Reg. No. | | | | | | | | |

G. VENKATASWAMY NAIDU COLLEGE (AUTONOMOUS), KOVILPATTI – 628 502.

UG DEGREE END SEMESTER EXAMINATIONS - NOVEMBER 2024.

(For those admitted in June 2021 and later)

PROGRAMME AND BRANCH: B.Sc., INFORMATION TECHNOLOGY

SEM	CATEGORY	COMPONENT	COURSE CODE	COURSE TITLE
IV	PART-III	CORE ELECTIVE	U21IT4E2A	OPERATIONS RESEARCH & NUMERICAL ANALYSIS

Date & Session: 15.11.2024 / AN **Time : 3 hours** **Maximum: 75 Marks**

Course Outcome	Bloom's K-level	Q. No.	**SECTION – A (10 X 1 = 10 Marks)** **Answer ALL Questions.**
CO1	K1	1.	When total supply is equal to total demand in a transportation problem, the problem is said to be. a) Balanced b) Unbalanced c) Degenerate d) None of the above
CO1	K2	2.	Which technique is used in finding a solution for optimizing a given objective, such as profit maximization or cost reduction under certain constraints? a) Quailing Theory b) Waiting Line c) Both A and B d) Linear Programming
CO2	K1	3.	In transportation Problems, VAM stands for _____. a) Value Addition Method b) Vogel's Approximation Method c) Virgenean Approximation Method d) None of these
CO2	K2	4.	The transportation problem is basically a. a) Maximization model b) Minimization model c) Transshipment problem d) Iconic model
CO3	K1	5.	Sequencing is subset of --------. a) Routing b) Scheduling c) Expediting d) none of these
CO3	K2	6.	When sequencing jobs , an approach which may be used to help cash constrained situation is _____. a) Shortest operation time first b) Last in First Out c) First in first Out d) Longest operation time first
CO4	K1	7.	The matrix A=[4 12 36] is. a) Column matrix b) Row matrix c) Horizontal matrix d) Scalar matrix
CO4	K2	8.	If A is a square matrix such that $A^2 = A(I-A)^3 + A$ is equal to. a) I b) 0 c) I-A d) I+A
CO5	K1	9.	The process of computing y corresponding x where x<x is called as. a) Interpolation b) Extrapolation c) Curve fitting d) None of these
CO5	K2	10.	The modification of Gauss elimination method is called as _____. a) Gauss Seidal b) Jacobi's Method c) Gauss Jordan d) Relaxation Method
Course Outcome	**Bloom's K-level**	**Q. No.**	**SECTION – B (5 X 5 = 25 Marks)** **Answer ALL Questions choosing either (a) or (b)**
CO1	K3	11a.	What is transportation problem? Formulation of Transportation. **(OR)**
CO1	K3	11b.	Write the difference between Transportation Problem vs. Assignment Problem.

<table>
<tr><td>CO2</td><td>K3</td><td>12a.</td><td>Write the steps of Assignment problem.
(OR)</td></tr>
<tr><td>CO2</td><td>K3</td><td>12b.</td><td>Solve the following assignment problem.
<table>
<tr><td></td><td>1</td><td>2</td><td>3</td></tr>
<tr><td>P</td><td>9</td><td>26</td><td>15</td></tr>
<tr><td>Q</td><td>13</td><td>27</td><td>6</td></tr>
<tr><td>R</td><td>35</td><td>20</td><td>15</td></tr>
<tr><td>S</td><td>18</td><td>30</td><td>20</td></tr>
</table></td></tr>
<tr><td>CO3</td><td>K4</td><td>13a.</td><td>Illustrate Processing a job through machines.
(OR)</td></tr>
<tr><td>CO3</td><td>K4</td><td>13b.</td><td>A company has to process five items on three machine A,B.C Processing times are given in the following table. Find the sequence that minimizes the total elapsed time.
<table>
<tr><td>Item</td><td>A</td><td>B</td><td>C</td></tr>
<tr><td>1</td><td>4</td><td>4</td><td>6</td></tr>
<tr><td>2</td><td>9</td><td>5</td><td>9</td></tr>
<tr><td>3</td><td>8</td><td>3</td><td>11</td></tr>
<tr><td>4</td><td>6</td><td>2</td><td>8</td></tr>
<tr><td>5</td><td>3</td><td>6</td><td>7</td></tr>
</table></td></tr>
<tr><td>CO4</td><td>K4</td><td>14a.</td><td>Illustrate Determinant of Matrix with example.
(OR)</td></tr>
<tr><td>CO4</td><td>K4</td><td>14b.</td><td>Solve the following equation of gauss elimination method.
x+y+z=2 , x+2y+3Z , 2x+3Y+4Z=11</td></tr>
<tr><td>CO5</td><td>K5</td><td>15a.</td><td>Discuss Newton’s Interpolation formula.
(OR)</td></tr>
<tr><td>CO5</td><td>K5</td><td>15b.</td><td>Solve the following system by the Gauss elimination method.
x+3y=7 and 3x+4y=11</td></tr>
</table>

<table>
<tr><th>Course Outcome</th><th>Bloom’s K-level</th><th>Q. No.</th><th><u>SECTION – C</u> (5 X 8 = 40 Marks)
Answer <u>ALL</u> Questions choosing either (a) or (b)</th></tr>
<tr><td>CO1</td><td>K3</td><td>16a.</td><td>Define LLP Problem and its method.
(OR)</td></tr>
<tr><td>CO1</td><td>K3</td><td>16b.</td><td>Solving Balanced Transportation problem by Northwest Corner Method
Consider this scenario:
<table>
<tr><td rowspan="6"></td><td></td><td>D1</td><td>D2</td><td>D3</td><td>D4</td><td>Supply</td></tr>
<tr><td>O1</td><td>3</td><td>1</td><td>7</td><td>4</td><td>300</td></tr>
<tr><td>O2</td><td>2</td><td>6</td><td>5</td><td>9</td><td>400</td></tr>
<tr><td>Sources</td><td>O3</td><td>8</td><td>3</td><td>3</td><td>2</td><td>500</td></tr>
<tr><td>Demand</td><td>250</td><td>350</td><td>400</td><td>200</td><td>1200</td></tr>
</table>
Destination</td></tr>
<tr><td>CO2</td><td>K4</td><td>17a.</td><td>Solve the following assignment problem. Cell values represent cost of assigning job A, B, C and D to the machines I, II, III and IV.
<table>
<tr><td></td><td>I</td><td>II</td><td>III</td><td>IV</td></tr>
<tr><td rowspan="4">JOBS</td><td>10</td><td>12</td><td>19</td><td>11</td></tr>
<tr><td>5</td><td>10</td><td>7</td><td>8</td></tr>
<tr><td>12</td><td>14</td><td>13</td><td>11</td></tr>
<tr><td>8</td><td>15</td><td>11</td><td>9</td></tr>
</table>
Machines
(OR)</td></tr>
<tr><td>CO2</td><td>K4</td><td>17b.</td><td>Give the mathematical Formulation of Assignment problem.</td></tr>
<tr><td>CO3</td><td>K4</td><td>18a.</td><td>Discuss the basic terminologies used in Sequencing Problem.
(OR)</td></tr>
<tr><td>CO3</td><td>K4</td><td>18b.</td><td>Explain the types of Sequencing problem.</td></tr>
<tr><td>CO4</td><td>K5</td><td>19a.</td><td>Define Matrix and its types.</td></tr>
<tr><td>CO4</td><td>K5</td><td>19b.</td><td>(OR)
How to find Inverse Matrix with example.</td></tr>
<tr><td>CO5</td><td>K5</td><td>20a.</td><td>Briefly explain Newton Forward and Backward Interpolation.
(OR)</td></tr>
<tr><td>CO5</td><td>K5</td><td>20b.</td><td>Solve the following system using Gauss-Jordan method, 2x+y+2z=10 and x+2y+z=8 and 3x+y−z=2</td></tr>
</table>