D 70767 (Pages : 4) Name.....

Reg. No.....

THIRD SEMESTER M.A. DEGREE (REGULAR) EXAMINATION NOVEMBER 2019

(CUCSS)

Applied Economics

Core VII—OPERATIONS RESEARCH FOR ECONOMIC ANALYSIS

Time : Three Hours Maximum : 36 Weightage

Part A

Answer **all** *questions.*
Each bunch of **four** *questions carries a weightage of* 1.

(A) Multiple Choice :

1 The term Operations Research was first coined in :

(a) 1956. (b) 1946.

(c) 1940. (d) 1944.

2 A feasible solution to a LPP which optimizes the objective function is :

(a) Optimum solution. (b) Equilibrium solution.

(c) Basic feasible solution. (d) Unbounded solution.

3 Dual of a dual gives :

(a) Primal. (b) Transpose.

(c) Inverse. (d) Transpose of dual.

4 In an assignment problem, number of rows not equal to number of columns :

(a) Balanced. (b) Maximized.

(c) Unbalanced. (d) Degenerated.

(B) Multiple Choice :

5 An artificial variable is a :

(a) Real variable. (b) Dummy variable.

(c) Fictitious variable. (d) Economic variable.

6 An activity whose float is zero is called :

(a) Real activity. (b) Prime activity.

(c) Key activity. (d) Critical activity.

7 Among the following, best example of risk is :

(a) Fall in demand. (b) Fire.

(c) Fall in price. (d) Any of the above.

8 Drawing of PERT network is based on :

(a) Expected time. (b) Optimistic time.

(c) Pessimistic time. (d) Likely time.

(C) Fill in the Blanks :

9 The first step in operational research is ————.

10 The decisions are taken on the basis of probability under ————.

11 In PERT analysis ———— is the shortest possible time for completing an activity

12 Shadow price is also called ————.

(D) State whether true *or* false :

13 Quadratic programming problem is a part of linear programming.

14 In Analogue models one set of properties is used to represent another set of properties.

15 In LPP, if the objective functions are of maximization all constraints other than non- negativity conditions are $\leq$ type.

16 The sequence of critical activities in a network is called decision tree.

(4 × 1 = 4 weightage)

Part B

Answer any **ten** *questions.*
Each question carries a weightage of 2.

17 Explain the methodology of OR.

18 Solve the following assignment problem :

		Man			
		1	2	3	4
Job	I	12	30	21	15
	II	18	33	9	31
	III	44	25	24	21
	IV	23	30	28	14

19 Explain decision making under uncertainty.

20 Briefly discuss about Kuhn-Tucker conditions.

21 Write the dual of the following LPP.

Maximize $Z = 5x_1 + 6x_2$

Subject to $x_1 + 2x_2 = 5$

$-x_1 + 5x_2 \geq 3$

$4x_1 + 7x_2 \leq 8$, and x_1 unrestricted in sign, $x_2 \geq 0$.

22 Explain the EMV criteria.

23 Distinguish between transportation and assignment problem.

24 Make a comparison between PERT and CPM.

25 Explain the procedure of simplex method.

26 Explain the decision tree analysis.

27 Briefly explain basic concepts in game theory.

28 Find the initial feasible solution to the transportation problem given below, by North West Corner rule :

	D_1	D_2	D_3	D_4	Supply
O_1	6	4	1	5	14
O_2	8	9	2	7	16
O_3	4	3	6	2	5
Demand	6	10	15	4	35

(10 × 2 = 20 weightage)

Part C

Answer any **three** *questions.*

Each question carries a weightage of 4.

29 Solve the following problem graphically

Maximize $Z = 60x + 40y$

Subject to $2x + y \leq 60$

$x \leq 25$

$y \leq 35$ and $x, y \geq 0$.

30 Define OR. Explain its scope and limitations.

31 What are the different methods of mixed strategy game problems ?

32 Using the principle of dominance, solve the following game :

$$\begin{pmatrix} 3 & -2 & 4 \\ -1 & 4 & 2 \\ 2 & 2 & 6 \end{pmatrix}.$$

33 Solve the following network technique problem by using CPM :

Activity	0-1	1-2	0-3	2-5	3-4	4-5	5-6
Duration(days)	2	4	2	1	2	5	3

(a) Draw network diagram.

(b) Calculate EST, LST, EFT, LFT.

(c) Find critical path and project duration.

(3 × 4 = 12 weightage)