

K.J. SOMAIYA INSTITUTE OF MANAGEMENT STUDIES AND RESEARCH

MIM 2017-20 BATCH IV SEM

QUANTITATIVE TECHNIQUES IN IT

Date : 08/04/2019

Total marks- 50

Duration : 3 hrs

Part A: Answer any 4 questions. All questions carry equal marks (5 marks each)

- 1) Explain Conjoint analysis. What is the practical application of this technique in business?
- 2) What are the application areas for Cluster analysis in marketing?
- 3) What is the difference between multivariate tests of dependence and tests of interdependence? Explain with examples
- 4) When do we use Factor analysis? Describe a business situation where Factor analysis is appropriate.
- 5) How do we decide if a multiple regression model is good? Explain

Part B: Answer any 3 questions. All questions carry equal marks (10 marks each)

- 6) A market researcher wants to understand the characteristics of people that determine which one of two brands of wine (brand A or B) they prefer. He has data on 30 people, with age, gender and income as the three independent variables. The coding is as under:

Brand :A=0,B=1

Age: in years

Gender: Female=0, Male=1

Income: Rs thousands

A partial output of Logistic regression on the data is reproduced below:

	B	S.E.	df	Sig
AGE	0.443	0.288	1	0.125
GENDER	8.783	4.785	1	0.066
INCOME	0.398	2.564	1	0.109
CONSTANT	-24.706	12.916	1	0.056

- i) Based on the output, which brand would older males with high level of income prefer?
 - ii) What is the probability that a female aged 18 , having an income of Rs 20,000/ would prefer Brand A?
- 7) A retail outlet wants to know the behavior of its consumers in terms of their preference of national brands and foreign brands. On the basis of the persons annual income and household size, they want to predict whether the customer will prefer a national brand or a foreign brand. A discriminant analysis was carried out. Given below is a partial output: (Codes used- 1-national brand; 2 –foreign brand)

Variable	Raw coefficients	Standardized coefficients
Income	-0.33	-0.72
Household size	0.31	0.49

Wilks Lambda: 0.473 p< 0.0017

Classification Matrix:

	G1 (predicted)	G2 (predicted)
G1 (observed)	9	1
G2 (observed)	2	8

Means of canonical variables

G1	-1.00
G2	1.00

- i) What percentage of the data is the model able to classify correctly?
- ii) Which variable is better in discriminating between the two groups/
- iii) Is the model significant?
- iv) What is the discriminant function?
- v) A new customer has an income of 15 and household size of 5. Which brand will he prefer?

- 8) The Indian biscuit industry has a turnover of around ₹3000 crores. India is the second largest manufacturer of biscuits after US. One of the company MRP Biscuits Co. was over the last three years facing a decline in sales which has been the main concern for the top management. The company hired research agency to identify various factors that influence the preference for biscuits. A sample of 40 individuals was chosen randomly from tier II city. The data was collected on variables like preservation, quality, taste, nutrition value and preference on a 7 point scale with a higher number indicating a more positive rating. SPSS output is presented below on the data.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.928 ^a	.860	.849	.69921

a. Predictors: (Constant), Preservation Quality, Nutrition Value, Taste

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	108.375	3	36.125	73.891	.000 ^b
	Residual	17.600	36	.489		
	Total	125.975	39			

a. Dependent Variable: Preference

b. Predictors: (Constant), Preservation Quality, Nutrition Value, Taste

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.733	.301		2.436	.020
	Nutrition Value	.295	.103	.284	2.865	.007
	Taste	.170	.103	.198	1.655	.107
	Preservation Quality	.548	.118	.522	4.660	.000

a. Dependent Variable: Preference

Answer the following questions:

- a. Is the model significant? State the null and alternative hypotheses.
- b. Which of the variables is more significant?
- c. What percentage of variation in preference is explained by the model
- e. Write the regression equation

- 9)) Comptech Company manufactures a printer and keyboard. The contribution margins of the printer and keyboard are \$30 and \$20, respectively. Two types of skilled labor are required to manufacture these products: soldering and assembling. A printer requires 2 hours of soldering and 1 hour of assembling. A keyboard requires 1 hour of soldering and 1 hour of assembling. Comptech has 1,000 soldering hours and 800 assembling hours available per week. There are no constraints on the supply of raw materials. Demand for keyboards is unlimited, but at most 350 printers are sold each week. Comptech wishes to maximize its weekly total contribution margin. Formulate the LPP and solve using graphical method.
- 10) The annual demand for a certain component is 10,000 nos. The Holding cost is 20% of the value of average Inventory. It costs Rs20/ to place an order. The cost per unit varies according to order size as under:
 0-499 units Rs 5/unit
 500-999 units Rs 4.5/unit
 1000 units and more Rs 3.9 /unit
 What is the Economic Order Quantity?