

VPM's
DR VN BRIMS, Thane
Programme: PGDM (2018-20)
PGDM Trimester II Examination December 2018

Subject	Quantitative Techniques		
Roll No.		Marks	60 Marks
Total No. of Questions	7	Duration	3 Hours
Total No. of printed pages	2	Date	26.12.2018

Note: Q1 is compulsory and solve any FOUR from the remaining SIX questions.

Q 1. UKHS manufactures two weight machines BP100 and BP200.

The BP100 consists of a frame unit, a press station, and a pec-dec station. Each frame produced uses 4 hours of machining and welding time and 2 hours of painting and finishing time. Each press station requires 2 hours of machining and welding time and 1 hour of painting and finishing time, and each pec-dec station uses 2 hours of machining and welding time and 2 hours of painting and finishing time. In addition, 2 hours are spent assembling, testing, and packaging each Body Plus 100. The raw material costs are 450 for each frame, 300 for each press station, and 250 for each pec-dec station; packaging costs are estimated to be 50 per unit.

The BP200 consists of a frame unit, a press station, a pec-dec station, and a leg-press station. Each frame produced uses 5 hours of machining and welding time and 4 hours of painting and finishing time. Each press station requires 3 hours machining and welding time and 2 hours of painting and finishing time, each pec-dec station uses 2 hours of machining and welding time and 2 hours of painting and finishing time, and each leg-press station requires 2 hours of machining and welding time and 2 hours of painting and finishing time. In addition, 2 hours are spent assembling, testing, and packaging each Body Plus 200. The raw material costs are 650 for each frame, 400 for each press station, 250 for each pec-dec station, and 200 for each leg-press station; packaging costs are estimated to be 75 per unit.

For the next production period 600 hours of machining and welding time, 450 hours of painting and finishing time, and 140 hours of assembly, testing, packaging time will be available. Current labor costs are 20 per hour for machining and welding time, 15 per hour for painting and finishing time, and 12 per hour for assembly, testing, packaging time. The market suggests a retail price of 2400 for the Bodyplus 100 and 3500 for the Body Plus 200.

The number of units of the Body Plus 200 produced must be at least 25% of the total production.

Analyze the production problem at UKHS and determine recommended number of BP100 and BP200 machines to produce and amount of profit generated.

Q 2. Answer any 2 from below:

A company wishes to advertize on Radio & TV. The cost is 2 lakhs per spot for Radio & 5 lakhs per spot for TV. The total advertising budget is 75 lakhs. The effectiveness is 600 per spot for Radio & 1000 per spot for TV. The no of spots for each Radio & TV must be 4 minimum. The total spots are limited to 30. The amount spent on each Radio & TV should be at least one third of total expenditure by the company.

(a) Formulate as LPP to maximize total effectiveness. Find EXCEL solution. Find graphical solution as well.

(b) Find the redundant constraints.

(c) Find if increase in advertising budget will increase effectiveness. Why?

Q 3. Answer any 2 from below:

An organization has 5 typists A,B,C,D& E having different speeds of typing in words per minute as 20,30,40,50 & 60. There are 5 jobs to be typed P,Q,R,S& T having pages

600,300,450,200 & 300. The typing format is 8 words per line & 30 lines per page. Formulate as LPP.

- Find the solution which will minimize total time of typing.
- Which person can be called as best typist?
- Does it follow that best person should do the best job?

Q 4. Answer any 2 from below:

A company has 3 factories at different locations F1, F2 & F3 having capacity 400, 300 & 800. The cost of production is (Rs/unit) 20, 30 & 20. The product produced can be supplied to 4 destinations D1, D2, D3 & D4 having demand 300, 400, 300 & 500. The selling price at these destinations is (Rs/unit) 50, 60, 50 & 60. The GST at destination is 12%, The cost of transportation is as given below in Rs /unit.

	D1	D2	D3	D4
F1	2	5	7	3
F2	8	4	6	2
F3	3	4	4	5

- Formulate as transportation which will maximize total profits.
- Find EXCEL solution. Note GST will be on cost of production plus cost of transportation.
- What should be cost of transportation from F2 to D1 to use this route?

Q 5. Answer any 2 from below:

A company produces a single product having production cost/unit 100, 105, 103 & 106 in month 1, 2, 3 & 4. The product required in any month can be produced & supplied in any month with extra cost of carrying inventory or shortage. The production capacity is 300 units /month. The cost of carrying stock or inventory is 5/unit/month. The cost of shortage or late supply is 7/unit/month. Formulate as transportation & find optimum production plan. The demand for next 4 months is 200, 500, 150 & 350 units. There is no stock at opening or nor is required at end.

- Find optimum solution which minimizes total cost.
- How the solution will change if there is opening stock of 20.
- Name different methods of generating initial solutions.

Q 6. Answer any 2 from below:

A company has 5 salespersons A, B, C, D, E and F having sales effectiveness in % as 90, 70, 80, 60, 50 and 55. They are to be allocated to any of 5 regions N, W, S, E & C having sales potential 600, 800, 500, 700 & 400.

- Formulate as LPP which will maximize total sales revenue for the company. Find EXCEL solution.
- Does this show same solution as "Best" man in "Best" region?
- What you will do with extra salesperson in the company?

Q 7 Answer any 2 from below:

A company manufactures paper rolls of standard width 10', 15' & 20'. A large order is received of rolls of nonstandard width as per details below: "177" rolls of width 5', 253 rolls of width 7' & 207 rolls of width 9'. These rolls can be obtained by cutting standard width rolls. The loss due to cutting is called as Trim Loss.

- Formulate to minimize trim loss. Find EXCEL solution.
- Find if extra no. of rolls are getting produced. If yes which?
- What you will do with those extra rolls?