)

## QUESTION THREE (20 MARKS)

- a) Middle class families are more likely to assist their children in doing homework than working class? A sample of middle class families' reported an average of 7.5 hours spend assisting children do their homework while sample of working class averaged 8.2 hours. Is the difference significant?  
(10 marks)

- b) At Machakos University, about half of the students live off-campus while the other half live in hostels on the campus. The academic performance based on a random sample of 500 students is shown in Table 1.0 below. Determine if there is an association between the students' academic performance and the living arrangement (10 marks)

**Table 1.0: Living Locality and Students' Academic Performance**

| Academic Performance | Locality                   |                         |           |
|----------------------|----------------------------|-------------------------|-----------|
|                      | Off Campus with Room mates | Off Campus with parents | On Campus |
| Low                  | 32                         | 50                      | 54        |
| Moderate             | 56                         | 40                      | 24        |
| High                 | 70                         | 80                      | 76        |

**QUESTION FOUR (20 MARKS)**

- a) The coach of the Red Eagles Basketball Team believes that his team plays better and scores more points in front of larger crowds. The number of points scored and attendance for the games last season are as reported below. Do these data support the coach's argument?

**Table 3.0: Population and Scores data**

| Game | Points Scored | Attendance |
|------|---------------|------------|
| 1    | 54            | 378        |
| 2    | 57            | 350        |
| 3    | 59            | 320        |
| 4    | 80            | 478        |
| 5    | 82            | 451        |
| 6    | 75            | 250        |
| 7    | 73            | 489        |
| 8    | 53            | 451        |
| 9    | 67            | 410        |
| 10   | 78            | 215        |
| 11   | 67            | 113        |
| 12   | 56            | 250        |

|    |     |     |
|----|-----|-----|
| 13 | 85  | 450 |
| 14 | 101 | 489 |
| 15 | 99  | 472 |

(10 marks)

- b) In a certain company, the Human Resource Department screens candidates for suitability of employment. To evaluate the screening process, the actual work performance of a sample of hired candidates has been rated.

| Case | Original Score | Performance Evaluation |
|------|----------------|------------------------|
| A    | 17             | 78                     |
| B    | 17             | 85                     |
| C    | 15             | 82                     |
| D    | 13             | 92                     |
| E    | 13             | 75                     |
| F    | 13             | 72                     |
| G    | 11             | 70                     |
| H    | 10             | 75                     |
| I    | 10             | 92                     |
| J    | 10             | 70                     |
| K    | 9              | 32                     |
| L    | 8              | 55                     |
| M    | 7              | 21                     |
| N    | 5              | 45                     |
| O    | 2              | 25                     |

Is there a relationship between the original scores and the performance evaluation of the job?

(10 marks)

#### QUESTION FIVE (20 MARKS)

- a) Explain the limitations of Analysis of Variance (ANOVA) (6 marks)
- b) Does the number of spectators vary significantly by the level of the competition? A random sample of different levels of competition displays the following pattern of spectator turn-out by the level of competition.

| <b>Zone</b> | <b>Sub-county</b> | <b>County</b> |
|-------------|-------------------|---------------|
| 32          | 40                | 30            |
| 45          | 48                | 40            |
| 42          | 50                | 40            |
| 47          | 55                | 45            |
| 48          | 55                | 45            |
| 50          | 60                | 50            |
| 51          | 65                | 52            |
| 55          | 70                | 55            |
| 60          | 75                | 55            |
| 65          | 75                | 60            |

Assess the results for significance  
marks)

(14