

BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF AGRICULTURE AND ENVIRONMENTAL SCIENCE

MFS 502

**Department of Agricultural Economics, Education and Extension
MSc in Food Security and Sustainable Agriculture Part I Examination
APPLIED STATISTICS**

3 HOURS (100 Marks)

NOV 2023

INSTRUCTIONS TO CANDIDATE

Answer question **ONE** from **SECTION A (Compulsory)** and any **TWO** questions from **SECTION B**

SECTION A (COMPULSORY)

1. Given below is a data set showing Food grain production

Production	Area	Fertiliser	Irrigation area
68.64	51.61	3.47	31.4
71.36	52.82	2.81	33.06
72.99	50.65	3.37	32.11
47.97	44.04	2.44	26.96
71.84	50.68	2.83	30.67
63.37	49.06	2.98	26.77
77.5	53.03	4.62	32.87
75.88	51.56	4.84	33
76.41	52.53	5.38	34.44
56.51	42.47	4.79	28.07
73.74	46.61	5.05	29.86

49.23	39.28	4.71	23.64
64.15	46.56	5.86	27.87
68.88	46.29	6.9	29.49
72.7	43.58	6.68	26.95
72.11	42.18	6.73	23.78
75.17	41.38	7.41	23.44
73.3	44.76	7.7	23.43
79.17	47.76	8	24.65
74.96	46.33	8.31	23.28
82.65	47.66	8.39	26.03
83.58	47.49	7.99	26.65
82.57	49.01	7.81	28.41
(a) 90.81	48.01	8.75	28.49
(b)			
68.04	40.73	7.56	28.73
76.42	42.79	7.91	29.12

(a) Analyse your data using SPSS

- i. Enter your data in SPSS and save it [5 marks]
- ii. Fit linear regression model [10 marks]
- iii. Test the presence of multicollinearity using V.I.F and explain
the results [5 marks]
- iv. Advise the farmer [10 marks]
- v. Interpret the value of R^2 [4 marks]

(b) The results below show the maize output in tonnes of a commercial farmer in Bindura District:

82, 93, 91, 69, 96, 61, 88, 58, 59, 100, 93, 71, 55, 78 and 98

Using Excel, Calculate the following:

- | | | |
|-------|--------------------|-----------|
| i. | Mean | [2 marks] |
| ii. | Standard Error | [2 marks] |
| iii. | Median | [2 marks] |
| iv. | Mode | [2 marks] |
| v. | Standard Deviation | [2 marks] |
| vi. | Kurtosis | [2 marks] |
| vii. | Skewness | [2 marks] |
| viii. | Range | [2 marks] |

SECTION B

2. The results below show the output of a research project from a final year student, can you interpret the results for the final year student.

Dependent Variable: RES1
Method: Least Squares
Sample (adjusted): 1965-1998
Included Observations: 34 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.590462	1.963603	2.847043	0.0085
X	-0.066605	0.023469	-2.838058	0.0087
RES1(-1)	0.814971	0.216231	3.768978	0.0009
RES1(-2)	-0.268651	0.273887	-0.980802	0.3357
RES1(-3)	-0.106017	0.272780	-0.388652	0.7007
RES1(-4)	0.305630	0.273258	1.118467	0.2736
RES1(-5)	-0.064375	0.280577	-0.229438	0.8203
RES1(-6)	0.216156	0.222160	0.972976	0.3395

$R^2 = 0.8920$ Durbin-Watson d stat 1.7589
 $\bar{R}^2 = 0.8629$

- [25 marks]
3. Discuss four methods of handling missing data in a research study. [25 marks]
4. Compare and contrast the probit and logit specifications for binary choice variables. [25 marks]

END OF PAPER