



**PRESIDENCY UNIVERSITY  
BENGALURU**

**SCHOOL OF COMMERCE  
END TERM EXAMINATION - JAN 2023**

**Semester :** Semester V - 2020

**Course Code :** OE145

**Course Name :** Sem V - OE145 - Optimization Techniques

**Program :** BAV / B.Com. Honors

**Date :** 11-JAN-2023

**Time :** 1.00PM - 4.00PM

**Max Marks :** 100

**Weightage :** 50%

**Instructions:**

- (i) Read all questions carefully and answer accordingly.
- (ii) Question paper consists of 3 parts.
- (iii) Scientific and non-programmable calculator are permitted.

**PART A**

**ANSWER ALL THE FOLLOWING QUESTIONS**

**10 X 1 = 10M**

1. Operations management can be defined as the application of \_\_\_\_\_ to a problem within a system to yield the optimal solution.  
a) Suitable manpower (CO1) [Knowledge]  
b) mathematical techniques, models, and tools  
c) Financial operations  
d) None of the Above
2. In graphical representation the bounded region is known as \_\_\_\_\_ region.  
a) Solution (CO1) [Knowledge]  
b) basic solution  
c) feasible solution  
d) optimal
3. Which technique is used in finding a solution for optimizing a given objective, such as profit maximization or cost reduction under certain constraints?  
a) Quailing Theory (CO1) [Knowledge]  
b) Waiting Line  
c) Both A and B  
d) Linear Programming

4. The occurrence of degeneracy while solving a transportation problem means that  
 a) total supply equals total demand (CO2) [Knowledge]  
 b) the solution so obtained is not feasible  
 c) the few allocations become negative  
 d) none of the above
5. The purpose of a dummy source or dummy destination in a transportation problem is to  
 a) prevent the solution from becoming degenerate. (CO2) [Knowledge]  
 b) obtain a balance between total supply and total demand.  
 c) make certain that the total cost does not exceed some specified figure.  
 d) provide a means of representing a dummy problem.
6. The solution to a transportation problem with 'm' rows (supplies) & 'n' columns (destination) is feasible if number of positive allocations are  
 a) m+n (CO2) [Knowledge]  
 b) m-n  
 c) m+n-1  
 d) m+n+1
7. Critical Path method is good for \_\_\_\_\_  
 a) small projects only (CO3) [Knowledge]  
 b) large project only  
 c) both small and large projects equally  
 d) neither small nor large projects
8. In assignment problem of maximization, the objective is to maximise  
 a) Profit (CO3) [Knowledge]  
 b) optimization  
 c) cost  
 d) Loss
9. In an assignment problem involving 5 workers and 5 jobs, total number of assignments possible are \_\_\_\_\_.  
 a) 5 (CO3) [Knowledge]  
 b) 10  
 c) 15  
 d) 20
10. The saddle point in a payoff matrix is always the \_\_\_\_\_.  
 a) largest number in the matrix (CO5) [Knowledge]  
 b) smallest number in its column and the smallest number in its row  
 c) smallest number in the matrix  
 d) largest number in its column and the smallest number in its row

## PARE B

**ANSWER ALL THE FOLLOWING QUESTIONS**

**5 X 10 = 50M**

11. State various phases of Operations Research and explain in brief. (CO1) [Comprehension]

12. Find an optimal solution for the transportation methods using any two methods of your choice.

	D1	D2	D3	Supply
O1	5	7	8	70
O2	4	4	6	30
O3	6	7	7	50
Demand	65	42	43	

(CO2) [Comprehension]

13. Construct a network for the project whose activities and precedence relationships are as given below:

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

(CO3) [Comprehension]

14. Solve the assignment problem by Hungarian method

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

(CO4) [Comprehension]

15. Find the value of the game whose payoff matrix. Also find the optimal strategy of player A & player B.

$$\begin{matrix}
 & \begin{matrix} B1 & B2 \end{matrix} \\
 \begin{matrix} A1 \\ A2 \end{matrix} & \begin{bmatrix} -4 & 6 \\ 2 & -3 \end{bmatrix}
 \end{matrix}$$

(CO5) [Comprehension]

### PART C

#### ANSWER ALL THE FOLLOWING QUESTIONS

2 X 20 = 40M

16. Briefly explain the formulation of LPP using Graphical Method.

$$\text{Maximize } Z = 3x + 5y$$

Subject to the constraints

$$x \leq 4$$

$$2y \leq 12$$

$$3x + 2y \leq 18$$

where  $x, y \geq 0$  using graphical method.

(CO1) [Application]

17. A small maintenance project consists of the following jobs, whose precedence relationships are given below

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

- Draw an arrow diagram representing the project.
- Compute the earliest and latest event time.
- Find the total float and free float for each activity.
- Determine the critical path and the total project duration.

(CO3) [Application]

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