Questions 7 and 8

Consider the following set of simultaneous linear algebraic equations.

$$\begin{aligned} x_1 + 4x_2 + 7x_3 &= 2 \quad E_1 \\ 2x_1 - 2x_2 - 3x_3 &= 5 \quad E_2 \\ -3x_1 - 2x_2 + 5x_3 &= 3 \quad E_3 \end{aligned}$$

7 Select the option which describes the first step in the process of Gaussian elimination with only essential row interchanges when applied to the above set of equations.

8 Select the option which describes the first step in the process of Gaussian elimination with partial pivoting when applied to the above set of equations.

Options for Questions 7 and 8

A Interchange E_1 and E_2.

B Interchange E_1 and E_3.

C Interchange E_2 and E_3.

D Add $2E_1$ to E_2 and subtract $3E_1$ from E_3.

E Subtract $2E_1$ from E_2 and add $3E_1$ to E_3.

F Add $\frac{1}{2}E_1$ to E_2 and subtract $\frac{1}{3}E_1$ from E_3.

G Subtract $\frac{1}{2}E_1$ from E_2 and add $\frac{1}{2}E_1$ to E_3.

Questions 9 to 11

Three simultaneous linear equations are written in matrix form. The matrix obtained at the end of the Gaussian elimination process is

$$\left[\begin{array}{ccc|c} 3 & 2 & 1 & 7 \\ 0 & 2 & 3 & 5 \\ 0 & 0 & (k-2) & (k-1)(k-2) \end{array}\right],$$

where k is some number.

9 For what value or values of k do the equations have no solution?

10 For what value or values of k do the equations have a unique solution?

11 For what value or values of k do the equations have an infinite number of solutions?

Options for Questions 9 to 11

A No values of k

B Only $k = 1$

C Only $k = 2$

D Only $k = 1$ and 2

E All values of k except $k = 1$ and 2

F All values of k except $k = 1$

G All values of k except $k = 2$

H All values of k