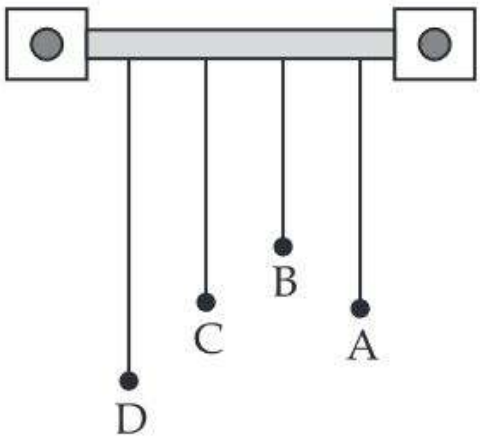
Q14.7. Four pendulums A, B, C and D are suspended from the same elastic support as shown in figure. A and C are of the same length, while B is smaller than A and D is larger than A. If A is given a transverse displacement.



(*a*) D will vibrate with maximum amplitude.

(*b*) C will vibrate with maximum amplitude.

(*c*) B will vibrate with maximum amplitude.

(*d*) All the four will oscillate with equal amplitude.

SOLUTION :

First thing to notice is that length of string 'A' & 'C' are equal.

So Time Period of oscillation

$$T = 2\pi\sqrt{\frac{l}{g}}$$

l = length of 'A'
= length of 'C'

So, the disturbance produce in elastic rigid support of time period 'T', which is transmitted to all pendulum, B, C, D, but the frequency or time period of 'C' is same as of 'A'.

So, this will produce resonance in 'C' and 'C' will vibrate with maximum as in resonance.

Hence, the option (b) is correct.