

COMPOUND INTEREST

Type - 02

1. Principal = ?, Time = 3 yr, Rate = 10%, compound interest = Rs. 6620

मूलधन = ? समय = 3 वर्ष, दर = 10%, चक्रवृद्धि ब्याज = Rs. 6620

- (a) Rs. 30000 (b) Rs. 25000 (c) ~~Rs. 20000~~ (d) Rs. 18000

$$10\% = \frac{1}{10}$$

$$\begin{array}{rcl} 10 & : & 11 \\ 10 & : & 11 \\ 10 & : & 11 \end{array}$$

Principal ← 1000 : 1331 → Amount

$$CI = 331 \text{ unit} \rightarrow 6620$$

$$1 \text{ unit} \rightarrow 20 \text{ ₹}$$

$$P = 1000 \text{ unit} \rightarrow 20 \times 1000$$

$$= 20,000 \text{ ₹}$$

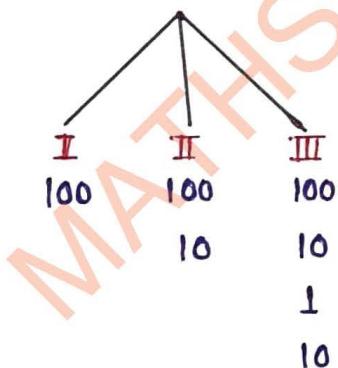
$$A = 1331 \text{ unit} \rightarrow 20 \times 1331$$

$$= 26620 \text{ ₹}$$

OR

$$10\% = \frac{1}{10}$$

$$P = (10)^3 = 1000$$



$$CI = 331 \text{ unit} \rightarrow 6620 \text{ ₹}$$

$$1 \text{ unit} \rightarrow 20 \text{ ₹}$$

$$P = 1000 \text{ unit} \rightarrow 1000 \times 20$$

$$= 20,000 \text{ ₹}$$

$$SI = 300 \text{ unit}$$

$$CI = 331 \text{ unit}$$

$$3^{\text{rd}} \text{ year CI} = 121 \text{ unit}$$

$$2^{\text{nd}} \text{ year CI} = 110 \text{ unit}$$

2. Principal = ?, Time = 3 yr, Rate = 15%, (CI - SI) = Rs. 1701

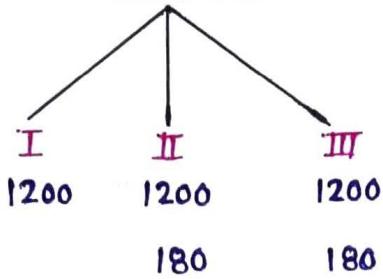
मूलधन = ?, समय = 3 वर्ष, दर = 15%, (चक्रवृद्धि ब्याज - साधारण ब्याज) = Rs. 1701

- (a) Rs. 24000 (b) Rs. 25000 (c) Rs. 30000 (d) Rs. 40000

$$\text{Rate} = 15\% = \frac{3}{20}$$

$$\text{Principal} = (20)^3 = P = 8000 \text{ unit}$$

$$T = 3 \text{ years}$$



$$P = 8000 \text{ unit}$$

$$SI = 3600 \text{ unit}$$

$$CI = 4167 \text{ unit}$$

$$CI - SI = 567 \text{ unit} \rightarrow 1701 \text{ रु}$$

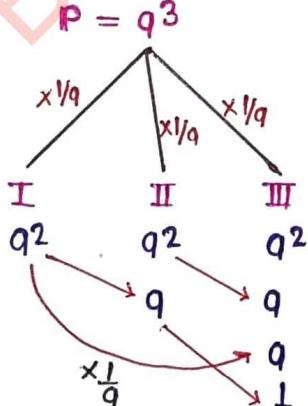
$$1 \text{ unit} \rightarrow 3 \text{ रु}$$

$$8000 \text{ unit} \rightarrow 8000 \times 3 \\ = 24,000$$

OR

$$\text{If } r\% = \frac{1}{q}$$

$$T = 3 \text{ years}$$



$$SI = 3q^2$$

$$CI = 3q^2 + 3q + 1$$

$$CI - SI = 3q + 1$$

3. Principal = ?, Rate = $12\frac{1}{2}\%$, Time = 3 yr. (CI - SI) = Rs. 12.50

मूलधन = ?, दर = $12\frac{1}{2}\%$, समय = 3 वर्ष, (चक्रवृद्धि ब्याज - साधारण ब्याज) = Rs. 12.50

- (a) Rs. 264 (b) Rs. 260 (c) Rs. 256 (d) Rs. 270

$$R = 12\frac{1}{2}\% = \frac{1}{8}$$

$$P = 8^3 = 512 \text{ unit}$$

$$CI - SI = 3q + 1$$

$$= 254 \text{ unit} \longrightarrow 12.5 \text{ रु}$$

$$1 \text{ unit} \longrightarrow \frac{1}{2} \text{ रु}$$

$$P = 512 \times \frac{1}{2}$$

$$P = 256 \text{ रु} \underline{\text{Ans}}$$

4. Principal = ?, Rate = $16\frac{2}{3}\%$, Time = 3 yr. (CI - SI) = Rs. 5.70

मूलधन = ?, दर = $16\frac{2}{3}\%$, समय = 3 वर्ष, (चक्रवृद्धि ब्याज - साधारण ब्याज) = Rs. 5.70

- (a) Rs. 648 (b) Rs. 600 (c) Rs. 548 (d) Rs. 560

$$R = 16\frac{2}{3}\% = \frac{1}{6}$$

$$P = 6^3 = 216 \text{ unit}$$

$$CI - SI = 3q + 1$$

$$19 \text{ unit} \longrightarrow 5.70 \text{ रु}$$

$$1 \text{ unit} \longrightarrow 0.3$$

$$P = 216 \times 0.3$$

$$P = 64.8 \text{ रु} \underline{\text{Ans}}$$

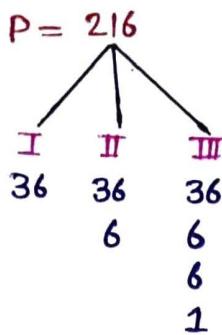
5. Principal = ?, Time = 3 yr, Rate = $16\frac{2}{3}\%$ 3rd yr. CI - 2nd year CI = Rs. 420

मूलधन = ?, समय = 3 वर्ष, दर = $16\frac{2}{3}\%$, (तीसरे वर्ष का चक्रवृद्धि ब्याज - दूसरे वर्ष का चक्रवृद्धि ब्याज) = Rs. 420

- (a) Rs. 10000 (b) Rs. 12960 (c) Rs. 11000 (d) Rs. 12000

$$R = 16 \frac{2}{3}\% =$$

$$\text{Principal} = 6^3 = 216$$



CI of 3rd year - CI of 2nd year

$$(36+6+6+1) - (36+6)$$

$$49 - 42 = 7 \text{ unit} \longrightarrow 420 \text{ ₹}$$

$$1 \text{ unit} \longrightarrow 60 \text{ ₹}$$

$$P = 216 \times 60$$

$$P = 12960 \text{ Ans}$$

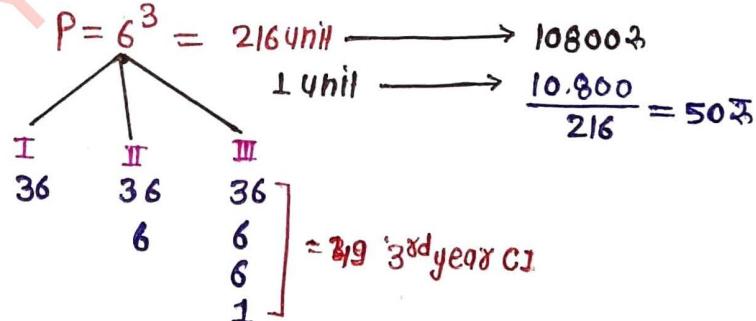
6. Principal = Rs. 10,800, Rate = $16 \frac{2}{3}\%$, Time = 2 yr. 73 days, CI = ?

मूलधन = Rs. 10,800 दर = $16 \frac{2}{3}\%$ समय = 2 वर्ष 73 दिन, चक्रवृद्धि ब्याज CI = ?

- (a) Rs. 4200 (b) Rs. 4000 (c) Rs. 4500 (d) Rs. 4390

$$\text{Rate} = 16 \frac{2}{3}\% = \frac{1}{6}$$

$$\text{Principal} = 6^3 = 216$$



$$\text{CI of 3rd year} = 49$$

$$\text{CI of 73 days} = \frac{49 \times 73}{365} = 908$$

$$\text{CI of I & IInd year} = 78$$

$$\text{CI of 73 days} = \frac{9 \cdot 8}{87 \cdot 8 \text{ unit}} \times 50 \longrightarrow 4590 \text{ ₹ Ans}$$

7. Principal = Rs. 20,000, Rate = 20%, Time = 1 yr. 6 month Calculate Compound Interest when rate is Compounded half yearly./मूलधन = Rs. 20,000, दर = 20%, समय = 1 वर्ष 6 महीने, चक्रवृद्धि ब्याज ज्ञात करों अगर दर अर्धवार्षिक जाए।
- (a) Rs. 6870 (b) Rs. 6520 (c) Rs. 6620 (d) Rs. 6600

$$\text{Principal} = 20,000$$

$$\begin{aligned}\text{Rate} &= 20\% \text{ Per year} \\ &= 10\% \text{ Per Half year}\end{aligned}$$

$$\begin{aligned}\text{Time} &= 1 \text{ year } 6 \text{ month} \\ &= 6 \text{ m} + 6 \text{ m} + 6 \text{ m} = 3 \text{ Half years}\end{aligned}$$

so -	Principal	Amount
10	:	11
10	:	11
10	:	11
1000		1331
	331	

$$\begin{aligned}P &= 1000 \text{ unit} \longrightarrow 20,000 \\ 1 \text{ unit} &\longrightarrow 20\end{aligned}$$

$$\begin{aligned}\text{then, CI} &= 331 \times 20 \\ &= 6620\end{aligned}$$

8. The compound interest on a sum of Rs 5,500 at 15% p.a. for 2 years, when the interest is compounded 8 monthly is:

रुपये 5,500 की राशि पर वार्षिक 15% की दर से 2 वर्ष में प्राप्त चक्रवृद्धि ब्याज ज्ञात कीजिए, जब ब्याज की गणना हर 8 महीने पर चक्रवृद्धि आधार पर की जाती है।

- (a) Rs. 1,850 (b) Rs. 1,880 (c) Rs. 1,820.50 (d) Rs. 1,773.75

$$\text{Time} = 2 \text{ years} = 8 \text{ months}$$

$$\text{Rate} = 15\% \text{ p.a}$$

$$\text{Rate of 8 month} = \frac{15}{12} \times 8$$

Principal	Amount
10	: 11
10	: 11
10	: 11
1000	1331

$\text{CI} = 331$

$$\begin{aligned} P &= 1000 \text{ unit} \longrightarrow 5500 \text{ ₹} \\ &\quad 1 \text{ unit} \longrightarrow 5.5 \text{ ₹} \\ CI &= 331 \text{ unit} \longrightarrow 331 \times 5.5 \\ &\qquad\qquad\qquad = 1820.50 \end{aligned}$$

9. The compound interest on a sum of Rs. 16000 at 20% p.a. for 9 months, when the interest is compounded quarterly?/रुपये 16000 की राशि पर वार्षिक 20% की दर से 9 माह में प्राप्त चक्रवृद्धि ब्याज ज्ञात कीजिए, जब ब्याज की गणना त्रैमासिक आधार पर की जाती है।

(a) 2522 (b) 2225 (c) 2672 (d) 2870

Time = 9 month = 3 quarters

$$\text{Rate} = 20\% \text{ p.a}$$

$$\text{Rate per Quarter} = \frac{20\%}{12} \times 3 = 5\% \text{ per Quarter}$$

Principal	Amount
20	21
20	21
20	21
8000	9261

$$P = 8000 \text{ unit} \longrightarrow 16000 \text{ ₹}$$

$$1 \text{ unit} \longrightarrow 2 \text{ ₹}$$

$$CI = 1261 \text{ unit} \longrightarrow 2 \times 1261 = 2522 \text{ ₹}$$

10. Principal = Rs. 8000, Rate = 20%, Time = 1 yr. Find (CI - SI) if rate is Compounded quarterly./मूलधन = Rs. 8000, दर = 20% समय = 1 वर्ष तो (चक्रवृद्धि ब्याज - साधारण ब्याज) ज्ञात करें। अगर दर त्रैमासिक हो तो।
- (a) Rs. 124.05 (b) Rs. 138.40 (c) Rs. 125.04 (d) Rs. 128

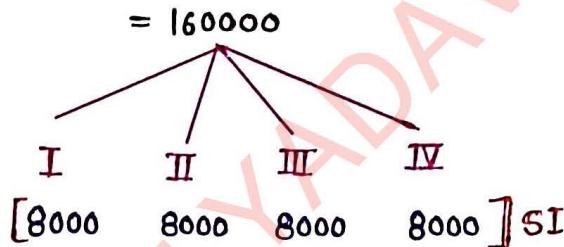
$$\text{Principal} = 8000$$

$$\text{Rate} = 20\% \text{ p.a}$$

$$\text{Rate per Quarter} = \frac{20}{12} \times 3 = 5\% \text{ p.q}$$

$$\text{Time} = 1 \text{ year} = 4 \text{ quarters}$$

$$\text{Principal} = (20)^4$$



$$\text{Principal} = 160000 \text{ unit} \rightarrow 8000$$

$$1 \text{ unit} \rightarrow \frac{8000}{160000} = \frac{1}{20}$$

$$\begin{aligned} \text{CI - SI} &= 2481 \times \frac{1}{20} \\ &= 124.05 \text{ ₹} \end{aligned}$$

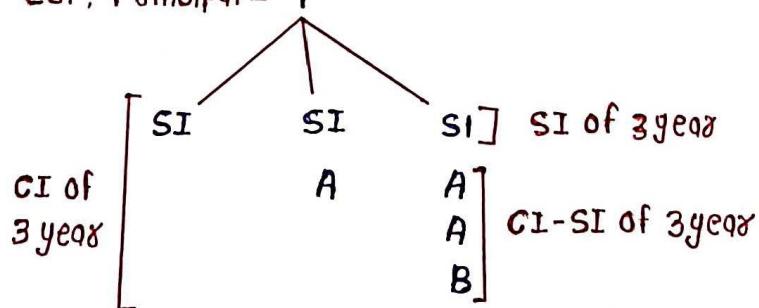
11. The ratio of difference between CI and SI for 3 years to the difference of CI and SI for 2 years is 19 : 6 find the rate of interest./3 वर्ष चक्रवृद्धि ब्याज और साधारण ब्याज का अंतर और 2 वर्ष के चक्रवृद्धि ब्याज व साधारण ब्याज के अंतर का अनुपात 19 : 6 है। दर ज्ञात करें?

- (a) 20% (b) 50% (c) $16\frac{2}{3}\%$ (d) 70

$$\text{CI - SI of 3 years} : \text{CI - SI of 2 years}$$

$$19 : 6$$

Let, Principal = P



$$\begin{array}{ccc} \text{Now,} & \text{3 years} & \text{2 years} \\ & \text{CI-SI} & \text{CI-SI} \\ & 3A+B & : & A \\ & \downarrow & & \downarrow \\ & 19 & : & 6 \end{array}$$

$$50 - 3 \times 6 + B = 19$$

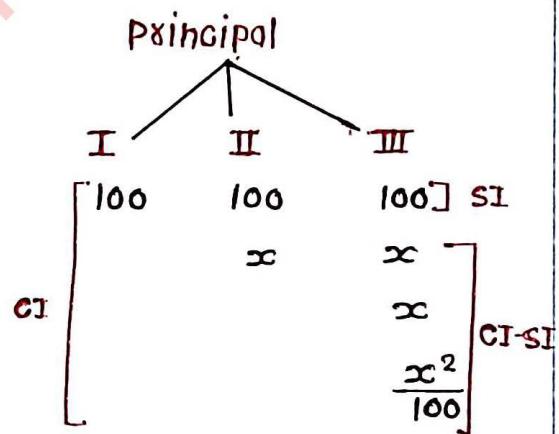
$$\Rightarrow B = 1$$

$$A = 6$$

$$80\% = \frac{1}{6} \times 100\% = 16\frac{2}{3}\%$$

3 years का CI	:	1 year का SI
364	:	100
3 years का		3 years का
364		SI 300

$d = 64$



$$\text{Now, CI-SI} \Rightarrow 3x + \frac{x^2}{100} = 64$$

$$\Rightarrow 300x + x^2 = 6400$$

$$\Rightarrow x(300+x) = 6400$$

$$\Rightarrow 20 \times 320 = 6400$$

$$\Rightarrow .6400 = 6400$$

$\alpha = 20\%$. Rate

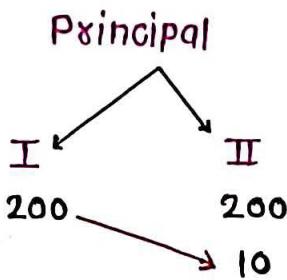
12. The simple interest and compound interest on a certain sum of money is Rs. 400 & Rs. 410 respectively find principal and rate of interest ? (time = 2 years)

किसी धन पर साधारण ब्याज व चक्रवृद्धि ब्याज क्रमशः Rs. 400 व 410 है। मूलधन व दर ज्ञात करो अगर समय 2 वर्ष हो?

- (a) 3500 (b) 4500 (c) 4000 (d) 2500

SI of 2 years = 400

CI of 2 years = 410



$$\text{Rate} = \frac{10}{200} \times 100 = 5\%$$

$$\text{Amount} = P \times \frac{5}{100} = 200$$

$$P = 4000 \text{ ₹}$$

$$\gamma = \sqrt{\frac{P}{A}} \times 100$$

Principal = ?

Rate = $\gamma\%$,

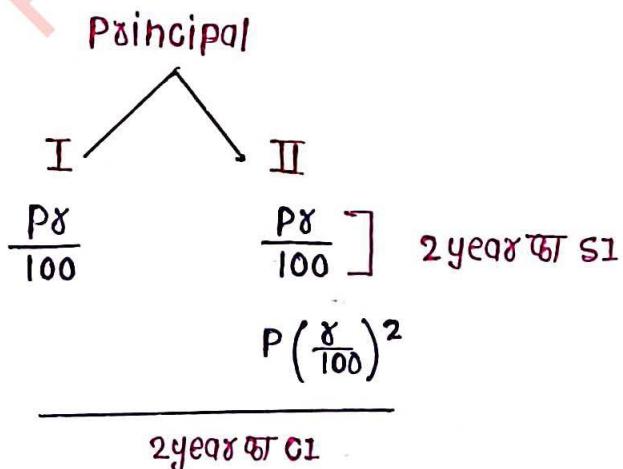
time = 2 years

CI - SI = D

$$\downarrow$$
$$P \left(\frac{\gamma}{100} \right)^2 = D$$

$$\left(\frac{\gamma}{100} \right)^2 = \frac{D}{P}$$

$$\gamma = \sqrt{\frac{P}{D}} \times 100$$



- 14.** If the difference between CI and SI on a certain sum of money of Rs. 5000 for 2 years is Rs. 72. find rate of interest?

Rs. 5000 के धन का 2 वर्ष का साधारण ब्याज और चक्रवृद्धि का अंतर Rs. 72 है दर ज्ञात करो।

- (a) 25% (b) 15% (c) 12% (d) 10%

$$\gamma = \sqrt{\frac{D}{P}} \times 100$$

$$\gamma = \sqrt{\frac{72}{5000}} \times 100$$

$$\gamma = \frac{6}{50} \times 100 = 12\%$$

Concept :- 3 पर्ष के साधारण छ्याज और चक्रवृद्धि छ्याज का अंतर

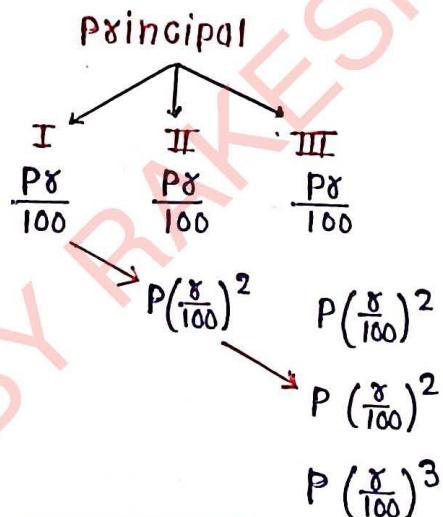
$$3P\left(\frac{x}{100}\right)^2 + P\left(\frac{x}{100}\right)^3 = D$$

Principal = P

$$\text{Rate} = 8\%$$

Time = 3 years

$$CI - SI = D$$



$$3P\left(\frac{8}{100}\right)^2 + P\left(\frac{8}{100}\right)^3 = \text{D}$$

15. At what percent the difference of CI and SI on a certain sum of money of Rs. 30720 in 3 years is Rs. 1500./Rs. 30720 के धन का 3 वर्ष का साधारण ब्याज और चक्रवृद्धि ब्याज का अंतर Rs. 1500 है। दर ज्ञात करो?

- (a) $12\frac{1}{2}\%$ (b) $15\frac{2}{3}\%$ (c) $18\frac{2}{3}\%$ (d) $16\frac{2}{3}\%$

Principal = 30720

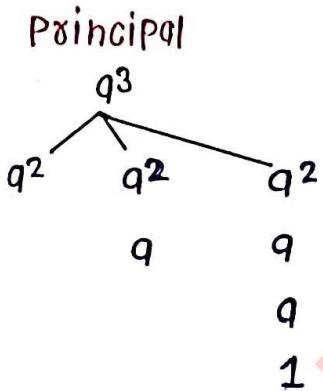
$$\text{Rate} = 8\% = \frac{1}{9}$$

$$\text{So, } \frac{\text{CI} - \text{SI}}{P} = \frac{39+1}{q^3}$$

$$\Rightarrow \frac{1500}{30720} = \frac{39+1}{q^3}$$

$$\Rightarrow \frac{25}{512} = \frac{39+1}{q^3} \quad q=8$$

$$\text{Rate} = \frac{1}{8} \times 100 = 12\frac{1}{2}\%$$



$\text{Rate} = 20\% = \frac{1}{5}$

2 साल में

$$\begin{array}{r} 5 & 6 \\ 5 & 6 \\ \hline 25 : 36 \\ \sqrt{25} : \sqrt{36} \\ 5 : 6 \end{array}$$

Rate = 100 रु पर 1 साल का व्याज

फोई धन 2 साले में 25 से 36 हुआ

$$\sqrt{25} : \sqrt{36}$$

$$\begin{array}{r} 5 : 6 \\ \cup \\ = \frac{1}{5} \times 100\% \end{array}$$

$$= 20\% \text{ Rate}$$