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0205N466

Candidate's Seat No :_____

MBA 1 Semester-2 (D/E) (Reg/Rep) Examination

MS

May-2024

Time : 2-30 Hours] **[Max. Marks : 70**

Instructions: (1) This paper contains **FIVE** questions.
(2) All questions are compulsory.
(3) Question No.**2, 3, 4** have internal options.
(4) Figures in the right side in parenthesis indicate marks.
(5) Use of Scientific Calculator is allowed.

Q:1 Maximise $Z=10\,X1 + 20X2$ **(14)**

Subject to

$$2X1 + 4X2 \geq 16$$
$$X1 + 5X2 \geq 15$$
$$X1, X2 \geq 0$$

Use graphical method and comment on LPP.

Q:2 (a) Refer Q:1 and write a dual of that LPP. **(07)**

Q:2 (b) A manufacturer of purses makes four styles of purses: a three-compartment bag which takes 45 minutes to assemble; a shoulder-strap bag, taking one hour to assemble; a tote bag, needing 45 minutes for assembly and pocket purse requiring 30 minutes to assemble. There are 32 hours of assembly time available per day. The profit contribution on the sale of a three-compartment bag is Rs 16, Rs 25 on a shoulder- strap bag, and Rs 12 each on tote bag and pocket purse. Special kind of fancy pins are used in decorating pocket purses and they are available for only 30 pieces. Different type of pins are used in other three types of bags of which only 70 are in stock. Enough raw material is available for a total of 60 pocket purses and tote bags which need same quantity of raw material. The manufacturer estimates a minimum demand of 6 pocket purses and 10 shoulder strap bags every day. **(07)**

Formulate a linear programming problem.

OR

(P.T.O)

NA66-2

Q:2 (a) Calculate IBFS from following cost matrix using any method of your choice. **(07)**

Sources/Destinations	P	Q	R	S	Supply
A	12	10	12	13	500
B	7	11	8	14	300
C	6	16	11	7	200
Demand	180	150	350	320	1000

Q:2 (b) Arrivals at a telephone booth are considered to be Poisson, with an average time of 10 minutes between one arrival and the next. The length of a phone call is assumed to be distributed exponentially, with mean 3 minutes. **(07)**

Find:

1. The probability that an arrival finds that four persons are waiting for their turn
2. The average number of persons waiting and making telephone calls
3. The average length of the queue that is formed from time to time.

Q:3 (a) Calculate Hungarian Assignment Method from the following table. **(07)**

	Time taken (in minutes) Job			
Workers	A	B	C	D
1	45	40	51	67
2	57	42	63	55
3	49	52	48	64
4	41	45	60	55

Q:3 (b) Refer above Q:3 (a) and formulate the same as IPP. **(07)**

OR

Q:3 A LP problem was formulated and solved by computer package. **(14)**
Perform the analysis form the given output.

Max $Z = 5X1 + 4X2$

Subject to,

$6X1 + 4X2 \leq 24$ (raw material 1 in tons)

$X1 + 2X2 \leq 6$ (raw material 2 in tons)

$-X1 + X2 \leq 1$ (difference between two, does not exceed 1)

$X2 \leq 2$ (maximum demand)

$X1, X2 \geq 0$

N466-3

Variable	Value	Obj coeff	Obj val contribution
X1	3.00	5.00	15.00
X2	1.50	4.00	6.00

Constraints	RHS	Slack- surplus+
1(<)	24.00	0.00
2(<)	6.00	0.00
3(<)	1.00	2.50-
4(<)	2.00	0.50-

Sensitivity Analysis

Variable	Current Coeff	Min Coeff	Max Coeff	Reduced Cost
X1	5.00	2.00	6.00	0.00
X2	4.00	3.33	10.00	0.00

Constraint	Curr RHS	Min RHS	Max RHS	Dual price
1(<)	24.00	22.00	36.00	0.75
2(<)	6.00	4.00	6.67	0.50
3(<)	1.00	-1.50	Infinity	0.00
4(<)	2.00	2.50	Infinity	0.00

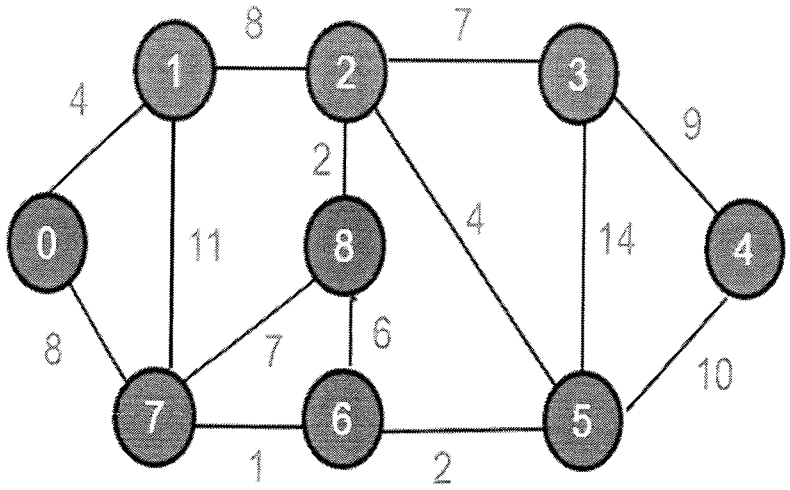
1) What is the best product mix?
2) What is the optimal contribution?
3) What are the shadow prices?
4) When the optimal solution has been reached, which resource has the highest marginal value?
5) State the dual of this problem.
6) Range of objective function coefficients.
7) RHS range.
8) Company wants to increase profit margin on X1 upto Rs. Rs.7
9) Company wants to decrease profit margin on X2 upto Rs. 2

(P.T.O)

N466-4

Q:4 **(a)** Discuss methods of transportation problem. **(07)**

Q:4 **(b)** **(07)**



XYZ Ltd. wants to send parcel from origin to destination, suggest shortest distance by applying appropriate method.

OR

Q:4 A market survey is made on two brands of breakfast foods A and B. Every time a customer purchases, he may buy the same brand or switch to another brand. The transition matrix is given below: **(14)**

From	To	
	A	B
A	0.8	0.2
B	0.6	0.4

1. Determine the market shares of brand A and brand B for the next period.
2. At present, it is estimated that 60 per cent of the people buy brand A and 40 per cent buy brand B. Keeping in mind given initial condition calculate market share for next period.

Q:5 Explain the following (any two) **(14)**

1. Write a detailed note on Queuing theory.
2. Special cases of LPP
3. Monte Carlo Simulation