Gauss-Jordan Method:-

This is a modification of the Gauss elimination method. In this method elimination of unknowns is performed not in the equations below but in the equations above also, ultimately reducing the system to a diagonal matrix form i.e. each equation involving only one unknown. From these Eqn. the unknowns x y z can be obtained readily.

Exp. To solve the equations by Gauss-Jordan method.

$$x+y+z=9 \quad \text{------ (i)}$$
$$2x-3y+4z=13 \quad \text{------ (ii)}$$
$$3x+4y+5z=40 \quad \text{------ (iii)}$$

Solution (1) To eliminate x from (ii) & (iii) by operate (ii) − 2(i) and (iii) − 3(i)

$$x+y+z=9 \quad \text{------ (iv)}$$
$$-5y+2z=-5 \quad \text{------ (v)}$$
$$y+2z=13 \quad \text{------ (vi)}$$

(2) - To eliminate y from (iv) and (vi) using operate (iv) + $\frac{1}{5}$(v) and (vi) + $\frac{1}{5}$(v) then

$$x+\frac{7}{5}z=8 \quad \text{------ (vii)}$$
$$-5y+2z=-5 \quad \text{------ (viii)}$$
$$\frac{12}{5}z=12 \quad \text{------ (ix)}$$

(3) → operate (vii) $- \frac{7}{12}$ (ix) and (viii) $- \frac{5}{6}$ (ix)
to eliminate z from (vii) and (viii)

$$x = 1$$

$$-5y = -15 \Rightarrow y = 3$$

$$\frac{12}{5} z = 12 \Rightarrow z = 5$$

Hence the solution is $x = 1$, $y = 3$ and $z = 5$