QUESTION: If the roots of equation $a(b-c)x^2+b(c-a)x+c(a-b)=0$ be equal then a, b, c are in

OPTIONS:

a) H.P
b) A.P
c) G.P
d) All of these

SOLUTION:

$$a(b-c)x^2+b(c-a)x+c(a-b)=0$$

$$roots\ \ of\ \ the\ equations\ are\ equal\ if\ \ B^2-4AC=0$$

$$Now$$

$$\left(b(c-a)\right)^2-4\left(a(b-c)\cdot c(a-b)\right)=0$$

$$b^2(c-a)^2-4ac(b-c)(a-b)=0 \quad ....(i)$$

$$Let\ \ a,b,c\ \ are\ \ in\ \ H.P.\ then$$

$$b=\frac{2ac}{a+c}$$

$$\left(\frac{2ac}{a+c}\right)^2(c-a)^2-4ac\left(\frac{2ac}{a+c}-c\right)\left(a-\frac{2ac}{a+c}\right)=0$$

$$\left(\frac{2ac}{a+c}\right)^2(c-a)^2-4ac\left(\frac{ac-c^2}{a+c}\right)\left(\frac{a^2-ac}{a+c}\right)=0$$

$$\left(\frac{2ac}{a+c}\right)^2(c-a)^2-4a^2c^2\left(\frac{a-c}{a+c}\right)\left(\frac{a-c}{a+c}\right)=0$$

$$\left(\frac{2ac}{a+c}\right)^2(c-a)^2-4a^2c^2\left(\frac{a-c}{a+c}\right)^2=0$$

$$\left(\frac{2ac}{a+c}\right)^2(c-a)^2-4a^2c^2\left(\frac{c-a}{a+c}\right)^2=0$$

$$\left(\frac{2ac}{a+c}\right)^2(c-a)^2-\left(\frac{2ac}{a+c}\right)^2(c-a)^2=0$$

Thus

Condition (i) *is hold such that* a, b, c *are in* $H.P.$