

**Subject : Operations Research**

Day : Tuesday  
Date : 07/06/2016



Time : 10.00 AM TO 1.00 PM  
Max Marks : 70 Total Pages : 2

**N.B.**

- 1) Attempt any **THREE** questions from Section – I and any **TWO** questions from Section – II.
- 2) Answers to both the sections should be written in the **SAME** answer book.
- 3) Figures to the right indicate **FULL** marks.
- 4) Use of non-programmable scientific calculator is **ALLOWED**.
- 5) Graph papers will be provided if required.

**SECTION – I**

**Q.1** Define Simulation. Explain the applications and advantages of simulation in business. (14)

**Q.2** A manufacturing company produces two types of products: the Super and the Regular. Resource requirements are given below in the table: (14)

Product Type	Profit Contribution	Assembly Time (Hrs)	Paint	Inspection
Regular	50	1.2	0.8	0.2
Super	75	1.6	0.9	0.2

There are 1600 hours of assembly worker hours available per week, 700 hours of paint time and 300 hours of inspection time. Regular customers will demand at least 1500 units of the regular type and 90 of the super type. Formulate the problem as LPP and solve graphically.

**Q.3** Weekly demand for taxis at a company is as follows: (14)

<b>Demand</b>	0	1	2	3
<b>Probability</b>	0.10	0.40	0.20	0.30

Simulate the demand for the next 15 days using random numbers 67, 91, 29, 49, 30, 50, 41, 79, 90, 59, 68, 89, 35, 29, 13.

**Q.4** For the following transportation problem (14)

From	To			
	P	Q	R	S
A	5	3	4	6
B	6	8	5	7
C	7	6	7	8
D	5	7	6	7
E	6	5	4	8

Find the initial basic feasible solution by Least Cost Method. Also check whether it is optimal or not.

- Q.5** Write short notes on any **TWO**: (14)
- a) Transportation problem
  - b) Importance of LPP
  - c) Vogel's approximation method

**P.T.O.**

## SECTION – II

- Q.6** A company is faced with the problem of assigning five different machines to five different jobs with a view to minimize total cost. The costs are estimated as follows (hundred of rupees). (14)

Machine	Jobs				
	1	2	3	4	5
1	2.5	5	1	6	2
2	2	5	1.5	7	3
3	3	6.5	2	8	3
4	3.5	7	2	9	4.5
5	4	7	3	9	6

Find the optimal assignment of machines and jobs.

- Q.7** Find the optimal transportation schedule from the following in order to minimize transportation costs. (14)

Plant	Markets			Supply (Units)
	X	Y	Z	
A	5	2	8	150
B	4	3	5	150
C	2	4	-	200
D	6	3	4	250
Demand (Units)	250	200	175	

- Q.8** A small project is composed of seven activities whose time estimates are given in the following table. (14)

Activity	Name of the activity	Time Required (days)		
		Optimistic	Most Likely	Pessimistic
(1-2)	A	6	6	24
(1-3)	B	6	12	18
(1-4)	C	12	12	30
(2-5)	D	6	6	6
(3-5)	E	12	30	48
(4-6)	F	12	30	42
(5-6)	G	18	30	54

- i) Find the expected duration and variance for each activity.
- ii) Find critical path.
- iii) What is the expected project length?

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