(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 1269/7113 **Roll No.**

M. B. A.

(Semester-~~VI~~ II) Even Semester Theory Examination, 2012-13

OPERATIONS RESEARCH

Time : 3 Hours] *[Total Marks : 100*

Note : Attempt questions from each Section as per instructions.

SECTION - A

Attempt *all* parts of this question in 50-75 words each. Each part carries 2 marks. 2×10=20

1. (a) "Operations Research is no more than a quantitative analysis of the problem." Explain.
   (b) What is Decision Tree?
   (c) What is meant by linear programming problem?
   (d) What are the useful aspects of Duality in LLP?
   (e) Explain Degeneracy in a Transportation Problem.
   (f) Explain two person zero-sum game.
   (g) Procedure of North-West Corner Rule.
   (h) Explain use of Project Management.
   (i) Role of dummy activities in Network Diagram.
   (j) What is meant by Crashing of Operations ?

SECTION - B

Attempt any *three* parts of this question in not more than 200 words each. Each part carries 10 marks. 10×3=30

2. (a) What areas of OR have made a significant impact on decision making process?
   (b) Explain with suitable example the basic philosophy behind sensitivity analysis.
   (c) What is an unbalanced Transportation Problem ? How do you start in this case?
   (d) Write a lucid note on scheduling problem.
   (e) Explain the meaning of the term 'Poisson Arrivals' and 'Exponential Service Times'.

SECTION -C

Attempt *all* questions of this Section. Answer the following questions in not more than 500 words. Each question carries 10 marks. 10×5=50

3. Solve the following LPP

Maximize :

$$Z=5A+3B+7C$$

Subject to :

$$A+B+C \leq 26$$

$$3A+2B+C \leq 26$$

$$A+B+C \leq 18, \text{ and}$$

$$A, B, C \geq 0$$

Or

A manufacturer has to decide how much finishing to perform on his product prior to sale. He may sell his product as :

(i) Raw casting-5 hours for casting, 1 hour for machining and 1 hour for plating.

(ii) Semifinished-5 hours for casting, 4 hours for machining and 2 hours for plating.

(iii) Finished-5 hours for casting, 4 hours for machining and 4 hours for plating.

The profit per unit of sale is Raw casting-Rs. 100 per unit; Semi finished-Rs. 250 per unit and Finished Rs. 350 per unit. The manufacturer can sell all the items that he can produce. The weekly production capacity of the casting department is 130 hours. The machining department has a capacity of 88 hours and the plating department has a capacity of 40 hours per week. What should the product-mix be to maximize profits?

4. A steel company has three open-hearth furnaces and four rolling mills.

Transportation cost (Rs. per quintal) for shipping steel from furnaces to rolling mills are shown in the following table :

Furnaces	Mills				
	A	B	C	D	Supply
1	3	1	5	10	20
2	7	4	2	3	60
3	8	8	5	2	70
Demand	30	30	40	50	

What is the optimum shipping schedule ?

Or

A marketing manager wants to assign five regions to four different salesman. Salesmen differ in their efficiency and territories also differ in potentiality. An estimated sales (in Rs. Lacks) by different salesmen in the five territories are given below :

	Territories					
		A	B	C	D	E
Salesman	1	20	36	31	17	25
	2	24	32	40	12	43
	3	22	40	38	18	37
	4	36	39	35	16	82

Determine the optimal assignment schedule for the maximization of sales.

5. How does the sequencing techniques help the manager ? Draw a flow chart to show the method of solution of sequencing problem.

Or

Customers arrive at a one window drive-in bank according to a Poisson distribution with mean 10 per hour. Service time per customer is exponential with mean 5 minutes. The space in front of the window, including that for the serviced car can accommodate a maximum of three cars. Other cars can wait outside this space. What is the probability that an arriving customer can drive to the space in front of the window?

6. A certain project is composed of nine activities whose time estimates are as given below :

Activity	1–2	1–3	1–4	2–5	3–5	4–6	5–6	6–7
Time (days)	2	3	5	4	1	6	2	8
Activity	5–7							
Time (days)	7							

Draw the project network and track all the possible paths from it. What is the expected project length ?

Or

Solve the game whose pay off matrix is given below :

2	2	4	4	0
3	4	2	4	3
4	2	4	0	2
0	4	0	8	5

7. Write short notes on any two of the following :

(a) Advantages and disadvantages of L. P. P.

(b) Stepping Stone Methods

(c) Decision-making environment

(d) Characteristics of M/M/1 Queuing models.