B.SC-III, paper-VI, group-B. (Condensed Matter physics)

:- CRYSTAL LATTICE AND TRANSLATION VECTORS :-

An arrangement of infinite no. of imaginary points in 3-D space with each point having identical surroundings is known as point lattice or space lattice.

The term identical surroundings means that the lattice has the same appearance when viewed from a point 'r' in the lattice as it has when viewed from any other point 'r' with respect to some arbitrary origin. This is possible only if the lattice contains a small group of points, called a pattern unit which repeats itself in all directions by means of a translational operation T

$$\therefore T = n_1 a + n_2 b + n_3 c$$

where n_1, n_2, & n_3 are arbitrary integers and the vectors a, b & c are called the fundamental translation vectors.

$$\text{Thus, } r' = r + T = r + n_1 a + n_2 b + n_3 c$$

The translation vectors a, b, c are also called the crystal axes or basis vectors.

Translational vectors which produce a translation operation containing integral coefficients are called primitive translation vectors.