Roll No. ....

Paper Code – 0508

B.Sc. (Part-III) EXAMINATION, 2023

(New Course)

(Vocational Course)

INFORMATION TECHNOLOGY

Paper : Second

(Operations Research and Optimization Techniques)

Time : Three Hours]   [Maximum Marks : 50

Note- Attempt questions from all sections as directed.

Inst.- The candidates are required to answer only in serial order. If there are many parts of a question, answer them in continuation.
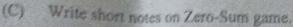
Section-A

(Short Answer Type Questions)

Note- All questions are compulsory. Each question carries 3 marks.

1.   (A)   What is Operation Research? Explain the situations where operation Research (O.R.) will be applied.

       (B)   What do you mean by unbalanced transportation problem?

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(C) Write short notes on Zero-Sum game.

(D) Solve Graphically-
Maximize $Z = 40x_1 + 100x_2$ subject to the constraints.
$2x_1 + x_2 \leq 500$
$2x_1 + 5x_2 \leq 1000$
$x_1, x_2 \geq 0$

(E) Explain the transient and steady state of queuing system.

(F) Explain how network analysis can be used for resource planning.

Section-B

(Long Answer Type Questions)

Note- Attempt any **two** questions. Each question carries **8** marks.

2. Explain the basic characteristics of O.R. (Operation Research).

3. Solve the following Assignment Problem.

Machines

	M₁	M₂	M₃	M₄
J₁	18	26	17	11
J₂	13	28	14	26
J₃	38	19	18	15
J₄	19	26	24	10

Jobs

4. Solve the following by Simplex Method –
Maximize $z = 2x_1 + 2x_2 + 4x_3$
Subject to the Constraints:
$2x_1 + 3x_2 + x_3 \leq 300$
$x_1 + x_2 + 3x_3 \leq 300$
$x_1 + 3x_2 + x_3 \leq 240$
$x_1, x_2, x_3 \geq 0$

5. Write short notes on the following :
   (a) Slack Variable
   (b) Surplus Variable
   (c) Feasible Solution
   (d) Optimal Solution

Section-C

(Long Answer Type Questions)

Note - Attempt any **two** questions. Each question carries **8** marks.

6. In a Telephone booth, the Arrivals follows Poisson distribution with on average of 9 minutes between two consecutive arrivals. The duration of a telephone call is exponential with an average of 3 minute.

   (i) Find the probability that a person arriving at the booth has to wait.

   (ii) Find the average queue length.

   (iii) Find the fraction of the day, the phone will be in use.