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DEPARTMENT OF TRANSPORT MANAGEMENT
HARMATTAN SEMESTER EXAMINATIONS 2018/2019 SESSION

COURSE CODE: TLM 407
COURSE TITLE: QUANTITATIVE TECHNIQUES IN TRANSPORT
INSTRUCTION: ANSWER ANY THREE QUESTIONS
TIME ALLOWED: TWO HOURS

1. Table 1 below shows the number of vehicles with current licences and the total casualties in road accidents for the years 2009 – 2018 in a country.

(a) Develop the estimating equation to predict casualties(y) from number of vehicles licensed (x)
(b) Predict casualties when the number of vehicles = 22; 27 and 34 millions
(c) Discuss any three of the assumptions to be considered in carrying out a regression analysis

Table 1: Number of vehicles and casualties in road accidents

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Vehicles (millions)	16	17	19	20	23	26	28	30	31	32
Casualties (thousands)	150	125	130	136	139	145	150	152	154	155

2. Table 2 is a contingency table of marital status of commuters in Lagos state and their view on the convenience of BRT service.

Table 2:

		Convenience of BRT Service	
		Convenient	**Not convenient**
Marital status	**Single**	70	30
	Married	40	60

(a) Use the Chi-square analysis to examine the hypothesis that marital status of commuters determines their view on convenience of BRT service (Critical χ value at 5% level and one degree of freedom = **3.841**)
(b) Briefly describe the four scales of data measurement
(c) What is the difference between descriptive and inferential statistics.

Table 3: Analysis of Variance of Multiple Regression Model

Model source	Sum of squares	Degrees of freedom	Mean square	F-ratio
Regression	130.799	5	?	?
Residual	407.203	90	?	
Total	538.000	95		

$R = 0.493$

3. (a) Use the multiple regression analysis result in Table 3 to answer the following:
(i) Compute the mean squares and the F-ratio
(ii) Find the coefficient of determination
(b) What is sampling distribution of means
(c) What is confidence interval in statistical hypothesis testing

4. Ten countries were randomly selected and ranked according to their performance on rail connectivity and per capital income as shown in Table 4.

Table 4:

Country Id.	1	2	3	4	5	6	7	8	9	10
Rank of rail connectivity (Beta index)	8	3	9	2	7	10	4	6	1	5
Rank of per capital income ($'000)	9	5	10	1	8	7	3	4	2	6

(a) Using the Spearman's rank correlation coefficient, determine the nature of the relationship between rail connectivity and per capital income.
(b) Does correlation imply causality? Discuss.
(c) What is the difference between correlation and regression analysis?

5. The manager of a bus transit company is interested in finding the effect of bonuses paid to the drivers on their trip frequency. He collected data on ten randomly selected drivers of the company as shown in table 5

Table 5:

Driver Id.	1	2	3	4	5	6	7	8	9	10
No. of trips per month	310	280	410	330	290	260	313	320	280	315
Monthly bonus (in N'000)	33	30	39	35	30	29	32	34	30	30

(a) Calculate the Product Moment Correlation Coefficient for the bivariate distribution in Table 5
(b) Using the result in (a) above, test the hypothesis that there is no correlation between number of trips and the monthly bonus of the drivers at 0.05 significance level (critical value from Student's t-table at 5% level and 8 degrees od freedom = 2.306
(c) What is statistical sampling ?