

COMPOUND INTEREST

चक्रवृद्धि ब्याज is successive % increase.

2 sheets 200⁺Q
(12-13) class



Conversion of months into Years

12 Months = 1 year (12 महीने = 1 साल)

$$1 \text{ months} \rightarrow \frac{1}{12} \text{ yrs}$$

$$3 \text{ months} \rightarrow \frac{3}{12} \text{ yrs} = \frac{1}{4} \text{ yrs}$$

$$8 \text{ months} \rightarrow \frac{8}{12} \text{ yrs} = \frac{2}{3} \text{ yrs}$$

Conversion of Days into Years :-

365 Day = 1 year (365 दिन = 1 साल)

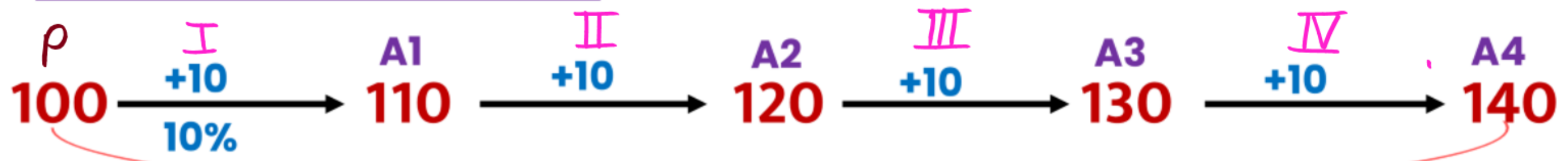
$$1 \text{ Day} \rightarrow \frac{1}{365} \text{ yrs}$$

$$73 \text{ Day} \rightarrow \frac{73}{365} \text{ yrs} = \frac{1}{5} \text{ yrs}$$

$$146 \text{ Day} \rightarrow \frac{146}{365} \text{ yrs} = \frac{2}{5} \text{ yrs}$$

For S.I

माना
 $P = 100 \text{ Rs.}$ $R = 10\% \text{ p.a}$

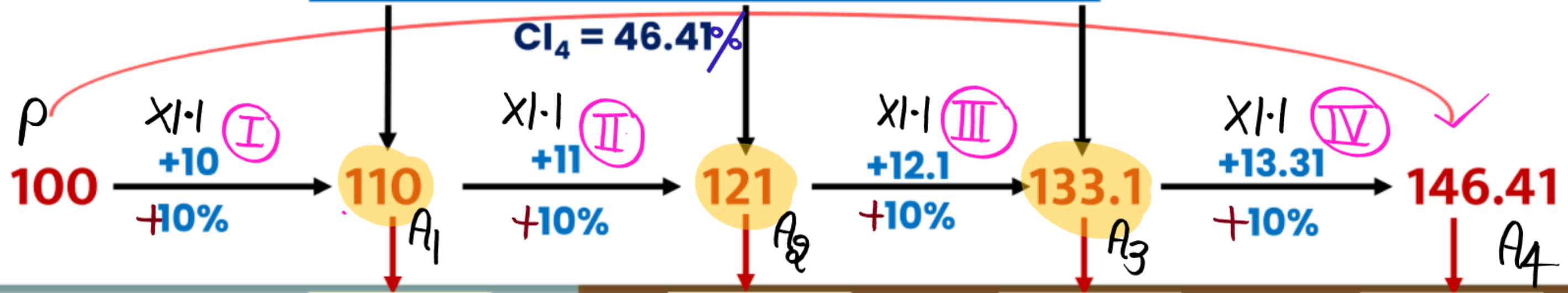


$SI_4 = 40\% = 10\% \times 4$

For C.I

$P = 100 \text{ Rs.}$ $R = 10\% \text{ p.a}$

2nd year का Principal 3rd year का Principal 4th year का Principal ✓



$CI_4 = 46.41\%$

Amount after 1 year Amount after 2 year Amount after 3 year Amount after 4 year

$CI > SI$

is successive % increase

Rate = $10\% \text{ p.a}$ $M.F \times 1.1 \times 1.1 \times 1.1 \times 1.1$

G.P. $\rightarrow$ 8, 24, 72, 216 - - -

$\times 3$ $\times 3$ $\times 3$



{ 100 ✓
formula ✓
Ratio ✓



$$SI_4 = 40\%$$

$$CI_4 = 46.41\%$$



$$10\%, 10\%$$

$$10\% \& 10\%$$

$$21\%$$

$$21\%$$

$$CI_4 = 46.41\%$$

$$\left(x + y + \frac{xy}{100} \right) \%$$

$$\left(\frac{x}{100} + \frac{y}{100} + \frac{x}{100} \times \frac{y}{100} \right) \%$$

$$(10 + 10 + 10 \times 10) \%$$

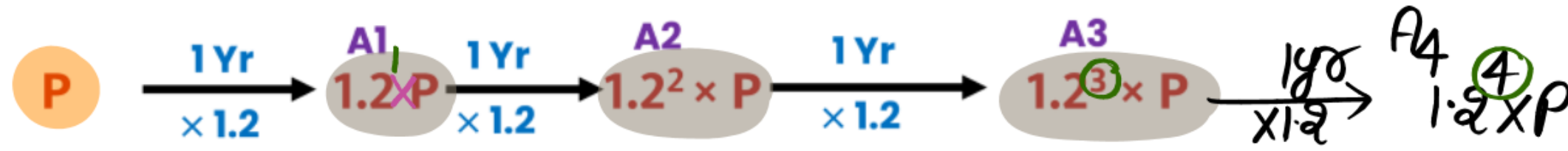
$$(40 + 4.41) \%$$



C.I में Amount G.P में होते हैं।

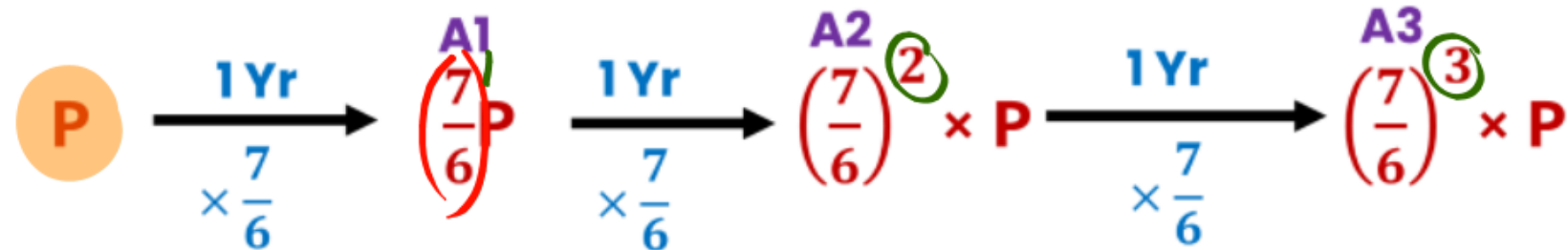
R = 20% p.a

M.F
 $\times 1.2$



जहाँ R = $16\frac{2}{3}\%$ p.a = $+\frac{1}{6}$

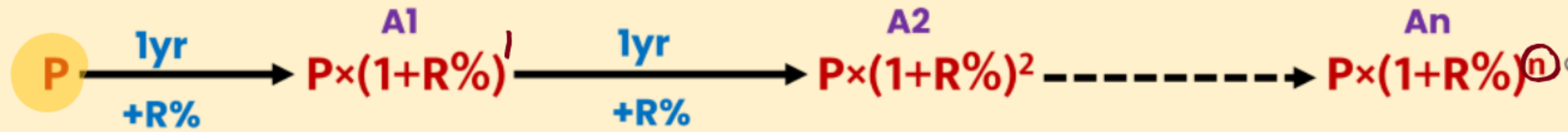
M.F
 $\times \frac{7}{6}$



$1.2P \times 1.2$
 $1.2^2 P \times 1.2$

$\times \left(1 + \frac{1}{6}\right)$

$$Rate = R\% p.a \quad \text{M.F} \times (1+R\%)$$



P R % p.a C.I yearly

$$A_n = P \times (1 + R\%)^n$$

$$A_n = P \times \left(1 + \frac{R}{100}\right)^n \quad \checkmark$$

$$CI_n = P \times [(1+R\%)^n - 1]$$

$$CI_n = A_n - P$$

$$= P \times \left(1 + \frac{R}{100}\right)^n - P$$

$$CI_n = P \times \left[\left(1 + \frac{R}{100}\right)^n - 1\right]$$

EXAMPLE

$$+16\frac{2}{3}\% p.a = +\frac{1}{6}$$

m.f
1 year $\times \frac{7}{6}$

$$\frac{A_3}{P} = \left(\frac{7}{6}\right)^3 = \frac{343}{216}$$

$$\frac{A_2}{P} = ?$$

$$\frac{A_7}{A_3} = ?$$

$$A_2 = P \times \left(\frac{7}{6}\right)^2$$

2 years
m.f

$$\frac{A_2}{P} = \left(\frac{7}{6}\right)^2 = \frac{49}{36}$$

$$\frac{A_7}{A_3} = \frac{P \times \left(\frac{7}{6}\right)^7}{P \times \left(\frac{7}{6}\right)^3} = \left(\frac{7}{6}\right)^4$$

4 years
m.f

$$\frac{A_7}{A_3} = \left(\frac{7}{6}\right)^4$$



EXAMPLE

$$R = 14\frac{2}{7}\% \text{ p.a.} = +\frac{1}{7}$$

$$A_3 = xRs \text{ माना}$$

अथ $\rightarrow A_5 = ?$

$$A_5 = x \left(1 + \frac{1}{7}\right)^2$$

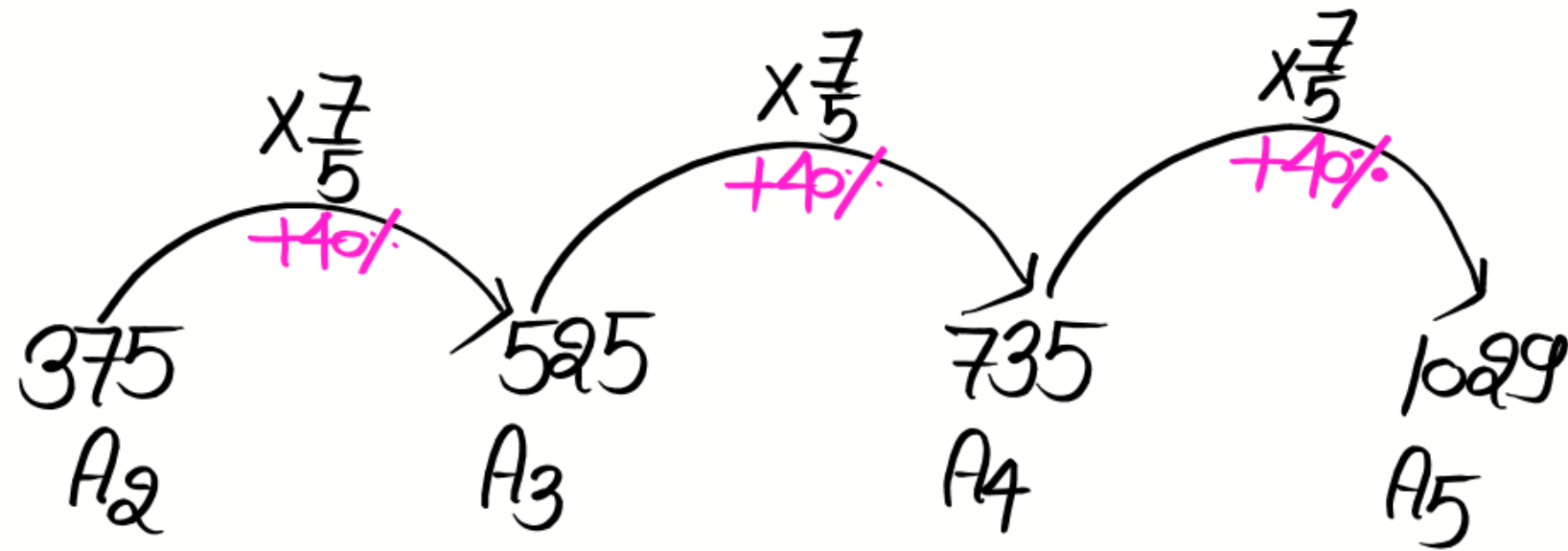
$$n.f \times \frac{8}{7}$$

EXAMPLE

$$A_2 = 375 \text{ Rs}$$

$$A_5 = 1029 \text{ Rs}$$

$$\text{Rate} = 40\% \text{ p.a.}$$



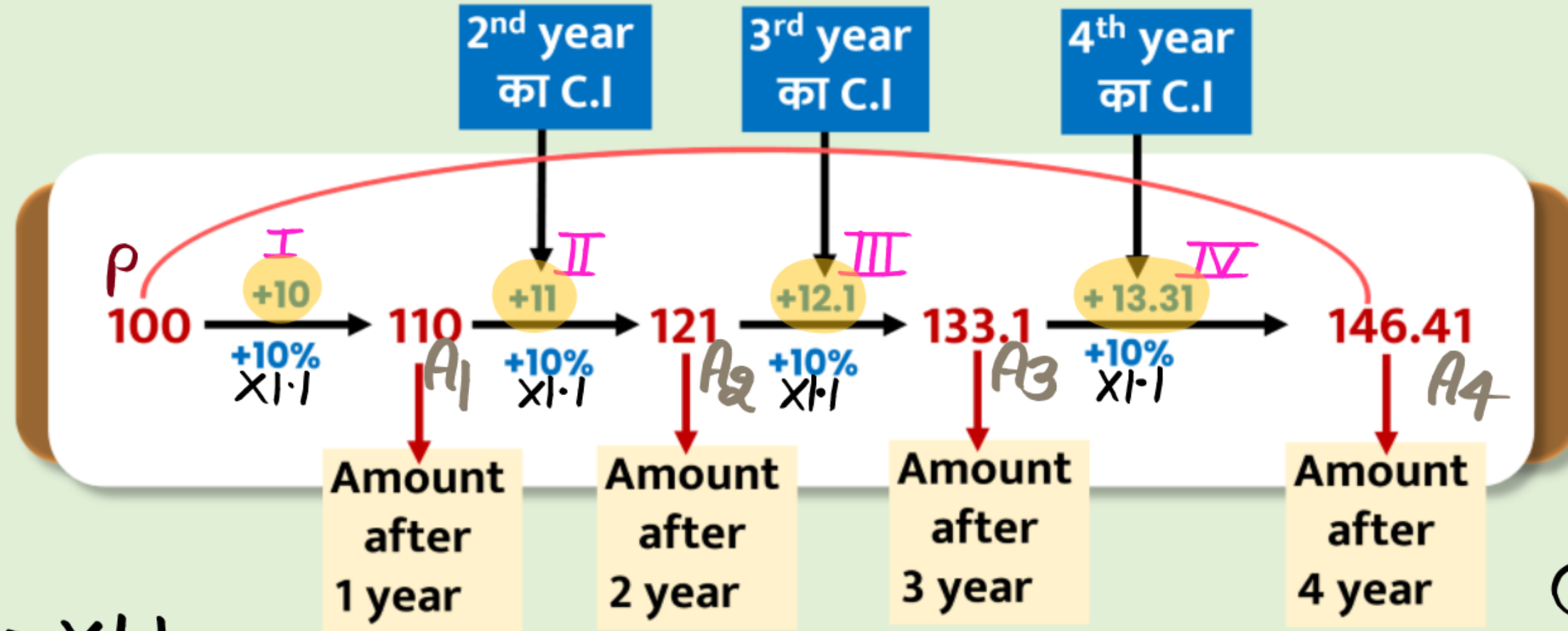
3 years M.F. $\frac{A_5}{A_2} = \frac{1029}{375}$

1 year M.F. $= \left(\frac{1029}{375} \right)^{\frac{1}{3}} = \frac{7}{5} \quad \frac{7}{5} = 40\%$

FOR C.I

P = 100

R = 10%p.a



10%p.a $\rightarrow \times 1.1$

$$CI_n = A_n - P$$

Particular Year के C.I भी GP होते है

$CI_I, CI_{II}, CI_{III}, CI_{IV}$

$10 \xrightarrow{\times 1.1} 11 \xrightarrow{\times 1.1} 12.1 \xrightarrow{\times 1.1} 13.31$

❖ $CI_1 = 10$

❖ $CI_2 = 21$

❖ $CI_3 = 33.1$

❖ $CI_4 = 46.41$

GP में नहीं होते है

1. If T denotes the sum of money, M denotes the number of years, P denotes the rate of interest, then the compound interest is given by:

यदि T धन की राशि को दर्शाता है, M वर्षों की संख्या को दर्शाता है, P ब्याज की दर को दर्शाता है, तो चक्रवृद्धि ब्याज इस प्रकार दिया जाता है:

(SSC GD 2021)

- ✓ [A] $T(1 + \frac{P}{100})^M - T$ [B] $M(1 + \frac{M}{100})^P$
[C] $T(1 + \frac{P}{100})^M$ [D] $M(1 + \frac{T}{100})^P - T$

$$CI_M = T \cdot \left(1 + \frac{P}{100}\right)^M - T$$