

QMM 03

Roll No.: Quantitative Models in Marketing
Total No. of Printed pages: 2

Total Marks: 30
Duration: 2 Hrs.
Total Questions: 5

Solve any 3 out of 5 Total Marks: 30

1) Techware Co. Ltd is considering introduction of two new software products in the market. The company has four options viz. Introduce product 1 only, introduce product 2 only, introduce both products or none of them. R & D cost for products 1 & 2 are Rs 1.8 lacs and Rs 1.5 lacs respectively. Company doesn't incur any cost if they decide not to introduce any product. Revenue estimates from these products are given below:

	Market status		
	Strong	Fair	Weak
Do not introduce	0	0	0
Introduce product 1 only	500000	260000	120000
Introduce product 2 only	420000	230000	110000
Introduce both	820000	390000	200000

Probabilities of market being strong, fair and weak are 0.3, 0.5 and 0.2 respectively.

- Suggest the best course of action to the company
- Compute expected value with perfect information
- Compute expected value of perfect information

2) A company produces two products A and B in quantities Q_1 and Q_2 . The demand equations are :

$$Q_1 = 20,000 - 400P_1 + 200P_2$$

$$Q_2 = 18,000 - 300P_2 + 100P_1$$

The cost equations of producing both products is :

$$C = 50Q_1 + 40Q_2 + 1,00,000$$

Determine the prices of A and B that will maximize total profit.

3) Given below is the Transitional probability matrix (Matrix of Retention, Loss and Gain) of three Firms.

	X	Y	Z
X	0.4	0.3	0.3
Y	0.3	0.4	0.3
Z	0.3	0.3	0.4

- (i) If the present shares are 10%, 40% and 50% respectively of X, Y and Z. Calculate the market share of next period.
- (ii) Do you need initial market shares to calculate the steady state share .
- (iii) Calculate the Steady State Market Shares.

4) The revenue function of a product is given by $R = 2A_1^2 + 4A_2^2 - 0.3 A_1A_2$ where R (revenue), A_1 (Advertisement expenditure on media 1) and A_2 (advertising expenditure on media 2) are expressed in Rs. Lakhs. The incremental profit as a fraction of selling price before advertisement is 0.52. Determine advertisement expenditure that will maximize profit is (1) there is no limit on advertising expenditure (2) if total advertising budget is Rs. 1 lakh .

5) i) Following data on number of customers who purchased a product is compiled from a consumer panel survey of size 2500 conducted in 1999. Compute appropriate indices measuring penetration level and repeat purchases and comment on the product's performance.

	Jan 99	Feb 99	Mar 99	Apr 99	May 99	Jun 99	Jul' 99	Aug 99	Sep 99	Oct 99	Nov 99	Dec 99	Interval between successive purchases (no.of days)
1 st purchase	120	150	175	120	160	165	210	195	220	200	275	150	45
2 nd purchase	80	85	75	75	58	65	70	80	90	120	175	125	35
3 rd purchase	50	55	65	75	85	60	55	50	75	45	30	110	20
4 th purchase	15	20	15	20	25	30	55	65	20	25	30	80	10

ii) A salesman has 110 working hours in a sale cycle. On an average he needs to spend 8 hours for a new customer for convincing him to buy his product and 3 hours to retain his existing customer. If he spends above time, probability that he would get a new customer is 25% and retain his existing customer is 80%. How many new and existing customers should be allocated to the salesman?

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