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SCHOOL OF INNOVATION AND INFORMATICS**

**SCS 324 STATISTICAL ANALYSIS WITH SPSS**

**INSTRUCTIONS**

**Attempt Question ONE and ANY other THREE from Section B**

**QUESTION #1[30 MARKS]**

- a) Explain the following types of statistical analysis using an example [4 Marks]
- b) Explain three measures of central tendency [6 Marks]
- c) Briefly state the implication of the following correlation coefficients [5 Marks]

Value of the Correlation Coefficient	Strength of Correlation
1	Perfect
0.7 - 0.9	Strong
0.4 - 0.6	Moderate
0.1 - 0.3	Weak
0	Zero

- d) State and explain using an example three categories of descriptive statistics that you would use to analyze your data [6 Marks]
- e) Differentiate between Independent and Dependent variables [4 Marks]
- f) Cross tabulation is a way of examining the relationship between two variables. State the procedure likely to be followed when you want to carry out cross tabulation with SPSS [5 Marks]

**QUESTION #2 [20 MARKS]**

Assume you want to run a regression of *current salary on beginning salary, education level and previous experience (in weeks)* for the datasheet shown below

Current salary= function (*beginning salary, education level and previous experience (in weeks)*)  
Or

$$\text{Current salary} = \beta_1 + \beta_2 * \text{beginning salary} + \beta_3 * \text{previous experience} + \beta_4 * \text{education level}$$

Gender	Education Level	Current Salary	Begin Salary	Prev Experience(in Weeks)
male	College	57000.00	27000.00	144.00
male	College	40200.00	18750.00	36.00
female	Secondary	21450.00	12000.00	381.00
female	Primary	21900.00	13200.00	190.00
male	College	45000.00	21000.00	138.00
male	College	32100.00	13500.00	67.00
male	College	36000.00	18750.00	114.00

The output of regression analysis is as follows

**coefficients<sup>a</sup>**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	<b>-5706.559</b>	6153.138		-.927	.422
Level of education	<b>3244.410</b>	1952.633	.201	1.662	.195
Beginning Salary	<b>1.960</b>	.258	.823	7.601	.005
Previous Experience in Weeks	<b>-7.731</b>	11.943	-.069	-.647	.564

a. Dependent Variable: Current Salary

- Write the regression equation line for this model [8 Marks]
- Rank the independent variables (**level of education, beginning salary, previous experience**) in terms of the variable that best predicts **current salary** [6 Marks]
- Which of the independent variables are significantly related to **current salary** [6 Marks]

**QUESTION #3 [20 MARKS]**

- Briefly explain the relevance of the Chi-Square Tests [4 Marks]

Chi-Square table is used to determine if there is a statistically significant relationship between two dichotomous or nominal variables. It tells you whether the relationship is statistically

significant but does not indicate the strength of the relationship. The strength of the relationship is determined by correlation coefficient.

- b) You have been asked to examine the relationship between the Gender of the student and the number of other colleges the student has visited before settling at JOOUST. The Data is as below:

ID	Gender	Colleges visited before
	1=Female, 2=Male	
11111	1	3
11112	2	4
11113	2	7
11114	1	5
11115	1	2
11116	2	1
11117	2	6
11118	1	4
11119	1	2

Explain the steps you are likely to follow in order to calculate correlation coefficient in SPSS. [8 Marks]

- c) Distinguish between the implications skewedness and kurtosis. Use diagrams to illustrate their various types [8 Marks]

#### **QUESTION #4 [20 MARKS]**

A researcher is interested in determining the impact of the availability of Teachers (x1) and Books(x2) on student performance in Kenya Certificate of Secondary Education (KCSE)(y) To answer this question, he collects the data from a one stream school as shown in the table below.

School	Number of teachers ( $x_1$ )	Student: book ratio ( $x_2$ )	KCSE Results (y)
A	7	3	6.312
B	8	2	7.478
C	5	3	5.133
D	10	1	8.273
E	9	2	7.514
F	9	1	7.427
G	8	2	7.640
H	11	1	8.1467
I	7	2	6.209
J	4	4	4.813
K	8	2	6.932

(a) State the null hypothesis for this study [2 Marks]

(b) Using SPSS explain how you will be able to compute the mean and standard deviation of Number of teachers (x), Student: book ratio and KCSE Results(y) [5 Marks]

(c) Explain how you will use SPSS to compute Pearson's correlation coefficient r for

1. Enrolment and KCSE\_Results. [4 Marks]

2. Enrolment and KCSE\_Results [4 Marks]

(d) Explain how you will use SPSS to compute a linear regression analysis and produce the linear regression equation of  $x_1$   $x_2$  (independent variables) and y (dependent variable) in the form:

$$y = a + bx_1 + cx_2$$

[5 Marks]

### **QUESTION #5 [20 MARKS]**

Consider sample questionnaire shown below

1. Name of the University (Institution).....

2. Gender:  Male  Female

3. How many years have you been using computers?

Less than 1 year

1-2 years

- 2-4 years
- 4-6 years
- More than 6 years

4. Did you receive any training in information and communication technology (ICT) over the past 3 years?

- Yes  No

5. What are your main reasons for attending computer training?

- Financial
- Prestige
- Career enhancement
- Personal growth
- Training is required
- Others (please specify .....

a) Explain how you are going to perform coding of the various variables for the Questionnaire [8 Marks]

b) State 4 examples of Bivariate analysis [4 Marks]

c) The following is an annotated output of correlation statistics generated from the hsb2.sav data file. Using the data file, generate the correlation coefficients and confirm the outputs.

For each of the bivariate correlation coefficients discuss the following:

- i. Strength of the correlation [4 Marks]
- ii. Direction of the correlation [4 Marks]

**Correlations**

		reading score	writing score	math score	science score	female
reading score	Pearson Correlation <sup>a</sup>	1	.597**	.662**	.630**	-.053
	Sig. (2-tailed) <sup>b</sup>	.	.000	.000	.000	.455
	N <sup>c</sup>	200	200	200	200	200
writing score	Pearson Correlation	.597**	1	.617**	.570**	.256**
	Sig. (2-tailed)	.000	.	.000	.000	.000
	N	200	200	200	200	200
math score	Pearson Correlation	.662**	.617**	1	.631**	-.029
	Sig. (2-tailed)	.000	.000	.	.000	.680
	N	200	200	200	200	200
science score	Pearson Correlation	.630**	.570**	.631**	1	-.128
	Sig. (2-tailed)	.000	.000	.000	.	.071
	N	200	200	200	200	200
female	Pearson Correlation	-.053	.256**	-.029	-.128	1
	Sig. (2-tailed)	.455	.000	.680	.071	.
	N	200	200	200	200	200

\*\* . Correlation is significant at the 0.01 level (2-tailed).