**Linear Algebra UNIT-2 (Rank of Matrix)**

**Tutorial Sheet**

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| **Rank of matrix** | |
| Q.01 | Reduce the following matrices to Row Echelon form and find its rank.  a)b) c)  Ans[3,2,2] |
| Q.02 | For what values of the matrix, has (i) rank 1, (ii) rank 2, or (iii) rank 3. |
| Q.03 | For what values of, the matrix has rank 1, rank 2 or rank 3. |
| Q.04 | Solve .  [Ans. ] |
| Q.05 | Solve .  [Ans. ] |
| Q.06 | Solve .  [Ans. ] |
| Q.07 | Determine the value of constant such that the system of homogeneous equations has i) trivial solution, ii) non-trivial solution. Find the non-trivial solution.  [Ans. i) , ii) ; ] |
| Q.08 | Determine the values of for which the system of equations has non-trivial solutions. Find them.  ,  ,  [Ans. i) , ii) ] |
| Q.09 | Investigate for what values of  and µ the equations have i) no solution, ii) unique solution and iii) many solutions.  [Ans. i) , ii) has any value, iii)] |
| Q.10 | Determine the values of  for which the following equations are consistent. Also solve the system for these values of. .  [Ans. For . For ] |

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| **Gauss Elimination Method** | |
| Q.11 | Solve the following using Gauss Elimination Method: |
| i. |  |
| ii. |  |
| iii. |  |
| **LU Decomposition** | |
| Q.12 | Solve the following using LU Decomposition Method: |
| i. |  |
| ii. |  |
| iii. |  |
|  |  |
| **Linear Combination of vectors:**  Q13. Write *v* as a linear combination of *u1, u2, u3* | |
|  | 1. v = (3, 7, -4) and u1 = (1, 2, 3), u2 = (2, 3, 7), u3 = (3, 5, 6).   *[Ans:v=2u1-4u2+3u3]*   1. v = (5, 9, 5) and u1=(2, 1, 4), u2=(3, 2, 5) u3=(1, -1, 3). |
|  | **Ans:** (*5, 9, 5) = 3(2, 1, 4) + 1 (3, 2, 5) + ( - 4) (1, -1, 3)*   1. v = (3, 10, 7) and u1 = (1, 3, -2), u2 = (1, 4, 2), u3 = (2, 8, 1).   *Ans: v = 2u1 + 7u2 - 3u3*   1. v = (2, 7, 10) and u1 = (1, 2, 3), u2 = (1, 3, 5), u3 = (1, 5, 9).   *Ans: No solution*   1. v = (1, 5, 4) and u1 = (1, 3, -2), u2 = (2, 7, -1), u3 = (1, 6, 7).   *Ans: v = 2u1 -2u2 + u3* |
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