

UNIVERSITY OF SWAZILAND

FACULTY OF EDUCATION



DEPARTMENT OF EDUCATIONAL FOUNDATIONS AND MANAGEMENT

FOR

FACULTY OF EDUCATION AND  
INSTITUTE OF DISTANCE EDUCATION

POSTGRADUATE CERTIFICATE IN EDUCATION (PGCE) **Full/Part Time**

NOVEMBER, 2017 FINAL EXAMINATION PAPER

COURSE CODE : EFM 515/EDF 322

TITLE OF PAPER : EDUCATIONAL RESEARCH

TIME ALLOWED : THREE HOURS

INSTRUCTIONS :  
1. THIS PAPER IS DIVIDED INTO **TWO SECTIONS (A AND B)**. ANSWER ANY **TWO** QUESTIONS FROM EACH SECTION  
2. UTILISE THE ATTACHED STATISTICAL FORMULAS AND TABLES WHERE NECESSARY.

TOTAL MARKS : 100

THIS PAPER IS NOT TO BE OPENED UNTIL PERMISSION TO DO SO HAS BEEN GRANTED BY THE INVIGILATOR.

## SECTION A

### Question 1

Choose any research topic of your choice and discuss any five ethical considerations you would consider in carrying out the research [Total 25 marks]

### Question 2

Design a topic of your choice and write the methodology section of your study under the following headings:

- |       |   |           |
|-------|---|-----------|
| (i)   | Research design                         | (5 marks) |
| (ii)  | Target population                       | (2 marks) |
| (iii) | Sampling                                | (5 marks) |
| (iv)  | Data collection methods/instrumentation | (5 marks) |
| (v)   | Validity/reliability/trustworthiness    | (4 marks) |
| (vi)  | Data analysis                           | (4 marks) |

[Total 25 marks]

### Question 3

Discuss any five issues a researcher would consider in order to evaluate or determine whether a research problem or topic is researchable. [Total 25 marks]

## SECTION B

### Question 4

Table 1 below shows the marks which were scored by pupils in Mathematics and Science mid-year examinations.

**Table 1 showing results of Maths and Science tests in Mid – Year Examinations**

Pupil	A	B	C	D	E	F	G	H	I	J
Maths mark	80	60	72	47	6	75	64	58	72	70
Science mark	78	61	70	52	60	75	65	60	70	70

- Calculate the mean of Mathematics marks. **(4 marks)**
- State the mode of Science marks **(2 marks)**
- Find the median of Science marks **(3 marks)**
- Compute the standard deviation of Mathematics marks **(10 marks)**
- State any two advantages and disadvantages of the mean **(4 marks)**
- Calculate the range of Science marks **(2 marks)**

**[Total = 25 marks]**

### Question 5

Table 2 below shows the number of hours spent by 10 students preparing for the final examinations.

**Table 2 showing hours spent in preparation for the final exam**

STUDENT	Q	R	S	T	U	V	W	X	Y	Z
TIME IN HOURS (X)	22	26	20	19	27	24	25	23	18	20
EXAMINATION SCORE (Y)	74	74	69	68	73	71	72	69	65	66

Calculate Pearson's Product Moment correlation co-efficient for the data and comment on it.

**(25 marks)**

### Question 6

Below is a data set for Social Studies scores for 36 Grade seven pupils.

37 28 10 14 70 19 13 46 8  
30 22 8 5 11 45 67 56 89  
16 64 34 50 56 94 41 81 57  
19 7 12 60 15 14 8 21 63

a) Re-arrange the data in descending order.

**(3 marks)**

b) Complete the frequency distribution table below using a uniform class interval of 10.

CLASS	TALLY	FREQUENCY
0 - 9		

**(10 marks)**

c) Comment on the class performance

**(2 marks)**

d) Using the data above draw a histogram/ bar graph.

**(10 marks)**

**[Total = 25 marks]**

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STATISTICAL FORMULAE

Sample Variance: 
$$S^2 = \frac{\sum(x-\bar{x})^2}{n-1}$$

Sample Standard Deviation: 
$$s = \sqrt{\frac{\sum(x-\bar{x})^2}{n-1}}$$

Product moment correlation coefficient:

$$r_{xy} = \frac{n\sum xy - \sum x \sum y}{\sqrt{[n\sum x^2 - (\sum x)^2][n\sum y^2 - (\sum y)^2]}}$$

Spearman's rank order correlation coefficient: 
$$rho = 1 - \frac{6\sum d^2}{n(n^2-1)}$$

Chi-squared Test Statistic: 
$$\chi^2 = \sum \frac{(O-E)^2}{E}$$

Z-score: 
$$z = \frac{x-\bar{x}}{s}$$

Standardisation: 
$$z = \frac{u-\mu}{\sigma}$$
 Where  $Z \sim N(0,1)$

T-score: 
$$T = 50 + 10 \left( \frac{x-\bar{x}}{s} \right)$$

Student t-test: 
$$t = \frac{\sqrt{(n-1)} \sum d}{\sqrt{n \sum d^2 - (\sum d)^2}}$$

## ANALYSIS OF VARIANCE (ANOVA) FORMULAE

$$1. \quad SS(TOTAL) = \sum x^2 - \frac{(\sum x)^2}{n}$$

$$2. \quad SST = SS(\text{Treatment}) = SS(\text{Btwn Grps}) = \sum \frac{T_i^2}{n_i} - \frac{(\sum x)^2}{n} = \frac{T_1^2}{n_1} + \frac{T_2^2}{n_2} + \dots + \frac{T_p^2}{n_p} - \frac{(\sum x)^2}{n}$$

$$3. \quad SSE = SS(TOTAL) - SST$$

[N.B.  $SSE = SS(\text{Error}) = SS(\text{Within Groups}) = SS(\text{Residual})$ ]

$$4. \quad MST = \frac{SST}{p-1}$$

$$5. \quad MSE = \frac{SSE}{n-p}$$

$$6. \quad F_{calc} = \frac{MST}{MSE}$$

### ONE-WAY ANOVA TABLE

Source of variation	Sum of squares	Degrees of Freedom (df)	Mean Square	$F_{calc}$
Between Groups (Treatments)	$SST$	$p-1$	$MST = \frac{SST}{p-1}$	$F_{calc} = \frac{MST}{MSE}$
Within Groups (Error or Residual)	$SSE$	$n-p$	$MSE = \frac{SSE}{n-p}$	
<b>Total</b>	<b><math>SS(TOTAL)</math></b>	<b><math>n-1</math></b>		

$n$  = total number of observations

$p$  = number of treatments (number of samples or groups)

$p-1$  = numerator degrees of freedom

$n-p$  = denominator degrees of freedom

$T_i$  = total for group  $i$  ( $i = 1, 2, 3, \dots, p$ )

$n_i$  = number of observations in group  $i$  ( $i = 1, 2, 3, \dots, p$ )

