

UNIVERSITY OF SWAZILAND

FACULTY OF EDUCATION



DEPARTMENT OF EDUCATIONAL FOUNDATIONS AND MANAGEMENT

FOR

FACULTY EDUCATION AND THE INSTITUTE OF DISTANCE EDUCATION

FULL TIME AND PART TIME PROGRAMMES

SUPPLEMENTARY EXAMINATION PAPER – JULY 2016

BACHELOR OF EDUCATION 111 (B.Ed.) Full-Time

BACHELOR OF EDUCATION 111 (B.Ed.) Part-Time

POSTGRADUATE CERTIFICATE IN EDUCATION (PGCE) Full and Part-Time

COURSE CODE : EDF 322 / EFM 515

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. Citing any five examples, examine the importance of a research proposal in educational research. **Total: 25 marks.**

2. Giving five examples of your choice, discuss the rationale for sampling in educational research. **Total: 25 marks.**

3. Selecting any five advantages and five disadvantages of your choice, discuss the usefulness of a questionnaire as a data collection instrument in educational research. **Total: 25 marks.**

SECTION B

4. The **Table 1** below shows marks scored by 10 pupils in Science and Mathematics end of year examinations.

Table. 1

Pupil	A	B	C	D	E	F	G	H	I	J
Science mark	74	82	70	91	54	69	84	81	75	67
Mathematics Mark	70	64	68	92	53	69	82	82	72	70

Using the data in **Table 1** above

- (a). Calculate the mean of science marks. **(3 marks)**

- (b). Find inclusive range of Mathematics marks. **(3 marks)**

- (c). Compute the Variance of Science marks. **(10 marks)**

- (d). Deduce the Standard Deviation from the Variance you have calculated above. **(5 marks)**

- (e). State **two** advantages and **two** disadvantages of the mean. **(4 marks)**

(Total 25 marks)

5. An Education Officer suspected that the attitudes of teachers towards work in school were dependent upon the geographical location of the school in which they taught. A survey was conducted and views of teachers teaching in rural areas, semi urban and urban areas were summarised as shown in **Table 2** below.

Table 2

	GEOGRAPHICAL	LOCATIONS OF	SCHOOLS
Attitudes towards work	Rural areas	Semi Urban	Urban areas
Favourable	118	60	70
Unfavourable	46	44	62

Using data in **Table 2** above:

Conduct a chi-square test at 5% significance level to determine if there is an association between teachers' attitudes towards work and the geographical location of their schools by

- (a) Stating the null and alternative hypothesis. **(2 marks)**
- (b) Introducing the row and column totals. **(2 marks)**
- (c). Calculating the degrees of freedom and hence write down the rejection criterion. **(2 marks)**
- (d) Calculating the expected frequencies. **(8 marks)**
- (e). Computing the test statistic. **(8 marks)**
- (f). Making a statistical decision and clearly stating your conclusion. **(3 marks)**

[Total 25 marks]

6. **Table 3** below shows the marks scored by pupils in Language and Literature Mid-Year Examinations.

Table 3

PUPIL	A	B	C	D	E	F	G	H	I	J
Literature	80	60	72	47	62	75	64	58	72	70
Language	78	61	70	52	60	75	65	60	70	70

Using data in **Table 3** above:

- (a). Calculate the mean of Literature marks. **(3 marks)**
- (b). State the mode of Language marks. **(2 marks)**
- (c). Find the median of Language marks. **(3 marks)**
- (d). Compute the standard deviation of Literature marks. **(10 marks)**
- (e). State two advantages of mode. **(2 marks)**
- (f). Given that the mean and the standard deviation of the Language marks are 66.1 and 7.94 respectively, determine the subject in which student D did better. **(5 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:

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

Pearson's 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:

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

T-score:

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

Student t-test:

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

T Test

TABLE II Critical Values of *t*: Student *t*-test

df	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					
	.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_{crit} is at the intersection of that row and that column. If $t_{obs} \geq t_{crit}$ then H_0 is rejected.

TABLE IV Critical Values of Chi Square

df	Level of significance for a non-directional test					
	.20	.10	.05	.02	.01	.001
1	1.64	2.71	3.84	5.41	6.64	10.83
2	3.22	4.60	5.99	7.82	9.21	13.82
3	4.64	6.25	7.82	9.84	11.34	16.27
4	5.99	7.78	9.49	11.67	13.28	18.46
5	7.29	9.24	11.07	13.39	15.09	20.52
6	8.56	10.64	12.59	15.03	16.81	22.46
7	9.80	12.02	14.07	16.62	18.48	24.32
8	11.03	13.36	15.51	18.17	20.09	26.12
9	12.24	14.68	16.92	19.68	21.67	27.88
10	13.44	15.99	18.31	21.16	23.21	29.59
11	14.63	17.28	19.68	22.62	24.72	31.26
12	15.81	18.55	21.03	24.05	26.22	32.91
13	16.98	19.81	22.36	25.47	27.69	34.53
14	18.15	21.06	23.68	26.87	29.14	36.12
15	19.31	22.31	25.00	28.26	30.58	37.70
16	20.46	23.54	26.30	29.63	32.00	39.29
17	21.62	24.77	27.59	31.00	33.41	40.75
18	22.76	25.99	28.87	32.35	34.80	42.31
19	23.90	27.20	30.14	33.69	36.19	43.82
20	25.04	28.41	31.41	35.02	37.57	45.32
21	26.17	29.62	32.67	36.34	38.93	46.80
22	27.30	30.81	33.92	37.66	40.29	48.27
23	28.43	32.01	35.17	38.97	41.64	49.73
24	29.55	33.20	36.42	40.27	42.98	51.18
25	30.68	34.38	37.65	41.57	44.31	52.62
26	31.80	35.56	38.88	42.86	45.64	54.05
27	32.91	36.74	40.11	44.14	46.96	55.48
28	34.03	37.92	41.34	45.42	48.28	56.89
29	35.14	39.09	42.69	46.69	49.59	58.30
30	36.25	40.26	43.77	47.96	50.89	59.70
32	38.47	42.59	46.19	50.49	53.49	62.49
34	40.68	44.90	48.60	53.00	56.06	65.25
36	42.88	47.21	51.00	55.49	58.62	67.99
38	45.08	49.51	53.38	57.97	61.16	70.70
40	47.27	51.81	55.76	60.44	63.69	73.40
44	51.64	56.37	60.48	65.34	68.71	78.75
48	55.99	60.91	65.17	70.20	73.68	84.04
52	60.33	65.42	69.83	75.02	78.62	89.27
56	64.66	69.92	74.47	79.82	83.51	94.46
60	68.97	74.40	79.08	84.58	88.38	99.61

Find the row corresponding to the indicated degrees of freedom, find the column corresponding to the chosen level of significance, the critical value of χ^2_{crit} is at the intersection of that row and that column. If $\chi^2_{obs} \geq \chi^2_{crit}$ then H_0 is rejected.