

Part C: Essay Questions 2016

Marks allocation : 30 marks

1. A multiple regression analysis is used to study the Sri Lankan tourist behaviour. For this, a sample of 1000 respondents is considered. The objective of this study is to predict the number of miles travelled on vacation by using family size, family income and age. The description of variables is given in Table 01. Answer the following questions, in each case justifying your answer by appropriate analyses.

Table 01: List of variables

Variable	Definition
Y	number of miles travelled on vacation
X1	family size
X2	family income
X3	Age

Using the computer software, they generated the following incomplete Minitab output for the best-fitting multiple regression.

Table 02: Coefficients Table

Predictor	Coefficient	Standard Deviation	P
Constant	26.40	6.700	0.000
X1	-0.250	4.800	0.000
X2	5.02	4.690	0.123
X3	-0.269	0.587	0.000

Table 03: Analysis of Variance Table

Source	df	SS	MS	F
Regression		8925698		
Residual		132589		
Total				

- What are the qualitative independent and quantitative independent variables in the model? (3 Marks)
- Write the Fitted model. (3 Marks)
- What are the model assumptions? (3 Marks)
- Complete the 'ANOVA' table (Table 03) (4 Marks)



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(In part e. and f. below: specify the null and alternative hypothesis and make your conclusions at 5% level of significance)

- e) Conduct the F-test for the overall fit of the regression. **(3 Marks)**
- f) Write the hypotheses tested and the decisions taken using the p-values given in the Table 02. **(4 Marks)**
- g) What is the Proportion of variation in data explained by the regression? **(2 Marks)**
(Total - 22 Marks)
2. Consider a computer system with Poisson job-arrival stream at an average of 2 per minute. Determine the probability that in any one-minute interval there will be;
- a) 0 jobs **(2 Marks)**
- b) exactly 2 jobs **(3 Marks)**
- c) What are the maximum jobs that should arrive one minute with 90 % certainty?
(3 Marks)
(Total - 08 Marks)

