NAME = Vimal Joshi

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COURSE = BSC HONS COMPUTER SCIENCE

PRACTICAL 4

GAUSSIAN ELIMINATION METHOD AND GAUSS-JORDAN METHOD:-

1-GAUSSIAN ELIMINATION METHOD:-

Q:1 SOLVE THE FOLLOWING SYSTEM OF EQUATIONS BY USING GAUSSUIAN elimination method-

```
MatrixForm[A = {{2, -3, 10, -2}, {1, -2, 3, -2}, {-1, 3, 1, 4}}]
```

$$\begin{pmatrix} 2 & -3 & 10 & -2 \\ 1 & -2 & 3 & -2 \\ -1 & 3 & 1 & 4 \end{pmatrix}$$

```
MatrixForm[A = {A[[2]], A[[1]], A[[3]]}]
```

$$\begin{pmatrix} 1 & -2 & 3 & -2 \\ 2 & -3 & 10 & -2 \\ -1 & 3 & 1 & 4 \end{pmatrix}$$

```
MatrixForm[A = {A[[1]], A[[2]] - 2 A[[1]], A[[3]] + A[[1]]}]
```

$$\begin{pmatrix} 1 & -2 & 3 & -2 \\ 0 & 1 & 4 & 2 \\ 0 & 1 & 4 & 2 \end{pmatrix}$$

```
MatrixForm[A = {A[[1]], A[[2]], A[[3]] - A[[2]]}]
```

$$\begin{pmatrix} 1 & -2 & 3 & -2 \\ 0 & 1 & 4 & 2 \\ 0 & 0 & 0 & 0 \end{pmatrix}$$

```
Solve[{x1 - 2 x2 + x3 == -2, x2 + 4 x3 == 2}, {x3, x2, x1}]
```

Solve: Equations may not give solutions for all "solve" variables.

$$\{\{x_2 \to 2 - 4\, x_3,\ x_1 \to 2 - 9\, x_3\}\}$$

```
MatrixForm[A = {{2, 1, 1, 10}, {3, 2, 3, 18}, {1, 4, 9, 16}}]
```

$$\begin{pmatrix} 2 & 1 & 1 & 10 \\ 3 & 2 & 3 & 18 \\ 1 & 4 & 9 & 16 \end{pmatrix}$$

```
MatrixForm[A = {A[[1]], A[[2]] - 3 / 2 A[[1]], A[[3]] - 1 / 2 A[[1]]}]
```

```
{{2, 1, 1, 10}, {3, 2, 3, 18}, {1, 4, 9, 16}}
```

$$\begin{pmatrix} 2 & 1 & 1 & 10 \\ 0 & \frac{1}{2} & \frac{3}{2} & 3 \\ 0 & \frac{7}{2} & \frac{17}{2} & 11 \end{pmatrix}$$

```
MatrixForm[A = {A[[1]], A[[2]], A[[3]] - 7 A[[2]]}]
```

$$\begin{pmatrix} 2 & 1 & 1 & 10 \\ 0 & \frac{1}{2} & \frac{3}{2} & 3 \\ 0 & 0 & -2 & -10 \end{pmatrix}$$

```
Solve[{2 x1 + x2 + x3 == 10, 1 / 2 x2 + 3 / 2 x3 == 3, -2 x3 == -10}, {x1, x2, x3}]
```

```
{{x1 → 7, x2 → -9, x3 → 5}}
```

gauss – jordan elimination method : –

```
MatrixForm[B = {{2, 1, 1, 10}, {3, 2, 3, 18}, {1, 4, 9, 16}}]
```

$$\begin{pmatrix} 2 & 1 & 1 & 10 \\ 3 & 2 & 3 & 18 \\ 1 & 4 & 9 & 16 \end{pmatrix}$$

```
MatrixForm[RowReduce[B]]
```

$$\begin{pmatrix} 1 & 0 & 0 & 7 \\ 0 & 1 & 0 & -9 \\ 0 & 0 & 1 & 5 \end{pmatrix}$$