FACULTY OF MANAGEMENT STUDIES

UNIVERSITY OF DELHI

Semester Examination 2012

Name of Examination: MBA (Full-Time) 1st Year

Paper Name: Quantitative Methods **Paper No: MBAFT-6102**

Time allowed: Three Hours **Maximum Marks: 50**

Attempt any five questions. All question carry equal marks.

<table>
<tr><th>Serial No. of Question</th><th></th><th>Marks</th></tr>
<tr><td>1 (a)</td><td>"Linear Programming is useful Management Science technique, but it has some limitations" Discuss it and give appropriate examples.</td><td>5</td></tr>
<tr><td>(b)</td><td>A firm has an advertising budget of Rs. 10,00,000. It wishes to allocate this budget to two media: magazines and television, so that the total exposure is maximized. Each page of magazine advertising is estimated to result in 60,000 exposures, whereas each slot on television is estimated to result in 1,20,000 exposures. Each page of magazine advertising costs Rs. 15,000 and each slot on television costs Rs. 25,000. An additional condition that the firm has specified is that at least two pages of magazine advertising be used and at least 3 slots on television. Determine the optimal media-mix for this firm.</td><td>5</td></tr>
<tr><td>2</td><td>A firm places an order for a particular product at the beginning of each month and the product is received at the end of the month. The firm sells during the month from the stocks, and it can sell any quantity. The prices at which the firm buys and sells every month vary. The following table shows the projected buying and selling prices for the next four months:
<table>
<tr><th>Month</th><th>Selling Price (Rs.) (during the month)</th><th>Purchase Price (Rs.) (beginning of the month)</th></tr>
<tr><td>April</td><td>---</td><td>75</td></tr>
<tr><td>May</td><td>90</td><td>75</td></tr>
<tr><td>June</td><td>60</td><td>60</td></tr>
<tr><td>July</td><td>75</td><td>--</td></tr>
</table>
The firm has no stocks on hand as on April 1 and does not wish to have any stock at the end of July. The firm has a warehouse of limited size, which can hold a maximum of 150 units of the product. Formulate the above problems as a linear programming problem.</td><td>10</td></tr>
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Serial No. of Question		
3.	An airlines company is considering the purchase of three types of jet passenger planes. The purchase price would be Rs 450 million for each A type plane, Rs. 400 million for each B type plane and Rs. 250 million for each C type plane. The company has recourses worth Rs. 5000 million for these purchases. The three types of the plane, if purchased, would be utilized at essentially maximum capacity. It is estimated that the net annual profit would be Rs. 30 million for A type plane, Rs 22.5 million for a B type plane and Rs. 15 million for a C type plane. It is estimated that 25-trained pilots will be available. If only C type planes were purchased, the maintenance facility would be able to handle 30 new planes. However, each B type of plane is equivalent to $1\frac{1}{3}$ C type planes, and each A type of plane is equivalent $1\frac{2}{3}$ C type planes in terms of their use of the maintenance facility. Using the above data as a first approximation the management of the company wants to know how many planes of each type (ignoring the fact the number of planes must be an integer) should be purchased in order to maximize profits. Write the dual of the above problem and use it for checking its optimal solution.	10
4.	State Bayes theorem on conditional probability. A computer manufacturing firm receives shipment of parts from two different suppliers. Supplier A supplies the 70% of the total parts and the remaining 30% is supplied by Supplier B. The historical quality levels of these two suppliers are shown in the following table:	

	Good parts (%)	Defective parts (%)
Supplier A	90	6
Supplier B	85	12

(i) A part is randomly selected from the firm's inventory, and it is found to be defective, what is the probability that it is supplied by the supplier A?
(ii) A part is randomly selected from the firm's inventory, and it is found to be good, what is the probability that it is supplied by the supplier B? 10

5. The GE Capital is in the business of making bids on investments offered by various firms that desire additional financing. The company has collected the following data on yearly investments and interest rates:

Year :	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Yearly Investment (Thousands of Rs.)	1080	948	920	1119	1695	2150	2170	2230	1880	1425
Average Interest rates (%):	4.8	5.1	5.9	5.1	4.8	3.8	3.7	4.5	4.9	6.2

Is the relationship between these variables significant? If the average interest rate is 6% five years from now, can yearly investment be forecasted? 10

Question		Marks
6.	The personnel department of IBM is doing a study about job satisfaction. A random sample of 375 employees was given a test designed to diagnose the level of job satisfaction. Each employee's salary was also recorded in the following table:	

Salary Versus Job Satisfaction

Satisfaction	Under $50000	$50000-$75000	Over $75000	Total
High	35	25	20	80
Medium	90	85	40	215
Low	45	20	15	80
Total	170	130	75	375

Use an appropriate significance test to determine if salary and job satisfaction are independent at 5% level of significance. 10

7. The raw data displayed below are the observations on the number of passengers who have chosen to fly on Air India in 32 cities, in a particular month.

25	37	23	26	30	40	25	26
39	32	21	26	19	27	32	23
18	26	34	18	31	35	21	33
33	9	16	32	35	42	15	24

(a) Construct a frequency distribution using the above data.

(b) Develop and interpret a Histogram from the frequency table you constructed from the above data.

(c) Calculate and interpret mean, median, variance and coefficient of variation for the above data.

(d) Are the data skewed? Give the coefficient of skewness. 10