## HOTS (Higher Order Thinking Skills)

**Que 1. If a point O lies between two points P and R such that PO = OR then prove that PO = $\frac{1}{2}$ PR.**

**Sol. Proof:** From Fig. 5.9,

PO + OR = PR …(i)

PO = OR (Given) …(ii)

PO + PO = PR [Using (ii) in (i)]

2PO = PR

PO = $\frac{1}{2}$ PR

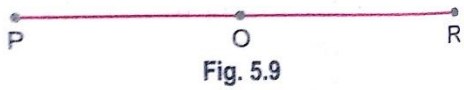

Fig. 5.9

**Que 2. Prove that every line segment has one and only one mid-point.**

**Sol. Proof:** Let us prove this statement by contradiction method. Let us assume that the line segment PT has two midpoints R and S.

Fig. 5.10

⇒ PR = $\frac{1}{2}$ PT

PS = $\frac{1}{2}$ PT (∵ R and S are mid-point according to assumption)

⇒ PR = PS

But this is possible only if R and S coincide.

**Que 3. Does Euclid's fifth postulate imply the existence of parallel lines? Explain.**

**Sol.** If straight line $l$ falls on two straight lines m and n such that the sum of interior angles on same side of $l$ is $180^0$, then by Euclid's $5^{th}$ postulates the lines will not meet on this side of $l$.

Also, the sum of interior angles on other side of $l$ will be $180^0$, they will not meet on the other side also.

⇒ m and n never meet ⇒ m and n are parallel.