PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF COMMERCE & MANAGEMENT

TEST 1

Even Semester: 2021 - 22

Course Code: OE 145

Course Name: Optimization Techniques

Program & Sem: BBB/BBF/BBD/BBE & IV Sem

Date: 27th April 2022

Time: 11:30 AM to 12.30 PM

Max Marks: 30

Weightage: 15%

Instructions:

(i) Read the all questions carefully and answer accordingly.
(ii) Answer all the questions.
(iii) Normal Graph Sheets are allowed.

Part A [Memory Recall Questions]

Answer all the Questions. Each question carries ONE mark. **(10Qx 1M= 10M)**

1) Operations Research (OR), which is a very powerful tool for _____ (CO1) [Knowledge]
   a) Research   b) Decision – Making   c) Operations   d) None of the above

2) The term Operations Research was coined in the year _____   (CO1) [Knowledge]
   a) 1950   b) 1940   c) 1978   d) 1960

3) This innovative science of Operations Research was discovered during   (CO1) [Knowledge]
   a) Civil War   b) World War I   c) World War II   d) Industrial Revolution

4) Operations Research has the characteristics the it is done by a team of ____(CO1) [Knowledge]
   a) Scientists   b) Mathematicians   c) Academics   d) All of the above

5) Operations Research involves _____ attack of complex problems to arrive at the optimum solution.   (CO1) [Knowledge]
   a) Scientific   b) Systematic   c) Both A and B   d) Statistical

6) Operations Research uses models to help the management to determine its _____ scientifically.   (CO1) [Knowledge]
   a) Policies   b) Actions   c) Both A and B   d) None of the above

7) Which technique is used in finding a solution for optimizing a given objective, such as profit maximization or cost minimization under certain constraints?   (CO1) [Knowledge]
   a) Quailing Theory   b) Waiting Line   c) Both A and B   d) Linear Programming

8) What refers to Linear Programming that includes an evaluation of relative risks and uncertainties in various alternatives of choice for management decisions? (CO1) [Knowledge]
   a) Probabilistic Programming   b) Stochastic Programming
   c) Both A and B   d) Linear Programming

9) In _____ models there is risk and uncertainty. (CO1) [Knowledge]
   a) Deterministic Models   b) Probabilistic Models
   c) Both A and B   d) None of the above

10) The objective functions and constraints are linear relationship between _____(CO1) [Knowledge]
   a) Variables   b) Constraints   c) Functions   d) All of the above

Part B [Thought Provoking Questions]

Answer both the Questions. Each question carries FIVE marks.   (2Qx5M=10M)

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

12) A Manufacturer produces 3 models I, II and III of a certain product using raw materials A and B. The following table gives the data. Formulate this problem as a Linear programming model.
     (CO1) [Comprehension]

Raw Material	Requirement per Unit			Availability
	I	II	III	
A	2	3	5	4000
B	4	2	7	6000
Min Demand	200	200	150	---
Profit / Unit	30	20	50	---

Part C [Problem Solving Questions]

Answer the Question. The question carries TEN marks.   (1Qx10M=10M)

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

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TEST 2

Even Semester: 2021 - 22

Course Code: OE 145

Course Name: Optimization Techniques

Program & Sem: BBB/BBF/BBD/BBE & IV Sem

Date: 2nd June 2022

Time: 11:30 AM to 12.30 PM

Max Marks: 30

Weightage: 15%

Instructions:
(iv) Read the all questions carefully and answer accordingly.
(v) Answer all the questions.

Part A [Memory Recall Questions]

Answer all the Questions. Each question carries ONE mark. (10Qx 1M= 10M)

14) The transportation problem is basically a (CO3) [Knowledge]
   a) Maximization model   b) Minimization model c) Transshipment problem d) Iconic model

15) In a transportation problem where the demand or requirement is equal to the available resource is known as (CO3) [Knowledge]
   a) Balanced transportation problem   b) Regular transportation problem
   c) Resource allocation transportation problem   d) Simple transportation model

16) In transportation Problems, VAM stands for (CO3) [Knowledge]
   a) Value Addition Method   b) Vogel's Approximation Method
   c) Virginia Approximation Method   d) None of these

17) The Assignment Problem is solved by (CO3) [Knowledge]
   a) Complex method   b) Graphical method   c) Vector method   d) Hungarian method

18) The assignment matrix is always a (CO3) [Knowledge]
   a) Rectangular matrix   b) Square matrix   c) Identity matrix d) None of the above

19) Which of the following methods is used to verify the optimality of the current solution of the transportation problem? (CO3) [Knowledge]
   a) LCM   b) VAM   c) Modified distribution method   d) All of the above

20) In a transportation problem, we must make the number of _____ and _____ equal. (CO3) [Knowledge]
   a) destinations; sources   b) units supplied; units demanded
   c) columns; rows   d) positive cost coefficients; negative cost coefficients

21) The solution to a transportation problem with m-rows (supplies) and n-columns (destination) is feasible if the number of positive allocations are   (CO3) [Knowledge]

a) m+n   b) m×n   c) m+n-1   d) m+n+1

22) The Hungarian method for solving an assignment problem can also be used to solve

(CO3) [Knowledge]

a) A transportation problem   b) A traveling salesman problem

c) A LP problem   d) Both a & b

23) In the assignment problem of maximization, the objective is to maximize

(CO3) [Knowledge]

a) Profit   b) optimization   c) cost   d) None of the above

Part B [Thought Provoking Questions]

Answer both the Questions. Each question carries FIVE marks.   (2Qx5M=10M)

24) Solve the assignment problem by Hungarian method   (CO3) [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

25) Construct a network diagram for each of the projects whose activities and their precedence relationships are given below: (CO3) [Comprehension]

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

Part C [Problem Solving Questions]

Answer the question. The question carries TEN marks.   (1Qx10M=10M)

26) Find the minimized cost using all the three transportation methods. (CO3) [Application]

	D1	D2	D3	D4
O1	19	30	50	10
O2	70	30	40	60
O3	40	8	70	20

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END TERM EXAMINATIONS

Even Semester: 2021 - 22

Course Code: OE 145

Course Name: Optimization Techniques

Program & Sem: BBB/BBF/BBD/BBE & IV Sem

Date: 29th June 2022

Time: 01:00pm – 04.00pm

Max Marks: 100

Weightage: 50%

Instructions:

(vi) Read the all questions carefully and answer accordingly.

(vii)   Answer all the questions.

(viii)   Normal Graph Sheets are allowed.

Part A [Memory Recall Questions]

Answer all the Questions. Each question carries ONE mark.   (10Qx 1M= 10M)

27) Operations Research (OR), which is a very powerful tool for _____ (CO1) [Knowledge]
a) Research   b) Decision – Making   c) Operations   d) None of the above

28) Operations Research has the characteristics the it is done by a team of _____
(CO1) [Knowledge]
a) Scientists   b) Mathematicians   c) Academics   d) All of the above

29) Which technique is used in finding a solution for optimizing a given objective, such as profit maximization or cost minimization under certain constraints   (CO1) [Knowledge]
a) Quailing Theory b) Waiting Line   c) Both A and B   d) Linear Programming

30) The objective functions and constraints are linear relationship between _____
(CO1) [Knowledge]
a) Variables   b) Constraints   c) Functions   d) All of the above

31) The transportation problem is basically a   (CO3) [Knowledge]
a) Maximization model b) Minimization model c) Transshipment problem d) Iconic model

32) In a transportation problem where the demand or requirement is equal to the available resource is known as   (CO3) [Knowledge]
a) Balanced transportation problem   b) Regular transportation problem
c) Resource allocation transportation problem   d) Simple transportation model

33) In transportation Problems, VAM stands for   (CO3) [Knowledge]
a) Value Addition Method   b) Vogel's Approximation Method
c) Virginia Approximation Method   d) None of these

34) The Assignment Problem is solved by   (CO3) [Knowledge]
   a) Complex method   b) Graphical method   c) Vector method   d)Hungarian method

35) Which of the following methods is used to verify the optimality of the current solution of the transportation problem?   (CO3) [Knowledge]
   a) LCM   b) VAM   c) Modified distribution method   d) All of the above

36) The solution to a transportation problem with m-rows (supplies) and n-columns (destination) is feasible if the number of positive allocations are   (CO3) [Knowledge]
   a) m+n   b) m×n   c) m+n-1   d) m+n+1

Part B [Thought Provoking Questions]

Answer all the Questions. Each question carries 10 marks.   **(5Qx10M=50M)**

37) State various phases of Operations Research and explain in brief.

                                                                   (CO1) [Comprehension]

38) Briefly explain the formulation of LPP using Graphical Method.   (CO2) [Application]
   Minimize $Z = 20x + 10y$
   Subject to the constraints $x + 2y \le 40$
   $$3x + y \ge 30$$
   $$4x + 3y \ge 60$$
   where $x, y \ge 0$ using graphical method.

39) Find an optimal solution for the transportation methods using any two methods of your choice.   (CO3) [Application]

	D1	D2	D3	D4	Supply
O1	6	4	1	5	14
O2	8	9	2	7	6
O3	4	3	6	2	3
Demand	6	10	6	2	

40) Solve the assignment problem by Hungarian method   (CO3) [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

41) Construct a network diagram for each of the projects whose activities and their precedence relationships are given below: (CO3) [Comprehension]

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

Part C [Problem Solving Questions]

Answer both the questions. Each question carries 20 marks.   **(2Qx20M=40M)**

42) A small maintenance project consists of the following jobs whose precedence relationships are given below

(CO4) [Application]

Job	1-2	1-3	2-3	2-5	3-4	3-6	4-5	4-6	5-6	6-7
Duration (days)	15	15	3	5	8	12	1	14	3	14

(a) Draw an arrow diagram representing the project.
(b) Find the total float and free float for each activity.
(c) Find the critical path and the total project duration.

43) A small project is composed of seven activities whose time estimates are listed in the table as below

(CO4) [Application]

Activity	1-2	1-6	2-3	2-4	3-5	4-5	6-7	5-8	7-8
Optimistic	1	2	2	2	7	5	5	3	8
Most likely	7	5	14	5	10	5	8	3	17
Pessimistic	13	14	26	8	19	17	29	9	32

(a) Draw the Project network.
(b) Find the expected duration and variance of each activity.
(c) Find the Critical path and total duration of the project.
(d) Calculate the Variance and standard deviation of project length.

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