For Geometric Series : $1+r+r^2+\ldots\ldots\infty$

(1) Convergent if $|r|\leq 1$

(2) Divergent if $|r|\geq 1$

(3) Oscillatory if $r\leq -1$

Eg: (1) G.P :- $1+\frac{1}{2}+\frac{1}{4}+\ldots\ldots\infty$

Sol^n :- Here, $r=\frac{1/2}{1}=\frac{1}{2}$

$\therefore r\leq 1 \Rightarrow$ G.P is convergent

(2) G.P :- $1-\frac{1}{3}+\frac{1}{3^2}+\ldots\ldots\infty$

Sol^n :- Here, $r=\frac{-1/3}{1}=-\frac{1}{3}$

$\therefore r\leq 1 \Rightarrow$ G.P is convergent

(3) G.P :- $2+4+8+\ldots\ldots\infty$

Sol^n :- Here, $r=2$

$\therefore r\geq 1 \Rightarrow$ G.P is divergent

(4) G.P :- $-2+(-2)^2+(-2)^3+\ldots\ldots\infty$

Sol^n :- Here, $r=-2$

$\therefore r\leq -1 \Rightarrow$ G.P is oscillatory