

JAIPURIA INSTITUTE OF MANAGEMENT, NOIDA
PGDM / PGDM (M) / PGDM (SM)
FIFTH TRIMESTER (Batch 2017-19)
Re- END TERM EXAMINATIONS, JANUARY 2018

Course Name	Management Science	Course Code	OP 201
Max. Time	2 hours	Max. Marks	40

INSTRUCTIONS: *Attempt all questions. Marks are indicated against each question.*

1. A decorating store specializing in do-it-yourself home decorators must decide how many information packets to prepare for the summer decorating season. The store managers know they will require atleast 400 copies of their popular painting packet. They believe that their new information packet on specialty glazing techniques could be a big seller, so they want to prepare atleast 300 copies. Their printer has given following information: The painting packet will require 2.5 minutes of printing time and 1.8 minutes of collating time. The glazing packet will require 2 minutes for each operation. The store has decided to sell the painting packet for 55 Rs a copy and to price the glazing packet at 45 Rs a copy. At this time, the printer can devote 36 hours of printing and 30 hours to collation. He will charge the store Rs 10 for each packet prepared. Company wants to know how many units of each packet to produce to maximize the revenue. From operation department of the company following results are provided;

SENSITIVITY REPORT

Adjustable Cells

Cell	Name	Final Value	Reduced Cost	Objective Coefficient	Allowable Increase	Allowable Decrease
\$B\$3	Painting Packet	514.28	0	55	1.25	14.5
\$C\$3	Glazing Packet	437.14	0	45	16.11	1

Constraints

Cell	Name	Final Value	Shadow Price	Constraint R.H. Side	Allowable Increase	Allowable Decrease
\$D\$5	Printing	2160	20.71	2160	106.66	80
\$D\$6	Collation	1800	1.78	1800	80	76.8
\$D\$7	Painting units	514.28	0	400	114.28	1E+30
\$D\$8	Glazing Units	437.14	0	300	137.14	1E+30

Analyze the report submitted by the Operation Department and answer the following questions. (4)

1. Suggest the optimum production policy to the company with appropriate recommendations.
2. Comment on the utilization of resources available with the company?
3. With change of business climate the selling price of Painting Packet has now been reduced to Rs 45, suggest the impact on the optimum production policy.

4. The store can arrange additional time for any one of the activity: Printing or Collation by paying a small amount but both activities can't be arranged simultaneously. Which activity should be arranged and why?

2. Two textile firms, HBK Textile Ltd and DKB Poly Ltd, for years have been selling shirting which is but a small part of both firms total sales. The Marketing Director of HBK Textile raised the question, "What should the firm's strategies be in terms of advertising for the product under consideration?" The market research team of HBK textile developed the following information related to the market-share of HBK textile for varying degree of advertising:

- No advertising, medium advertising and heavy advertising for both firms will result in equal market shares.
- HBK Textile with no advertising: 40% of the market with medium advertising by DKB Poly Ltd and 28% of the market with heavy advertising by DKB Poly Ltd.
- HBK Textile with medium advertising: 70% of the market with no advertising by DKB Poly Ltd and 45% of the market with heavy advertising by DKB Poly Ltd.
- HBK Textile with heavy advertising: 75% of market with no advertising by DKB Poly Ltd and 47.5 % of the market with medium advertising by DKB Poly Ltd.

The cost of using medium and heavy advertising is Rs. 50, 000 and Rs. 90, 000 respectively. The revenue firms get for 1% of their market share (for each percent of their market share) is Rs 10,000.

Construct the pay-off table.

(8)

3. "McBurger" a fast food outlet sells burger. The burger is sold in dozens and the probability of demand is given below. Each dozen of burger costs Rs 260/- and is sold for Rs 300/-. The unsold burgers is scraped to a cattle food organization for Rs 180/- per dozen. Find out the best policy for "McBurger".

(8)

Demand in Dozens	10	15	25	30	35	40	45
Probability	0.1	0.15	0.25	0.3	0.1	0.05	0.05

4. A new product is introduced in the market by three companies A, B and C, at the same time. When they were introduced, each company had an equal market share, but during the first year following changes took place

- Company A retained 90% of its customer, lost 3% to B and 7 % to C.
- Company B retained 70% of its customer, lost 10% to A and 20 % to C.
- Company C retained 80% of its customer, lost 10% to A and 10 % to B.

Assuming the above buying behaviour of the customers, what will be market share of three companies at the end of the first year? End of the second year?

(4)

5. The Circulation Unlimited Co. has two factories producing a product that must be shipped to two warehouses A and B. Factory 1 can be send unlimited amount by rail line to warehouse A only, whereas factory 2 can send an unlimited amount by rail line to warehouse B only. However, independent truckers can be used to ship up to 70 units from each factory to a distribution centre located in Kolkata. From this distribution center up to 60 units can be shipped to each warehouse. The profit per unit for each alternative is shown in the following table

From \ To	Warehouse A	Warehouse B	Distribution Center
Factory 1	\$7	----	\$3
Factory 2	----	\$9	\$4
Distribution Center	\$2	\$4	----

Factory 1 and factory 2 is producing 100 units and 90 units respectively. Demands at warehouse A and warehouse B are 80 and 110 units respectively. Formulate this problem as the maximal flow problem by drawing a network diagram. (8)

6. The hospital administrators at General Hospital, University Hospital, County Hospital, and State Hospital have been meeting to discuss ways in which they can help one another improve the performance at each of their hospitals. A consultant suggested measuring the performance of each hospital relative to the performance of all four hospitals. Data envelopment analysis was used to evaluate the relative efficiencies of four hospitals.

To determine the weight that each hospital will have in computing the outputs and inputs

for the composite hospital, we use the following decision variables: w_g = weight applied to inputs and outputs for General Hospital, w_u = weight applied to inputs and outputs for University Hospital, w_c = weight applied to inputs and outputs for County Hospital and w_s = weight applied to inputs and outputs for State Hospital.

Data for input measures and output measures were provided in the following solution is optimal using Excel.

	E	w_g	w_u	w_c	w_s			
	1	1	0	0	0			
MinZ	1					1		
Weights		1	1	1	1	1	=	1
Medicare patient-days (1000s)		48.14	34.62	36.72	33.16	48.14	>=	48.14
Non-Medicare patient-days (1000s)		43.1	27.11	45.98	56.46	43.1	>=	43.1
Nurses trained		253	148	175	160	253	>=	253
Interns trained		41	27	23	84	41	>=	41
Full-time equivalent nonphysicians	-285.2	285.2	162.3	275.7	210.4	0	<=	0
Supply expense (\$1000s)	-123.8	123.8	128.7	348.5	154	0	<=	0
Bed-days available (1000s)	-106.7	106.7	64.21	104.1	104.04	0	<=	0

Questions:

(8)

- In the given output which hospital is being compared? What does the solution indicate about the efficiency of selected hospital?
- Explain which hospital or hospitals make up the composite unit used to evaluate selected hospital and why.
- Which hospitals would you recommend to consider emulating to improve the operations efficiency?
- Can you identify most problematic area to improve efficiency of operation?