CA FOUNDATION JAN 2025

FREE AGASTYA BATCH

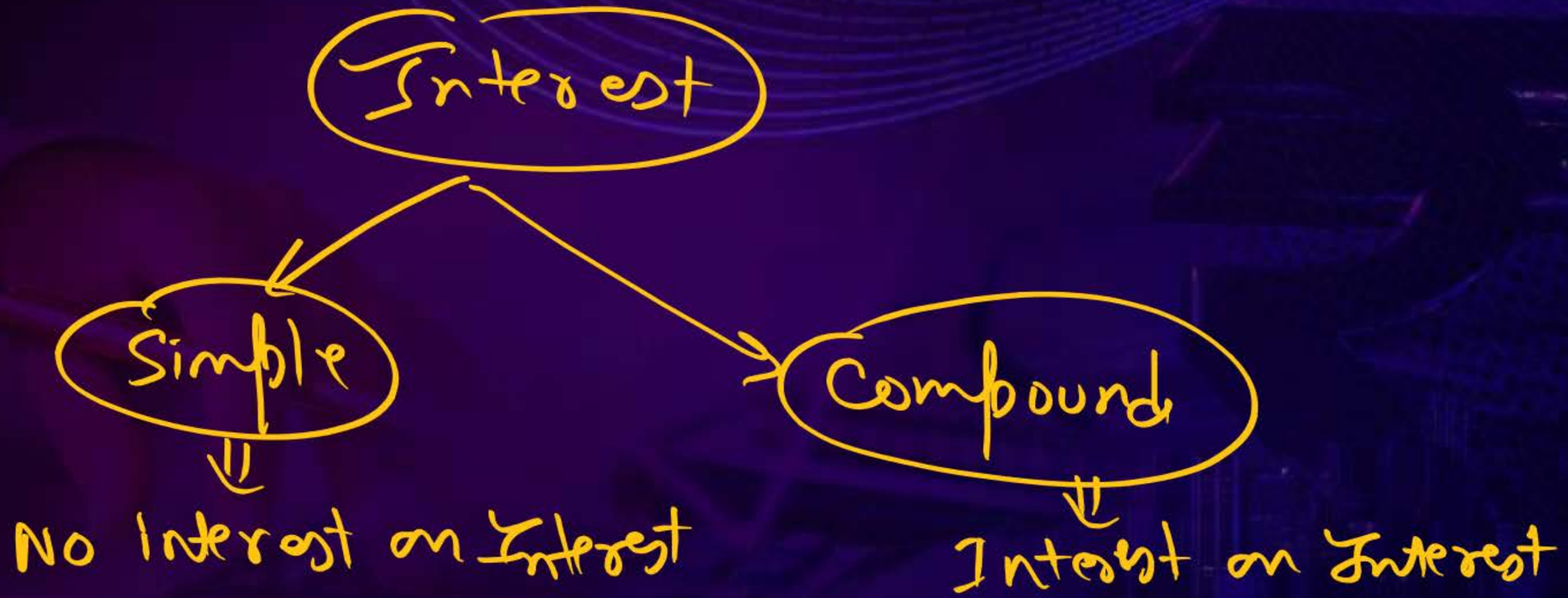
QUANTITATIVE APTITUDE

MATHEMATICS OF FINANCE (PART-1)

CHAPTERWISE CONCEPT
& PRACTICE SESSIONS

Simple Interest

Compound Interest


Interest
Simple
Compound
No Interest on Interest
Interest on Interest

10% SI

1,00,000

1st year 10,000

1,10,000

IInd year. 10,000

1,20,000

10% CI

100,000

+ 10,000

1,10,000

+ 1100

1,21000

Simple Interest

$I = P \cdot r \cdot t$

$A = P + I$

$A = P(1 + rt)$

Paisa Double

$t = \frac{1}{r}$ or $r = \frac{1}{t}$

Paisa Triple

$t = \frac{2}{r}$ or $r = \frac{2}{t}$

Paisa 4 times

$t = \frac{3}{r}$ or $r = \frac{3}{t}$

Compound Interest

$$\# \quad A = P\left(1+\frac{r}{m}\right)^{t\times m}$$

$m \Rightarrow$ No. of compounding

\# Monthly $\Rightarrow m = 12$
Quarterly $\Rightarrow m = 4$
Semiannually $\Rightarrow m = 2$
Annually $\Rightarrow m = 1$

$$\# \quad CI = A - P$$

$$CI = P\left\{\left(1+\frac{r}{m}\right)^{t\times m} - 1\right\}$$

$CI - SI = P \cdot r^2$

(for 2 years)

$CI - SI = P r^2 \cdot (r+3)$

(for 3 years)

Effective Rate (Annual Rate)

$$r_e = \left(1 + \frac{r}{m}\right)^m - 1$$

Log

→ √ 19 times
→ −1
→ ×2276 95

or

→ √ 13 times
→ −1
→ ×3558

AL

→ ÷2276 95
→ +1
→ X= 19 times

or

→ ÷3558
→ +1
→ X= 13 times

$(x)^{\frac{1}{n}} = ??$

→ √ 12 times
→ −1
→ ÷n
→ +1
→ X= 12 times

QUESTION

Sept-2024

$1200 \times 12 = 14400$

The sum required to earn a monthly interest of ₹1,200 at 18% per annum simple interest is:

A 50000

B 60000

C 80000

D 66000

$I = P \times r \times t$

$14,400 = P \times 0.18 \times (1)$

$P = \frac{14,400}{0.18}$

$= 80,000$

QUESTION

A sum of money doubles itself in 10 years under simple interest. The number of years it would take to quadruple itself is:

A 20 years

B 25 years

C 30 years

D 40 years

Money Double

$r = \frac{1}{t}$

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

$r = 0.1$

or

10%

4 times

$t = \frac{3}{r}$

$= \frac{3}{0.1}$

= 30 years.

QUESTION

A sum of money amounts to ₹7500 in 5 years and ₹9000 in 8 years under simple interest. What is the simple rate of interest per annum?

A 8%

B 10%

C 12%

D None

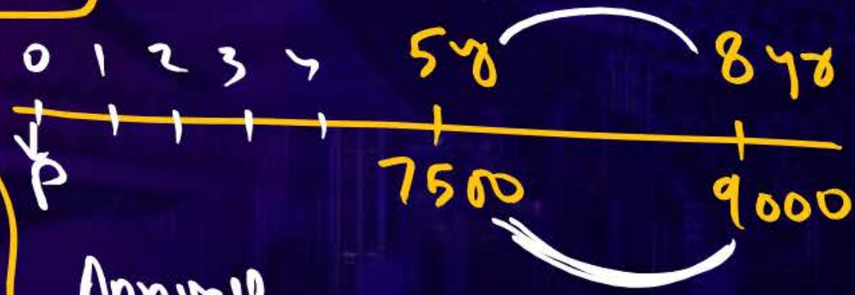
$t_1 = 5yr$ $\quad 8yr = t_2$

$A_1 = 7500$ $\quad 9000 = A_2$

$$r = \frac{A_2 - A_1}{A_1 t_2 - A_2 t_1}$$

$$= \frac{9000 - 7500}{60000 - 45000}$$

$$= \frac{1500}{15000} = \frac{1}{10} = 0.1 \text{ or } 10\%$$



$$\text{Annual Int} = \frac{9000 - 7500}{8 - 5} = \frac{1500}{3} = 500$$

$$P = 7500 - 5(500) = 5000$$

$$SI = P \times r \times t$$

$$500 = 5000 \times r \times 1$$

$$r = \frac{1}{10} = 0.1 \text{ or } 10\%$$

QUESTION

Sept - 2024

$6m = \frac{6}{12}$ year

The compound interest on ₹40,000 at 12% per annum compounded quarterly for 6 months is

A 2643

B 2463

C 2364

D 2436 ✓

$$A = P\left(1+\frac{r}{m}\right)^{t\times m}$$

$$= 40{,}000\left[1+\frac{0.12}{4}\right]^{\frac{1}{2}\times 4}$$

$$= 40{,}000\,(1.03)^2$$

$$A = 42436$$

$$CI = 42436 - 40{,}000 = 2436$$

QUESTION

Sept-2024

$P = 300000$

At a certain rate of interest per annum, the difference between the compound interest and simple interest on ₹3,00,000 for two years is ₹480. Then the rate of interest per annum is:

A 2%

B 4%

C 6%

D 8%

$CI - SI = 480$

$P r^2 = 480$

$r^2 = \frac{480}{P} = \frac{480}{300000}$

$r = \sqrt{\frac{480}{300000}} = 0.04$ or 4%

QUESTION

The difference between C.I. and S.I. on a certain sum of money invested for 3 years at 6% p.a is ₹110.16. The principal is:

A 3000

B 3700

C 12000

D 10000

$CI - SI = 110.16$

$P\gamma^2(\gamma+3) = 110.16$

$P = \dfrac{110.16}{\gamma^2(\gamma+3)}$

$= \dfrac{110.16}{(0.06)^2[0.06+3]}$

$= 10,000$

$\dfrac{110.16}{(0.06)^2[0.06+3]}$

$\dfrac{110.16}{0.011016}$

$= 10,000$

QUESTION

The effective rate of interest corresponding to a nominal rate of 7% p.a. convertible quarterly is:

$$r_e = \left(1 + \frac{r}{m}\right)^m - 1$$

$$= \left[1 + \frac{0.07}{4}\right]^4 - 1$$

$$= 0.0718$$

or

7.18%

A 7%

B 7.5%

C 5%

D 7.18%

QUESTION

The annual birth and death rates per 1,000 are 19.4 and 9.4 respectively. The number of years in which the population will be doubled assuming there is no immigration or emigration is:

A 6.4 years ✗

B 7.27 years ✗

C 7.45 years ✗

D None

$$\frac{19.4 - 9.4}{1000} = \frac{10}{1000} \times 100 = 1\%$$

$$A = P(1+r)^t$$

$$200 = 100(1+0.01)^t$$

$$2 = (1.01)^t$$

$$\log 2 = \log(1.01)^t$$

$$0.3010 = t \log(1.01)$$

$$0.3010 = t(0.00432)$$

$$t = 69.64 \text{ years}$$

Q $P = 150$

$A = 450$

$t = 10$ years.

Compound rate of interest ?

Sol:

$$A = P(1+r)^t$$

$$450 = 150(1+r)^{10}$$

$$3 = (1+r)^{10}$$

$$(1+r)^{10} = 3$$

$$1+r = (3)^{\frac{1}{10}}$$

$$r = (3)^{\frac{1}{10}} - 1$$

$$= 1.1161 - 1$$

$$= 0.1161$$

$$r = 11.61\%$$

Eg

Machine

Cost = 60,000

Rate of dep = 8% WDV

Value of Asset after 6 years of use.

Sol:

$$\text{Value} = \text{cost}\left[1 - \text{dep}\right]^{\text{time}}$$

$$= 60{,}000\,(1 - 0.08)^{6}$$

$$= 60{,}000\,(0.92)^{6}$$

$$\text{Value} = 36{,}381$$

Thank You