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PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF COMMERCE

Summer Term End Term Examinations, August 2024

Winter Semester: 2023 - 24

Course Code: MAT2029&OE145

Course Name: Optimization Technique

Program & Sem: BBA & V

Date: 12 / August / 2024

Time: 1:00 pm to 4:00 pm

Max Marks: 100

Weightage: 50%

Instructions:

(i) Read the all questions carefully and answer accordingly.
(ii) Question paper consists of three parts.
(iii) Scientific and Non Programable Calculators are Permitted.
(iv) Do not write any information on the question paper other than roll number.

Part A

Answer any FIVE Questions.   (5 Q x 2 M = 10 M)

1.Mention the steps of LPP   (CO1) [Knowledge]

2. List any TWO applications of Optimizationtechniques   (CO1) [Knowledge]

3. What is an Unbalanced Transportation Problem?   (CO2) [Knowledge]

4.What is the Objective of Assignment problem?   (CO2) [Knowledge]

5.What is the abbrevation of CPM and PERT?   (CO3) [Knowledge]

6.What is the Objective of Sequence Model?   (CO4) [Knowledge]

7.Define Two Person Zero sum game?   (CO5) [Knowledge]

Part B

Answer any FIVE Questions.   (5 Q x 10 M = 50 M)

8.Briefly explain the main phases of Operations Research?   (CO1) [Comprehension]

9.A TV company has to decide on the number of 27-inch and 20-inch TV sets to be produced at one of its factories. Market research indicates that at most 40 number of 27-inch and 10 number of 20-inch TV sets can be sold per month. The maximum number of work hours available is 500 hours / month. A 27-inch TV requires 20 work hours and A 20-inch TV requires 10 work hours. Each 27-inch TV sold produces a profit of $120 and each 20-inch TV produces a $80. A wholesaler agreed to purchase all the TV sets produced if the

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number do not exceed the maximum indicated by market research. Formulate this problem as a Linear Programming model.   (CO1) [Comprehension]

10. Find the initial solution for the given transportation problem by any two methods of your choice.
                                                        (CO2) [Comprehension]

	D1	D2	D3	D4	Supply
O1	19	30	50	10	7
O2	70	30	40	60	9
O3	40	8	70	20	18
Demand	5	8	7	14	

11. Find the Optimal solution using Hungarian Method.   (CO2) [Comprehension]

	A	B	C	D
P	8	26	17	11
Q	13	28	4	26
R	38	19	18	15
S	19	26	24	10

12. Construct a network for the project whose activities and precedence relationships are as given below:
                                                        (CO3) [Comprehension]

Activity	A	B	C	D	E	F	G	H	I	J	K
Predecessor	--	--	A	A	I,J,K	B,D	B,D	F	A	G,H	F

13. There are 5 jobs, each of which has to go through the machines A and B in the order AB. The processing times (in hours) are given as   (CO4) [Comprehension]

Job	:	J_1	J_2	J_3	J_4	J_5
Machine A	:	2	4	5	7	1
Machine B	:	3	6	1	4	8

Determine a sequence of these jobs that will minimise the total elapsed time T. Also obtain:

    i)   the minimum elapsed time; and
    ii)   the idle time for each of the machines.

14. Determine which of the following two person zero sum games are strictly determinable and fair,Given the Optimum strategy for each player in the case of strictly determinable games

I)   Player A $\begin{pmatrix} -5 & 2 \\ 7 & -4 \end{pmatrix}$ Player B

ii) Player A $\begin{pmatrix} 0 & 2 \\ 1 & 4 \end{pmatrix}$ Player B

(CO5) [Comprehension]

Part C

Answer any TWO Questions.   (2 Q x 20 M = 40 M)

15. Briefly explain the formulation of LPP using Graphical Method.   (CO1) [Application]

   Maximize Z = x + 1.5 y
   Subject to the constraints   x + 2y ≤ 160
                3 x + 2 y ≤ 240
                where x, y ≥ 0 using graphical method.

16. A project schedule has the following characteristics.   (CO3) [Application]

Activity	1-2	1-3	2-3	2-5	3-4	3-6	4-5	4-6	5-6	6-7
Time (Days)	15	15	3	5	8	12	1	14	3	14

   From the following information, you are required to
   a) Construct a network diagram.
   b) Compute the earliest and latest event time.
   c) Determine the critical path and project duration.
   d) Compute total and free float for each activity.

17. Solve the following pay-off matrix to find the value of the game.   (CO5)[Application]

		Player B	
		B1	B2
Player A	A1	8	-7
	A2	-6	4