Total number of printed pages–7

14 (COM-2) 2036 ORCB

2018

OPERATIONS RESEARCH AND COMPUTER IN BUSINESS

Paper : 2·84/COM-2036

(New and Old Course)

Full Marks : 80

Time : Three hours

The figures in the margin indicate full marks for the questions.

GROUP–A

(Operations Research)

While **New Course** students will answer question no. **4(b)**, **Old Course** students will answer question no. **4(c)** in lieu of **4(b)**. **All** other questions are **common** to the students of both the courses **New and Old**.

1. Answer the following questions :

   (a) Fill in the blank :   1

   The variables associated with a linear programming problem are called _____ .

(b) Choose the correct alternative : 1

In an LPP

(i) only the objective function is linear

(ii) only the constraints are linear

(iii) the objective function and the constraints are linear

(iv) the constraints are linear, but the objective function may be linear or non-linear

(c) The solution to a transportation problem with m-sources and n-destinations is a basic feasible solution, if the number of positive allocations is : 1

(i) m×n

(ii) m+n+1

(iii) m+n

(iv) m+n−1

(d) When is a game said to be fair ? 1

(e) State whether the following statement is true **or** false : 1

"The time spent by a customer in the queueing system is longer than his waiting time."

2. (a) Write a note on the uses of OR in management. 5

(b) Explain with the help of an example the problem of infeasible solution associated with linear programming. 5

Or

Write down the general LPP in its standard form and hence write down its dual.

(c) Point out the differences between a transportation problem and an assignment problem. State the assignment problem mathematically. 4+1=5

3. (a) Solve graphically the following LPP : 6

Minimize $Z = 2x + 3y$

subject to :

$$36x + 6y \geq 108$$
$$3x + 12y \geq 36$$
$$20x + 10y \geq 100$$
$$x, y \geq 0$$

Contd.

(b) A company manufactures 3 types of products that require precious metals, platinum and gold. Due to shortage of these precious metals the Government regulates the amount that may be used per day. The relevent data with respect to requirements and profits are summarised in the table below :

Product	Platinum required/unit (in gm)	Gold required/unit (in gm)	Profit/unit (in ₹)
A	2	3	500
B	4	2	600
C	6	4	1200

Daily supply of platinum and gold are 160gm and 120gm respectively. Formulate this as an LPP and solve it by simplex method to maximise profit.

9

For **Old** and **New** Course.

4. *(a)* Use VAM to find the initial basic feasible solution to the following transportation problem :

8

Destinations

	W_1	W_2	W_3	Supply
F_1	(2)	(7)	(4)	5
Sources F_2	(3)	(3)	(1)	8
F_3	(5)	(4)	(7)	7
F_4	(1)	(6)	(2)	14
Demand	7	9	18	34

Or

Solve the game having the following pay-off matrix : 8

Player B

I   II   III

$$\text{Player A} \quad \begin{matrix} \text{I} \\ \text{II} \\ \text{III} \end{matrix} \begin{bmatrix} -1 & -2 & 8 \\ 7 & 5 & -1 \\ 6 & 0 & 12 \end{bmatrix}$$

*For **New Course** only.*

(b) A ticket window of a cinema hall is manned by a single individual. Customers arrive to purchase tickets in a Poisson fashion with a mean rate of 30 per hour. The time required to serve a customer has an exponential distribution with a mean rate of 30 seconds. Find (i) expected queue length, (ii) expected waiting time per unit in the queue. 3+4=7

Or

What is a pay-off matrix ? Explain two-person zero-sum game with a suitable example. 2+5=7

For **Old Course** only.

(c) Discuss the payback period method of investment analysis. 7

GROUP–B

(Computer in Business)

[For both New Course and Old Course]

5. Answer the following questions :

(a) Define data dictionary. 1

(b) Mention *one* advantage and *one* limitation of E-Commerce. 2

(c) What is the full form of SET ? 1

(d) Define 'digital signature'. 1

6. (a) Define Decision Table. Illustrate it with an example. 5

Or

Discuss on system security.

(b) What is Data Flow Diagram (DFD) ? Define the various symbols used in DFD. 5

7. (a) What is E-Commerce ? Write a note on the lure of E-Commerce. 3+5=8

Or

What is System Development Life Cycle ? Explain the different stages of System Development Life Cycle.
3+5=8

(b) What is Encryption ? Point out the elements of encryption. 3+4=7

1000