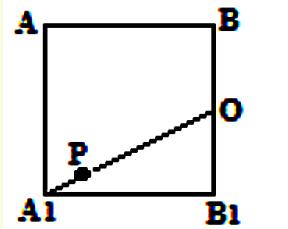




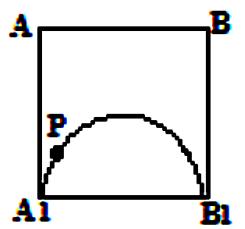
Knowledge Error

Question

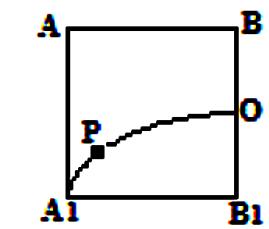
As shown in the figure, within the side face AB_1 of the cube $ABCD-A_1B_1C_1D_1$, there is a moving point P whose distance to line AB equals its distance to line B_1C_1 . The shape of the curve on which the moving point P is located is ()



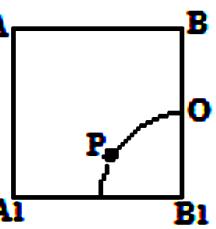
A.



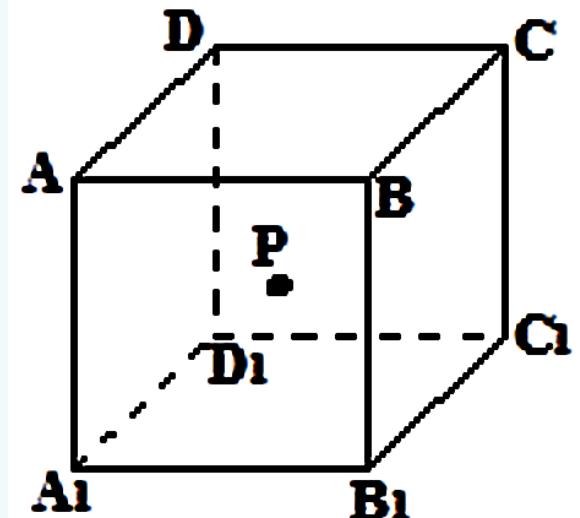
B.



C.



D. ↵



Ground Truth

C

Model's answer

In the cube $ABCD-A_1B_1C_1D_1$, we analyze the distance from the moving point P to the two lines AB and B_1C_1 .

Step 1: Understanding the problem: Point P is located on the side face AB_1 of the cube. The distances from P to AB and B_1C_1 are equal.

Step 2: Geometric relationship analysis: Line AB is parallel to line B_1C_1 and both are located in plane $ABCD$. Therefore, finding the perpendicular distance from P to these two lines is essentially solving for the intersection of a cylindrical surface with a plane.

Step 3: Parabola definition: In space, **when a point's distance to a fixed point (focus) equals its distance to a fixed line (directrix), the trajectory is a parabola**. Therefore, here we can view AB and B_1C_1 as fixed points, and P 's trajectory satisfies this condition.

Step 4: Examining the graphical options: A. Parabola passing through the intersection of A_1B_1 B. Parabola passing through the extension of B_1C_1 C. The domain of the parabola doesn't match the cube structure D. Inverse proportional function form, doesn't correspond

Conclusion: Based on the above analysis, the curve on which the moving point P is located should be a parabola. Therefore, the correct answer is **option A**.

ORM's Feedback

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