Sequence and Series - Class XI

Past Year JEE Questions

Questions

Quetion: 01

If the sum of an infinite GP a, ar, ar^2, ar^3, ... is 15 and the sum of the squares of its each term is 150, then the sum of ar^2, ar^4, ar^6, ... is :

A. $\frac{5}{2}$

B. $\frac{1}{2}$

C. $\frac{25}{2}$

D. $\frac{9}{2}$

Solutions

Solution: 01

Explanation

Sum of infinite terms :

$\frac{a}{1-r} = 15$ ..... (i)

Series formed by square of terms :

a^2, a^2r^2, a^2r^4, a^2r^6 .....

Sum = $\frac{a^2}{1-r^2} = 150$

$\Rightarrow \frac{a}{1-r}\frac{a}{1+r} = 150 \Rightarrow 15.\frac{a}{1+r} = 150$

$\Rightarrow \frac{a}{1+r} = 10$ ..... (ii)

by (i) and (ii), a = 12; r = $\frac{1}{5}$

Now, series : ar^2, ar^4, ar^6

Sum = $\frac{ar^2}{1-r^2} = \frac{12.\left(\frac{1}{25}\right)}{1-\frac{1}{25}} = \frac{1}{2}$