UNIVERSITY OF ESWATINI

FACULTY OF EDUCATION

DEPARTMENT OF EDUCATIONAL FOUNDATIONS AND MANAGEMENT

FOR

INSTITUTE OF POST GRADUATE STUDIES

MASTER OF EDUCATION (M. Ed)

FINAL EXAMINATION PAPER – NOVEMBER 2019

COURSE CODE:	EFM 601
COURSE TITLE:	QUANTITATIVE METHODS OF RESEARCH
TIME ALLOWED:	THREE (3) HOURS
INSTRUCTIONS:	1. THIS PAPER IS OF TWO SECTIONS (**A** AND **B**). 2. ANSWER QUESTION **ONE** AND ANY OTHER **ONE** FROM SECTION **A** 3. ANSWER ANY **TWO** QUESTIONS FROM SECTION **B** 4. MAKE USE OF THE ATTACHED STATISTICAL FORMULAS AND TABLES WHERE NECESSARY
TOTAL MARKS:	100

THIS PAPER IS NOT TO BE OPENED UNTIL YOU ARE PERMITTED TO DO SO.

Question 1

1. A research problem titled "Science teacher career satisfaction and school organisational climate as predictors of job performance in rural learning ecologies" was approved as your M.Ed research proposal topic by the research committee of Faculty of Education. Use the above information to answer the following questions:

a. Identify the independent and dependent variables in the research problem. **(3marks)**
b. State two objectives of the study **(4marks)**
c. Formulate two Null hypotheses for the study **(4marks)**
d. Briefly state the delimitation of the research problem **(4marks)**
e. Identify the areas in which literature should be reviewed **(4marks)**
f. What type of research paradigm appropriate for the study? **(1mark)**
g. What type of data suitable for this study? **(1mark)**
h. Mention the appropriate research instrument for data collection **(1mark)**
i. Identify any two methods that you can use to validate the research instrument mentioned in question **h** **(2marks)**
j. Identify any two methods you can use to estimate the reliability of the research instrument stated in question **h** **(2marks)**
k. State the type of statistical tool suitable to measure how the independent variables will significantly predict the dependent variable. **(2marks)**
l. What type of statistical software package appropriate for analysing the data to be collected? **(2marks)**

Total = 30marks

Question 2

2a. State any five ethical consideration when conducting educational research **(5marks)**

b. The first column of table 1 contains five types of test statistics. Copy and complete the table by providing the appropriate measurement level and use of each test statistics in the second and third columns respectively.

Table 1: Test statistics, measurement level and use

Test statistics	**Measurement Level**	**Use**
Linear regression	1mk	2mks
t-test	1mk	2mks
Chi-square	1mk	2mks
Pearson Product Moment Correlation (PPMC)	1mk	2mks
Analysis of Variance (ANOVA)	1mk	2mks

(15marks)

Total = 20marks

Question 3

3. Explain the following terms used in quantitative methods of research. Give example where necessary:

i. Level of significance **(4marks)**
ii. Non-directional test **(4marks)**
iii. Hypothesis **(4marks)**
iv. Sample size **(4marks)**
v. Experimental research **(4marks)** **Total = 20marks**

SECTION B

Question 4

Table 2 shows the distribution of scores of 46 undergraduates in Educational Research test.

Table 2: Distribution of undergraduates' scores

Scores	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49
Frequency	2	8	6	12	7	6	3	2

Use the data in Table 2 to:

a. Construct a frequency distribution table to show the following features: Midpoint(X), Cumulative frequency(Cf), $\sum fx$, $\sum(X-\overline{X})^2$, and $\sum f(X-\overline{X})^2$ **(17marks)**
b. Find the mean value of the distribution. **(3marks)**
c. Calculate the standard deviation of the scores obtained by Undergraduates. **(5marks)**

Total = 25 Marks

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STATISTICAL FORMULAE

Variance $(S^2) = \frac{\sum f(X-\overline{X})^2}{\sum f}$

Variance $(S^2) = \frac{\sum(X-\overline{X})^2}{N-1}$

Standard deviation (SD) = $\sqrt{\frac{\sum f(X-\overline{X})^2}{\sum f}}$

SD = $\sqrt{\frac{\sum(X-\overline{X})^2}{N-1}}$

Z-score = $\frac{(X-\overline{X})}{SD}$

The Independent-measures (t-test) =

$\frac{\bar{X}_1-\bar{X}_2}{\sqrt{\frac{S^2}{n_1}+\frac{S^2}{n_2}}}$ OR $\frac{M_1-M_2}{\sqrt{\frac{S^2}{n_1}+\frac{S^2}{n_2}}}$

$$PPMC(r_{xy}) = \frac{N\sum XY - \sum X\sum Y}{\sqrt{\{N\sum X^2-(\sum X)^2\}\{N\sum Y^2-(\sum Y)^2\}}}$$

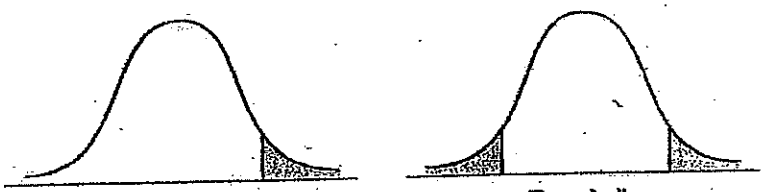
Spearman's Rank $(r_s) = 1 - \frac{6\sum D^2}{N(N^2-1)}$

$$Chi-square(\mathcal{X}^2) = \sum\frac{(f_o-f_e)^2}{f_e}$$

$$f_e = \frac{f_r \times f_c}{N}$$

TABLE B.2 THE t DISTRIBUTION

Table entries are values of t corresponding to proportions in one tail or in two tails combined.

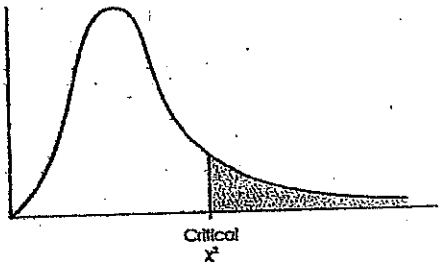


	Proportion in One Tail					
	0.25	0.10	0.05	0.025	0.01	0.005
	Proportion in Two Tails Combined					
df	0.50	0.20	0.10	0.05	0.02	0.01
1	1.000	3.078	6.314	12.706	31.821	63.657
2	0.816	1.886	2.920	4.303	6.965	9.925
3	0.765	1.638	2.353	3.182	4.541	5.841
4	0.741	1.533	2.132	2.776	3.747	4.604
5	0.727	1.476	2.015	2.571	3.365	4.032
6	0.718	1.440	1.943	2.447	3.143	3.707
7	0.711	1.415	1.895	2.365	2.998	3.499
8	0.706	1.397	1.860	2.306	2.896	3.355
9	0.703	1.383	1.833	2.262	2.821	3.250
10	0.700	1.372	1.812	2.228	2.764	3.169
11	0.697	1.363	1.796	2.201	2.718	3.106
12	0.695	1.356	1.782	2.179	2.681	3.055
13	0.694	1.350	1.771	2.160	2.650	3.012
14	0.692	1.345	1.761	2.145	2.624	2.977
15	0.691	1.341	1.753	2.131	2.602	2.947
16	0.690	1.337	1.746	2.120	2.583	2.921
17	0.689	1.333	1.740	2.110	2.567	2.898
18	0.688	1.330	1.734	2.101	2.552	2.878
19	0.688	1.328	1.729	2.093	2.539	2.861
20	0.687	1.325	1.725	2.086	2.528	2.845
21	0.686	1.323	1.721	2.080	2.518	2.831
22	0.686	1.321	1.717	2.074	2.508	2.819
23	0.685	1.319	1.714	2.069	2.500	2.807
24	0.685	1.318	1.711	2.064	2.492	2.797
25	0.684	1.316	1.708	2.060	2.485	2.787
26	0.684	1.315	1.706	2.056	2.479	2.779
27	0.684	1.314	1.703	2.052	2.473	2.771
28	0.683	1.313	1.701	2.048	2.467	2.763
29	0.683	1.311	1.699	2.045	2.462	2.756
30	0.683	1.310	1.697	2.042	2.457	2.750
40	0.681	1.303	1.684	2.021	2.423	2.704
60	0.679	1.296	1.671	2.000	2.390	2.660
120	0.677	1.289	1.658	1.980	2.358	2.617
∞	0.674	1.282	1.645	1.960	2.326	2.576

Table III of R. A. Fisher and F. Yates, *Statistical Tables for Biological, Agricultural and Medical Research*, 6th ed. London: Longman Group Ltd., 1974 (previously published by Oliver and Boyd Ltd., Edinburgh). Adapted and reprinted with permission of the Addison Wesley Longman Publishing Co.

TABLE B.8 THE CHI-SQUARE DISTRIBUTION*

*The table entries are critical values of χ^2.



	Proportion in Critical Region				
df	0.10	0.05	0.025	0.01	0.005
1	2.71	3.84	5.02	6.63	7.88
2	4.61	5.99	7.38	9.21	10.60
3	6.25	7.81	9.35	11.34	12.84
4	7.78	9.49	11.14	13.28	14.86
5	9.24	11.07	12.83	15.09	16.75
6	10.64	12.59	14.45	16.81	18.55
7	12.02	14.07	16.01	18.48	20.28
8	13.36	15.51	17.53	20.09	21.96
9	14.68	16.92	19.02	21.67	23.59
10	15.99	18.31	20.48	23.21	25.19
11	17.28	19.68	21.92	24.72	26.76
12	18.55	21.03	23.34	26.22	28.30
13	19.81	22.36	24.74	27.69	29.82
14	21.06	23.68	26.12	29.14	31.32
15	22.31	25.00	27.49	30.58	32.80
16	23.54	26.30	28.85	32.00	34.27
17	24.77	27.59	30.19	33.41	35.72
18	25.99	28.87	31.53	34.81	37.16
19	27.20	30.14	32.85	36.19	38.58
20	28.41	31.41	34.17	37.57	40.00
21	29.62	32.67	35.48	38.93	41.40
22	30.81	33.92	36.78	40.29	42.80
23	32.01	35.17	38.08	41.64	44.18
24	33.20	36.42	39.36	42.98	45.56
25	34.38	37.65	40.65	44.31	46.93
26	35.56	38.89	41.92	45.64	48.29
27	36.74	40.11	43.19	46.96	49.64
28	37.92	41.34	44.46	48.28	50.99
29	39.09	42.56	45.72	49.59	52.34
30	40.26	43.77	46.98	50.89	53.67
40	51.81	55.76	59.34	63.69	66.77
50	63.17	67.50	71.42	76.15	79.49
60	74.40	79.08	83.30	88.38	91.95
70	85.53	90.53	95.02	100.42	104.22
80	96.58	101.88	106.63	112.33	116.32
90	107.56	113.14	118.14	124.12	128.30
100	118.50	124.34	129.56	135.81	140.17

Table 8 of E. Pearson and H. Hartley, *Biometrika Tables for Statisticians*, 3d ed. New York: Cambridge University Press, 1966. Adapted and reprinted with permission of the Biometrika trustees.