

2021

COMPUTER SCIENCE — HONOURS

Paper : DSE-B-1

(Operation Research)

Full Marks : 50

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Answer **question no. 1** and **any four** from the rest.

1. Answer **any five** questions : 2×5

- (a) What do you understand by decision alternatives?
- (b) What do you mean by non-negativity constraint? Give examples.
- (c) What is the objective of judgemental phase in O.R.?
- (d) State briefly the different phases of O.R.
- (e) What do you mean by feasible solution?
- (f) Explain the rules to determine a Saddle Point.
- (g) What is triangular inequality?
- (h) State four characteristics of O.R.
- (i) Define slack and surplus variable.

2. (a) Find the initial basic feasible solution of the following transportation by least cost method.

	I	II	III	IV	Supply
A	10	30	20	13	5
B	22	9	7	16	10
C	4	32	5	29	15
Demand	5	5	10	10	

(b) What do you mean by Static and Dynamic model? 8+2

Please Turn Over

3. (a) What is the unbalanced assignment problem? How is it solved by the Hungarian method?
 (b) State and explain the different steps of Iso-Profit or Iso-Cost graphical model. 7+3
4. (a) Consider the following LP with two variables :
 Maximize $Z := 2x_1 + 3x_2$
 Subject to $\left. \begin{array}{l} -2x_1 + x_2 \leq 4 \\ x_1 + 2x_2 \leq 5 \\ x_1, x_2 \geq 0 \end{array} \right\}$ Solve it graphically
- (b) What is de-generacy in transportation problem? 8+2
5. (a) Define primal and dual solution with example.
 (b) Write the steps of the formulation of Dual problem. (2+2)+6
6. (a) Consider the following LP :
 Maximize : $Z = 2x_1 + 4x_2 + 4x_3 - 3x_4$
 Subject to $\begin{array}{l} x_1 + x_2 + x_3 = 4 \\ x_1 + 4x_2 + x_4 = 8 \\ x_1, x_2, x_3, x_4 \geq 0. \end{array}$
- (b) What do you understand by Zero Sum Game? 8+2
7. Write short notes on *any two* : 5×2
 (a) Assignment Problem
 (b) North-West Corner Method
 (c) Critical Path Method.
8. (a) Construct the PERT network for the following profit schedule.

Activity	Name	Time (days)	Activity	Name	Time (days)
1 – 2	A	4	5 – 6	G	4
1 – 3	B	1	5 – 7	H	8
2 – 4	C	1	6 – 8	I	1
3 – 4	D	1	7 – 8	J	2
3 – 5	E	6	8 – 10	K	5
4 – 9	F	5	9 – 10	L	7

- (b) What do you mean by objective function? 8+2