Long Answer Type Questions

[4 MARKS]

Que 1. Read the following statement:

"A square is a polygon made up of four line segments, out of which, length of three line segments are equal to the length of fourth one and all its angles are right angles." Define the terms used in this definition which you feel are necessary. Are necessary. Are there any undefined terms in this? Can you justify that all angles and sides of a square are equal?

Sol. Undefined terms used: line, point.

The terms that need to be defined are:

Polygon: A simple closed figure made up of three of more line segments.

Line segment: Part of a line with two end points.

Angle: A figure A figure formed by two rays with a common initial point.

Ray: Part of a line with one end point.

Right angle: Angle whose measure is 90^0.

Euclid's fourth postulate says that "all right angles are equal to one another."

In a square, all angles are right angles, therefore, all angles are equal.

Three line segments are equal to fourth line segment (Given).

Therefore, all the four sides of a square are equal. (By Euclid's first axiom, "things which are equal to the same thing are equal to one another."

Que 2. Consider two postulates given below:

$(\boldsymbol{i})$ **Given any two distinct points $\boldsymbol{A}$ and $\boldsymbol{B}$, there exists a third point $\boldsymbol{C}$ which is in between $\boldsymbol{A}$ and $\boldsymbol{B}$.**

$(\boldsymbol{ii})$ **There exists at least three points that are not on the same line.**

Do these postulates contain any undefined terms? Are these postulates consistent? Do they follow Euclid's postulates? Explain.

Sol. Undefined terms used: line, point. They are consistent, because they deal with two different situations.

Postulate (i) says that given two points A and B, there is a point C lying on the line in between them.

Postulate (ii) says that given A and B, we cannot take C not lying on the line through A and B. These 'postulates' do not follow Euclid's postulates. However, they follow axiom stated as given two distinct points, there is a unique line that passes through them.