



Sahi Prep Hai Toh Life Set Hai

INSTALLMENTS

{ * ✓ Installments → 19TH June @ 5pm

{ ± ✓ Time & Work → 20TH June

{ Any Doubts → @ 11am

Simple Interest
Installments \rightarrow 5:50 - 5:55 pm

Compound Interest
Installed \rightarrow 6:40 - 6:45

Installments questions based on Simple Interest

— — — — — Future
3 lakh ✓✓

T = 5 years

after 5 years

(i) Save \rightarrow 60000 Rs/year

(ii) Save $>$ 60000 Rs/year

~~(iii)~~ Save $<$ 60000 Rs/year

CONCEPT

$$\underline{n = 4}$$

$$\underline{A = \text{Rs. } 6450}$$

$$\underline{R = 5\% \text{ p.a.}}$$

(Installment is given at the end of every year)*

Shortcut \rightarrow

$$400\% + (3+2+1) \times 5\%$$

$$430\% \text{ of } I = 6450$$

$$I = 1500$$

The annual installment that will discharge a debt of Rs. A due in n years at $r\%$ p.a. simple interest.

$$n=4$$

$$R=5\%$$

$$A=\underline{\underline{6450}}$$

Eg. The annual installment that will discharge a debt of Rs. 6450 due in 4 years at 5% p.a. simple interest.

I Detailed Approach

at the end of I^4

$$4I + \frac{I \cdot 5 \cdot 6}{100} = 6450$$

$$\frac{43\cancel{4}I}{100} = \overset{15}{\cancel{6454}}$$

$$I = \underline{\underline{1500}}$$

I^1

I^2

I^3

$$I + \frac{I \cdot 5 \cdot 3}{100}$$

$$I + \frac{I \cdot 5 \cdot 2}{100}$$

$$I + \frac{I \cdot 5 \cdot 1}{100}$$

$$I$$

$$= 6450$$

Examples:

(i) $n = 4$

$R = 5\%$ p.a.

430% of $I = A$

✓ (ii) $n = 3$

$R = 8\%$ p.a.

324% of $I = A$

✓ (iii) $n = 5$

$R = 20\%$ p.a.

700% of $I = A$

✓ (iv) $n = 4$

$R = 11\%$ p.a.

466% of $I = A$

Other Examples:

(i) $n = 5$

$R = \underline{3\% \text{ p.a.}}$

$530\% \text{ of } I$

(ii) $n = 6$

$R = \underline{8\% \text{ p.a.}}$

$720\% \text{ of } I$

(iii) $n = 4$

$R = \underline{15\% \text{ p.a.}}$

$490\% \text{ of } I$

(iv) $n = 7$

$R = \underline{2\% \text{ p.a.}}$

$742\% \text{ of } I$

(v) $n = 8$

$R = \underline{3\% \text{ p.a.}}$

$884\% \text{ of } I$

Q1. What annual installment will discharge a debt of Rs. 1740 due in 5 years at 8% simple interest.

(a) Rs. 360

(b) Rs. 340

(c) Rs. 200

(d) Rs. 300

$$n = 5$$

$$R = 8\%$$

$$A = 1740$$

$$58\% \text{ of } I = 1740$$

$$I = 300$$

Ans. (d)

$$n = 4 \quad R = 4\% \quad A = 848$$

$$424\% \text{ of } I = 848$$

$$\underline{I = 200}$$

Q2. What annual installment will discharge a debt of Rs. 848 due in 4 years at 4% simple interest.

(a) Rs. 212

(c) Rs. 250

~~(b) Rs. 200~~

(d) Rs. 225

with the help of Option

$$\frac{848}{4} = 212$$

$$\underline{\underline{< 212}}$$

Ans. (b)

Q3. What annual installment will discharge a debt of Rs. 13260 due in 4 years at 7% simple interest.

(a) Rs. 2700

☒ (b) Rs. 3000

(c) Rs. 3300

(d) Rs. 3450

$$442\% \rightarrow I = 13260$$

$$I = 3000$$

Ans. (b)

Q4. What quarterly installment will discharge a debt of Rs. 19,080 due in 1 year at 16% p.a.?

Installment period \longrightarrow Quarterly
every 3 months

$$n = 4 \quad r = 4\% / \text{installment}$$

$$424\% \text{ of } I = 19080$$

$$I = \frac{19080 \times 100}{424}$$

$$I = 4500 \text{ Rs}$$

$$n=4 \quad r=4\%$$

$$424\% \text{ of } I = 2120$$

$$I = \underline{\underline{500}}$$

Q5. What quarterly payment will discharge a debt of Rs. 2120 in one year at 16% per annum simple interest ?

(a) Rs. 450

(b) Rs. 400

(c) Rs. 600

☒ (d) Rs. 500

Ans. (d)

$$\begin{aligned} & \text{600\%} \\ & (5+4+3+2+1) \cdot 13 \\ & \rightarrow 195\% \end{aligned}$$

$$n = 6$$

Q6. What annual installment will discharge a debt of Rs. 33390 due in 6 years at 13% simple interest.

(a) 3800

(b) 4000

✓ (c) 4200

(d) 4400

$$R = 13\%$$

$$795\% \text{ of } I = 33390$$

$$\begin{aligned} I &= \frac{33390 \times 100}{795} \\ &= 4200 \text{ Rs} \end{aligned}$$

Ans. (c)

$$I = 90$$

$$n = 5$$

$$R = 4\%$$

$$A = ??$$

Q7. The annual payment of Rs. 90 in 5 years at 4% per annum simple interest will discharge a debt of

(a) Rs. 450

(c) Rs. 500

✓ (b) Rs. 486

(d) Rs. 530

$$540\% \text{ of } 90$$

$$\frac{540}{100} \cdot 90$$

$$= \underline{486}$$

Ans. (b)

Mobile Phone

I. Cash : Rs. 18,000

II. Down Payment:

Rs. 6,000 & six monthly installments of
Rs. 2400 each.

Find r ??

(If nothing is given by default rate of
interest p.a.)

1st Approach

18000 Cash

or

6000 DP

2400 x 6 monthly install

R → Rate of installment

x → rate of interest / month

$$12000 + \frac{12000 \cdot x \cdot 6}{100} = (600 + 15.9)\% \text{ of } 2400$$

$$12000 + 720x = 14400 + 360x$$

$$360x = 2400$$

$$x = \frac{20 \times 2400}{3360}$$

Rate of interest → $\frac{20}{3} \times 12 \rightarrow 80\%$ ✓

2nd Approach

18000

Cash

OR

DP →

6000.

2400 × 6 months Int
14400

$$P_1 = 12000$$

$$P_2 = 9600$$

$$P_3 = 7200$$

$$P_4 = 4800$$

$$P_5 = 2400$$

$$P_6 = 0$$

$$\underline{36000}$$

$$P = 36000$$

$$R = ??$$

$$T = \frac{1}{12} \text{ year}$$

$$S.I = 2400$$

$$2400 = \frac{36000 \cdot R \cdot \frac{1}{12}}{100}$$

$$R = 80\% \text{ / annum}$$

let $x \rightarrow$ rate of interest
month

$$880 + \frac{880 \cdot x \cdot 6}{100} = \left(\frac{600 + 15 \cdot x}{100} \right) \cdot 160$$

$$880 + \frac{528x}{10} = 960 + 24x$$

$$\frac{288x}{10} = 80$$

$$x =$$

$$\frac{800}{288} \times 100 = 36$$

Q8. A watch is available at Rs. 1200 cash payment for sale. A man purchase that watch for Rs. 320 on down payment and installment of Rs. 160 of each month for 6 months. Find the rate of simple interest.

(a) $66\frac{2}{3}\%$

(b) 20%

~~(c) $33\frac{1}{3}\%$~~

(d) 25%

$$R = \frac{100}{36} \times 12 = 33\frac{1}{3}\%$$

Ans. (c)

$x \rightarrow$ rate of interest/month

Q9. A computer is available for Rs. 39000 cash or Rs. 17000 as cash down payment followed by five monthly installments of Rs. 4800 each. What is the rate of interest under the installment plan ?

- (a) 35.71% (b) 36.71%
(c) 37.71% (d) 38.71%

$$22000 + \frac{22000 \cdot x \cdot 5}{100} = \left(\frac{500 + 10x}{100} \right) \cdot 4800$$

$$22000 + 1100x = 24000 + 480x$$

$$x = \frac{2000}{31624}$$

$$R = \frac{100 \times 12}{31} \Rightarrow 38.$$

39000 a

17000 DP

4800 x 5 monthly 24000

$$P_1 = 22000$$

$$P_2 = 17200$$

$$P_3 = 12900$$

$$P_4 = 7600$$

$$P_5 = \frac{2800}{62000}$$

$$\frac{62000 \cdot R \cdot 1}{100 \cdot 12} = 2009$$

$$R = \frac{100 \cdot 2009 \cdot 12}{62000}$$

$$\underline{\underline{38.71\%}}$$

Homework

Q10. An article is available for Rs. 2500 cash or Rs. 520 cash down payments followed by 4 equal monthly installments. If the rate of interest is 25% per annum, calculate the monthly installment ?

(a) Rs. 520

(b) Rs. 480

(c) Rs. 485

(d) Rs. 500

Ans. (a)

loan Amt = 10

11 monthly 1 Rs

$x \rightarrow$ rate of interest/month

$$10 + \frac{10 \cdot x \cdot 11}{100} = \frac{(100 + 55x) \cdot 1}{100}$$

$$10 + \frac{11x}{10} = 11 + \frac{55x}{100}$$

$$\frac{55x}{100} = 1$$

$$x = \frac{100}{55} = 20 \frac{11}{11}$$

Q11. A sum of Rs. 10 is lent to be returned in 11 equal monthly installments of Rs. 1. What is the rate of simple interest per annum.

(a) $9\frac{1}{11}\%$

(b) 10%

(c) 11%

☒ (d) $21\frac{9}{11}\%$

PYQ of SSC

$$R = \frac{20}{11} \times 12 = \frac{240}{11}$$

Ans. (d)

Installments questions based on Compound Interest

Today

loan

6 lakh

— — —

{ (i)
~~(ii)~~
 (iii)

$$= 2,00,000$$

$$> 2,00,000$$

$$< 2,00,000$$

Present and Future Value

R = 20% p.a.

Year: **2016**

Amount: **5000**

2017

6000

2018

7200

2019

8640

$$5000 \times \left(\frac{120}{100}\right)^3$$

→

$$5000 \times \frac{6}{5} \times \frac{6}{5} \times \frac{6}{5} = 8640$$

$$8640 \times \left(\frac{100}{120}\right)^3$$

→ 5000

2016

2017

2018

2019

↑ R%

after ~~1~~ year

$$\times \left(\frac{100+R}{100} \right)^n$$

n years ago

$$\times \left(\frac{100}{100+R} \right)^n$$

Rs. A is to be paid back in n equal annual
installments of Rs. I each and the rate of
interest is $r\%$ p.a. Here,

A = Present value of your loan

I = Value of each installment

r = Rate of interest p.a.

n = No. of installments

$$A = \mathbf{I} \left[\left(\frac{100}{100 + r} \right)^1 + \left(\frac{100}{100 + r} \right)^2 + \dots \dots \dots \left(\frac{100}{100 + r} \right)^n \right]$$

Here,

A = Present value of your loan

I = Value of each installment

r = Rate of interest p.a.

n = No. of installments

$$\frac{100}{100+r} = \frac{x}{y}$$

$$\text{Let, } \frac{100}{100+r} = \frac{x}{y} \quad [x < y]$$

$$I \left[\left(\frac{x}{y} \right)^1 + \left(\frac{x}{y} \right)^2 + \left(\frac{x}{y} \right)^3 + \dots + \left(\frac{x}{y} \right)^n \right] = A$$

2 Installments:

$$I \left[\frac{x}{y} + \left(\frac{x}{y} \right)^2 \right] = A$$

$$I \cdot \frac{x}{y} \left[1 + \frac{x}{y} \right] = A$$

$$\Rightarrow I \cdot \frac{x}{y} \left[\frac{x+y}{y} \right] = A$$

For 2 installments (If I and r are same)

$$A = I \cdot \frac{x}{y} \left[\frac{x + y}{y} \right]$$

For 3 installments (If I and r are same)

$$A = \textcolor{blue}{I} \cdot \frac{x}{y} \left[\frac{x^2 + xy + y^2}{y^2} \right] \textcolor{blue}{}$$

$$R = 10\% \left(\frac{1}{10} \right) \rightarrow \frac{10(x)}{11(y)}$$

$$\text{Let, } \frac{100}{100+r} = \frac{x}{y}$$

r	x/y
10%	10/11
20% $\frac{1}{5}$	5/6
30% $\frac{3}{10}$	10/13
40% $\frac{2}{5}$	5/7

r	x/y
5% $\frac{1}{20}$	20/21
15% $\frac{3}{20}$	20/23
25% $\frac{1}{4}$	4/5

r	x/y
4% $\frac{1}{25}$	25/26
8% $\frac{2}{25}$	25/27
12% $\frac{3}{25}$	25/28
16% $\frac{4}{25}$	25/29

$$\text{Let, } \frac{100}{100 + r} = \frac{x}{y}$$

r	x/y
$12\frac{1}{2}\%$ $\frac{1}{8}$	$\frac{8}{9}$
$14\frac{2}{7}\%$ $\frac{1}{7}$	$\frac{7}{8}$
$16\frac{2}{3}\%$ $\frac{1}{6}$	$\frac{6}{7}$
$11\frac{1}{9}\%$ $\frac{1}{9}$	$\frac{9}{10}$

$$\frac{100}{100+R} = \frac{x}{y}$$

*

2nd install

3rd install

$$I \left[\left(\frac{100}{100+R} \right)^1 + \left(\frac{100}{100+R} \right)^2 + \dots + \left(\frac{100}{100+R} \right)^n \right] = A$$

$$I \cdot \frac{x}{y} \left[\frac{n+y}{y} \right] = A$$

$$I \cdot \frac{x}{y} \left[\frac{x^2 + ny + y^2}{y^2} \right] = A$$

It

Detailed

$$A = 2100 \quad n = 2$$

$$R = 10\%$$

$$I \left[\left(\frac{100}{100+R} \right)^1 + \left(\frac{100}{100+R} \right)^2 \right] = 2100$$

$$I \cdot \left[\left(\frac{10}{11} \right)^1 + \left(\frac{10}{11} \right)^2 \right] = 2100$$

$$I \cdot \frac{10}{11} \left[1 + \frac{10}{11} \right] = 2100$$

$$I \cdot \frac{10}{11} \cdot \frac{21}{11} = 2100$$

$$I = \underline{\underline{1210}}$$

Q1. A sum of Rs. 2100 is to be paid back in 2 equal annual installments. How much is each installment if the interest is compounded annually at 10% per annum?

(a) Rs. 1210

(b) Rs. 1240

(c) Rs. 1230

(d) Rs. 1220

$$R = 10\% \left(\frac{1}{10} \right) \frac{x}{y} = \frac{10}{11}$$

$$I \cdot \frac{x}{y} \cdot \frac{x+y}{y} = A$$

$$I \cdot \frac{10}{11} \cdot \frac{21}{11} = 2100$$

$$I = 1210$$

Ans. (a)

$$n = 2 \quad A = 25500$$

$$R = 4\% \left(\frac{1}{25} \right)$$

$$\begin{matrix} 25 \rightarrow x \\ 26 \rightarrow y \end{matrix}$$

$$I \cdot \frac{25}{26} \cdot \frac{51}{26} = \frac{25500}{1.0202}$$

$$I = \underline{\underline{13520}}$$

Q2. A sum of Rs. 25500 is to be paid back in 2 equal annual installments. How much is each installment if the interest is compounded annually at 4% per annum?

(a) Rs. 13530

(b) Rs. 13570

(c) Rs. 13510

☒ (d) Rs. 13520

Ans. (d)

$$I = 2809 \quad n = 2$$

$$R = 6\% \left(\frac{103}{10050} \right) \quad \begin{matrix} x \rightarrow 50 \\ y \rightarrow 53 \end{matrix}$$

$$I \cdot \frac{x}{y} \cdot \frac{x+y}{y} = A$$

$$\frac{2809 \cdot 50 \cdot 103}{53 \cdot 53} = \underline{\underline{5150}}$$

Q3. A sum is to be paid back in 2 equal annual installments. The interest is compounded annually at 6% per annum. If each installment be Rs. 2809 then what is the sum?

(a) Rs. 5100

(b) Rs. 5140

(c) Rs. 5130

☒ (d) Rs. 5150

Ans. (d)

$$I \cdot \frac{x}{y} \left[\frac{x^2 + xy + y^2}{y^2} \right] = A$$

$$R = 20\% \left(\frac{1}{5} \right) \quad \frac{x \rightarrow 5}{y \rightarrow 6}$$

Q4. A sum of Rs. 45500 is to be paid back in 3 equal annual installments. How much is each installment if the interest is compounded annually at 20% per annum?

- (a) Rs. 21600 (b) Rs. 21700
(c) Rs. 21800 (d) Rs. 21900

$$I \cdot \frac{5}{6} \left[\frac{25 + 30 + 36}{36} \right] = \frac{45500}{100}$$

$$I = 21600$$

Ans. (a)

$$5\% \cdot \left(\frac{1}{20}\right) \quad \begin{matrix} x \rightarrow 20 \\ y \rightarrow 21 \end{matrix}$$

$$I \cdot \frac{20}{21} \left[\frac{400 + 420 + 441}{441} \right] = \frac{1261}{25220}$$

$$I = \underline{\underline{9261}}$$

Q5. A sum of Rs. 25220 is to be paid back in 3 equal annual installments. How much is each installment if the interest is compounded annually at 5% per annum ?

(a) Rs. 9361

☒ (b) Rs. 9261

(c) Rs. 9621

(d) Rs. 9216

Ans. (b)

$$R = 12\% \left(\frac{3}{25} \right) \frac{25}{28} \rightarrow \frac{25}{28}$$

$$I = \frac{28}{28} \cdot \left[\frac{625 + 700 + 784}{784} \right] = \frac{2109}{52725}$$

$$I = 28 \times 784$$

$$= 21952$$

Q6. A sum of Rs. 52725 is to be paid back in 3 equal annual installments. How much is each installment if the interest is compounded annually at 12% per annum?

(a) Rs. 21952

(b) Rs. 21592

(c) Rs. 21852

(d) Rs. 21259

Ans. (a)

Q7. A sum is to be paid back in 3 equal annual installments. The interest is compounded annually at 30% per annum. If each installment be Rs. 21970 then what is the sum ?

- (a) Rs. 39800 ☒ (b) Rs. 39900
(c) Rs. 39950 (d) Rs. 39990

$$\begin{aligned}
 & \overset{10}{21970} \cdot \frac{10}{13} \left[\frac{100 + 130 + 169}{169} \right] \\
 & 100 \left[399 \right] = \underline{39900}
 \end{aligned}$$

$n = 4$ $R = \underline{20\%}$ / annum

$$I = 12960$$

$$\frac{x}{y} \rightarrow \frac{5}{6}$$

Q8. A sum is to be paid back in 4 equal annual installments. The interest is compounded annually at 20% per annum. If each installment be Rs. 12960 then what is the sum ?

- (a) Rs. 34400 (b) Rs. 35400
(c) Rs. 34500 ~~(d) Rs. 33550~~

$$I \left[\left(\frac{x}{y} \right)^1 + \left(\frac{x}{y} \right)^2 + \left(\frac{x}{y} \right)^3 + \left(\frac{x}{y} \right)^4 \right] = A$$

$$12960 \cancel{I} \cdot \left(\frac{5}{6} \right) \left[1 + \frac{5}{6} + \frac{25}{36} + \frac{125}{216} \right] = A$$

$$10 \quad \cancel{12960} \cdot \frac{5}{6} \left[\frac{216 + 180 + 150 + 125}{216} \right]$$

Ans. (d)

$$A = 6800$$

$$n = 2$$

$$R = 12\frac{1}{2}\% \left(\frac{1}{8} \right) \quad \begin{matrix} x \rightarrow 8 \\ y \rightarrow 9 \end{matrix}$$

$$I \cdot \frac{8}{9} \cdot \frac{17}{9} = \frac{4050}{6800}$$

$$I = \underline{4050}$$

Q9. Neeraj took Rs. 6800 as a loan which along with interest is to be repaid in two equal annual installments. If the rate of interest is $12\frac{1}{2}\%$ compounded annually, then the value of each installment is :

- (a) Rs. 8100
- (b) Rs. 4150
- ☒ (c) Rs. 4050
- (d) Rs. 4000

PYQ of SSC

Ans. (c)

$$R = 8\frac{3}{4}\%$$

$$= \frac{387}{40080} \quad \frac{n}{y} = \frac{80}{87}$$

$$I = \frac{80}{87} \cdot \frac{167}{87} = \frac{1336}{87}$$

$$I = 87^2 = 7569$$

Q10. A sum of Rs. 13360 was borrowed at $8\frac{3}{4}\%$ p.a. compound interest and paid back in two years in two equal annual installments. What was the amount of each installment?

(a) Rs. 5769

(c) Rs. 7009

☒ (b) Rs. 7569

(d) Rs. 7500

pyq of SSC

Ans. (b)

$$PP = 16224$$

2 installments - each of 16224 Rs

$$R = 4\% \left(\frac{1}{25} \right) \quad \frac{n}{y} = \frac{25}{26}$$

$$I \cdot \frac{25}{26} \left[\frac{51}{26} \right] = A$$

$$\frac{62424}{16224} \cdot \frac{25}{26} \cdot \frac{51}{26}$$

$$A = 30600$$

Q11. A man buys a scooter on down payment of Rs. 16224 and two more yearly installments of equivalent amount in next two years. If the rate of interest is 4% per annum, compounded yearly, the cash value of the scooter, is :

- (a) Rs. 40000 (b) Rs. 46824
(c) Rs. 46000 (d) Rs. 50000

PyQ of SSC

Cash value of scooter

46824

Ans. (b)

$$DP = 1500$$

$$I^{\text{st}} \rightarrow 1020$$

$$II \rightarrow 1003$$

$$III \rightarrow 990$$

$$R = 10\% \left(\frac{10}{11} \right)$$

$$1020 \cdot \frac{10}{11} + 1003 \cdot \frac{10 \cdot 10}{11 \cdot 11} + 990 \cdot \frac{10 \cdot 10 \cdot 10}{11 \cdot 11 \cdot 11}$$

$$\frac{10200}{11} + \frac{100300}{121} + \frac{900000}{1331}$$

$$\frac{112200 + 100300 + 900000}{1331} = \frac{1112500}{1331} = 836 \text{ (approx)}$$

Q12. Subhash purchased a refrigerator on the terms that he is required to pay Rs. 1500 cash down payment followed by Rs. 1020 at the end of first year, Rs. 1003 at the end of second year and Rs. 990 at the end of third year. Interest is charged at the rate of 10% per annum compound interest. What is the cash price of the refrigerator?

- (a) Rs. 4000
(c) Rs. 4150

- (b) Rs. 4100
(d) Rs. 4200

$$\text{Time} \rightarrow 2 \text{ min}$$

$$\text{Total} = 4000$$

Ans. ~~(b)~~ a



Sahi Prep Hai Toh Life Set Hai

Practise
topic-wise quizzes

Keep attending
live classes

