UNIVERSITY OF SWAZILAND

FACULTY OF EDUCATION

DEPARTMENT OF EDUCATIONAL FOUNDATIONS AND MANAGEMENT

— FOR

INSTITUTE OF DISTANCE EDUCATION AND FULL TIME PROGRAMMES

SUPPLEMENTARY EXAMINATION PAPER – JULY, 2017

BACHELOR OF EDUCATION 111 (B.Ed.) Full-Time
BACHELOR OF EDUCATION 111 (B.Ed.) Part-Time
POSTGRADUATE CERTIFICATE IN EDUCATION (PGCE) Part-Time

COURSE CODE   :   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

1. Discuss any three non-probability sampling techniques indicating their applicability in educational research *Total: 25 Marks.*

2. Citing any five examples of your choice, discuss the importance of a pilot study in educational research *Total: 25 Marks*

3. Discuss the major components of a research report *Total: 25 Marks*

SECTION B

4. Two lecturers conducted an interview for prospective students and awarded them marks as follows;

Table I: Interview marks

Student	A	B	C	D	E	F	G	H	I	J
Lecturer X	50	48	52	70	70	72	55	70	80	72
Lecturer Y	45	44	60	66	80	60	40	68	84	72

Using data on **Table 1** above

i)   Calculate the standard deviation of marks awarded by lecture X   (12 marks)

ii) Calculate the variance of scores awarded by lecturer Y   (7 marks)

iii) What is the range of marks awarded by lecturer Y   (3 marks)

iv) Calculate the inclusive range of marks awarded by lecturer X   (3 marks)

[Total 25 Marks]

5. **Table 2** below shows the marks of learners taught in English and also through code switching

Table 2 marks obtained from English and also from Code Switching

PUPIL	MEDIUM OF INSTRUCTION	
	ENGLISH	CODE SWITCHING
A	69	72
B	58	65
C	70	80
D	32	56
E	40	40
F	57	70
G —	65	70
H	30	54
I	70	75
J	62	70

Carry out a t-test at 5% significance level to test the hypothesis that there is no significant difference in performance between pupils taught in English and those taught through code switching and comment.

(25 marks)

[Total 25 Marks]

6. **Table 3** below shows marks obtained in two tests

Table 3 showing marks from two tests

Pupil	A	B	C	D	E	F	G	H	I	J
Test (i)	25	38	35	30	20	30	40	25	35	25
Test(ii)	30	46	50	48	26	36	40	31	40	32

Calculate Spearman's rank order correlation coefficient and comment on it.   **(25 marks)**

[Total 25 Marks]

T Test

TABLE II   Critical Values of t: Student t-test

	Level of significance for a directional (one-tailed) test					
	.10	.05	.025	.01	.005	.0005
	Level of significance for a non-directional (two-tailed) test					
df	.20	.10	.05	.02	.01	.001
1	3.078	6.314	12.706	31.821	63.657	636.619
2	1.886	2.920	4.303	6.965	9.925	31.598
3	1.638	2.353	3.182	4.541	5.841	12.941
4	1.533	2.132	2.776	3.747	4.604	8.610
5	1.476	2.015	2.571	3.365	4.032	6.859
6	1.440	1.943	2.447	3.143	3.707	5.959
7	1.415	1.895	2.365	2.998	3.499	5.405
8	1.397	1.860	2.306	2.896	3.355	5.041
9	1.383	1.833	2.262	2.821	3.250	4.781
10	1.372	1.812	2.228	2.764	3.169	4.587
11	1.363	1.796	2.201	2.718	3.106	4.437
12	1.356	1.782	2.179	2.681	3.055	4.318
13	1.350	1.771	2.160	2.650	3.012	4.221
14	1.345	1.761	2.145	2.624	2.977	4.140
15	1.341	1.753	2.131	2.602	2.947	4.073
16	1.337	1.746	2.120	2.583	2.921	4.015
17	1.333	1.740	2.110	2.567	2.898	3.965
18	1.330	1.734	2.101	2.552	2.878	3.922
19	1.328	1.729	2.093	2.539	2.861	3.883
20	1.325	1.725	2.086	2.528	2.845	3.850
21	1.323	1.721	2.080	2.518	2.831	3.819
22	1.321	1.717	2.074	2.508	2.819	3.792
23	1.319	1.714	2.069	2.500	2.807	3.767
24	1.318	1.711	2.064	2.492	2.797	3.745
25	1.316	1.708	2.060	2.485	2.787	3.725
26	1.315	1.706	2.056	2.479	2.779	3.707
27	1.314	1.703	2.052	2.473	2.771	3.690
28	1.313	1.701	2.048	2.467	2.763	3.674
29	1.311	1.699	2.045	2.462	2.756	3.659
30	1.310	1.697	2.042	2.457	2.750	3.646
40	1.303	1.684	2.021	2.423	2.704	3.551
60	1.296	1.671	2.000	2.390	2.660	3.460
120	1.289	1.658	1.980	2.358	2.617	3.373
∞	1.282	1.645	1.960	2.326	2.576	3.291

Find the row corresponding to the indicated degrees of freedom, find the column corresponding to the chosen level of significance, taking into account the type of H_1 (directional or non-directional). The critical value t_{cm} is at the intersection of that row and that column. If $t_{ocr} \geq t_{cm}$ then H_o is rejected.

STATISTICAL FORMULAE

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

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

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: $\qquad rho = 1 - \frac{6\sum d^2}{n(n^2-1)}$

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

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

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

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

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

ANALYSIS OF VARIANCE (ANOVA) FORMULAE

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

2. $SST = SS(\text{Treatment}) = SS(BtwnGrps) = \sum \dfrac{T_i^2}{n_i} - \dfrac{(\sum x)^2}{n} = \dfrac{T_1^2}{n_1} + \dfrac{T_2^2}{n_2} + \cdots + \dfrac{T_p^2}{n_p} - \dfrac{(\sum x)^2}{n}$

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

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

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

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

6. $F_{calc} = \dfrac{MST}{MSE}$

ONE-WAY ANOVA TABLE

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

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, …, p)

n_i = number of observations in group i(i = 1, 2, 3, …, p)