BRAINWARE UNIVERSITY

Term End Examination 2023-2024
Programme – Dip.ME-2022
Course Name – Operations Research
Course Code - DMEOE402A
(Semester IV)

Full Marks : 60 **Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question) 1 x 15=15

1. *Choose the correct alternative from the following :*

(i) Identify the appropriate reason for which the need of 'Operation Research' is generated.

a) International Emergency. b) Political Problem.
c) Combined efforts of talents of all fields. d) Economics and Engineering.

(ii) Examine the correct duration when Operation Research came into operation.

a) Freedom fighting movement of India. b) World War – I.
c) World War – II. d) Cold War.

(iii) Identify the number of variables have in the formulation of 5*5 assignment problem.

a) 20 b) 25
c) 30 d) 35

(iv) Identify the number of constraints have in the dual formulation of 5*5 assignment problem.

a) 15 b) 20
c) 25 d) 30

(v) The total opportunity cost matrix is observed by doing _____. Judge the correct answer.

a) Row operation on row opportunity cost matrix. b) Column operation on row opportunity cost matrix.
c) Column operation on column opportunity cost matrix. d) None of these.

(vi) If the game is having a saddle point, then select from the following that method is used to solve the game:

a) Linear Programming method b) Minimax and maximin criteria.
c) Algebraic method d) Graphical method.

(vii) In case there is no saddle point in a game then the game identified as

a) Deterministic game b) Fair game

c) Mixed strategy game
d) Multiplayer game

(viii) In a two-person zero sum game, identify from the following that does not hold correct

a) Row player is always a loser
b) Column player is always a winner
c) Column player always minimizes losses
d) If one loses, the other gains.

(ix) Identify the wrong statement:

a) Game without saddle point is probabilistic
b) Game with saddle point will have pure strategies
c) Game with saddle point cannot be solved by dominance rule
d) Game without saddle point uses mixed strategies

(x) Select wrong option from below.

a) a model should be simple and coherent
b) a model should not take much time in its construction for any problem
c) A model representing the typical budget of business accounts is called "account model"
d) a model which has the probability of measuring observations is called "qualitative model"

(xi) Determine the correct one-A constraint in an LPP restricts

a) value of objective function
b) value of a decision variable
c) use of available resource
d) uncertainity of optimum value

(xii) Non-negativity condition is an important component of LPP, because---Illustrate the correct option.

a) variables are inter-related in terms of limited resources
b) value of variables make sense and correspond to real world problems
c) value of variables should remain under the control of decision-maker
d) none of these

(xiii) Minimization of objective function in LPP determined as

a) least value chosen among the allowable decision
b) greatest value chosen among the allowable decisions
c) Both least value chosen among the allowable decision and greatest value chosen among the allowable decisions
d) none of these

(xiv) Determine "The general linear programming problem is in standard form", if

a) the constraints are strict equations
b) the constraints are inequalities of 'less than or equal to' type
c) the constraints are inequalities of 'greater than or equal to' type
d) the decision variables are unrestricted in sign

(xv) A feasible solution to an LPP illuustrate as

a) must satisfy all of the problem's constraints simultaneously
b) must be a corner point of the feasible region
c) need not satisfy all of the constraints, only some of them
d) must optimize the value of the objective function

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Illustrate the important characteristics of Decision Theory. (3)
3. Explain how Operation Research techniques are helpful I decision-making. (3)
4. Identify and explain the essential features of OR approch. (3)
5. Explain feasible solution and basic feasible solution. (3)
6. Illustrate the areas of application of network analysis. (3)

OR

Explain the phrase 'Critical path'. (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. Convert the following primal problem into dual. Minimize G = 16x - 20y subject to following constrains; 2x - 5y >= 3; 3x - 2y >= 4; x, y >0 (5)
8. Compute the value of x and y for the following problem: Minimize Z = 3x - 2y subject to the following constrains; 2x + y >= 4; x + 2y <= 6; x, y > 0 (5)
9. Evaluate the value of x and y for the following problem: Minimize Z = 3x + 4y subject to the constrains; 2x + 3y >= 12; x + 2y <= 8; x, y > 0 (5)
10. State the characteristics of Dual Problem. (5)
11. Explain Modified Distribution method with suitable numerical example. (5)
12. Illustrate Least cost method with suitable numerical example. (5)

OR

Explain Vogel approximation method with suitable numerical example. (5)

****