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Simple Interest

IMPORTANT FACTS AND FORMULAE

- I. Principal:** The money borrowed or lent out for a certain period is called the *principal* or the *sum*.
II. Interest: Extra money paid for using other's money is called *interest*.
III. Simple Interest (S.I.): If the interest on a sum borrowed for a certain period is reckoned uniformly, then it is called *simple interest*.

Let Principal = P , Rate = $R\%$ per annum (p.a.) and Time = T years.

Then, (i) $S.I. = \left(\frac{P \times R \times T}{100} \right)$.

(ii) $P = \left(\frac{100 \times S.I.}{R \times T} \right); R = \left(\frac{100 \times S.I.}{P \times T} \right)$ and $T = \left(\frac{100 \times S.I.}{P \times R} \right)$.

SOLVED EXAMPLES

Ex. 1. Find the simple interest on ₹ 68000 at $16\frac{2}{3}\%$ per annum for 9 months.

Sol. $P = ₹ 68000$, $R = \frac{50}{3}\%$ p.a. and $T = \frac{9}{12}$ years = $\frac{3}{4}$ years.

$$\therefore S.I. = \left(\frac{P \times R \times T}{100} \right) = ₹ \left(68000 \times \frac{50}{3} \times \frac{3}{4} \times \frac{1}{100} \right) = ₹ 8500.$$

Ex. 2. Find the simple interest on ₹ 3000 at $6\frac{1}{4}\%$ per annum for the period from 4th Feb., 2009 to 18th April, 2009.

Sol. Time = (24 + 31 + 18) days = 73 days = $\frac{73}{365}$ year = $\frac{1}{5}$ year.

$P = ₹ 3000$ and $R = 6\frac{1}{4}\%$ p.a. = $\frac{25}{4}\%$ p.a.

$$\therefore S.I. = ₹ \left(3000 \times \frac{25}{4} \times \frac{1}{5} \times \frac{1}{100} \right) = ₹ 37.50.$$

Remark : The day on which money is deposited is not counted while the day on which money is withdrawn is counted.

Ex. 3. A sum at simple interest at $13\frac{1}{2}\%$ per annum amounts to ₹ 2502.50 after 4 years. Find the sum.

Sol. Let sum be ₹ x . Then, $S.I. = ₹ \left(x \times \frac{27}{2} \times 4 \times \frac{1}{100} \right) = ₹ \frac{27x}{50}$.

$$\therefore \text{Amount} = ₹ \left(x + \frac{27x}{50} \right) = ₹ \frac{77x}{50}.$$

$$\therefore \frac{77x}{50} = 2502.50 \Leftrightarrow x = \frac{2502.50 \times 50}{77} = 1625.$$

Hence, sum = ₹ 1625.

Ex. 4. The simple interest accrued on an amount of ₹ 2500 at the end of 6 years is ₹ 1875. What would be the simple interest accrued on an amount of ₹ 6875 at the same rate and for the same period? (Bank P.O., 2009)

Sol. $P = ₹ 2500$, $T = 6$ years, S.I. = ₹ 1875.

$$\therefore \text{Rate} = \left(\frac{100 \times 1875}{2500 \times 6} \right) \% = 12\frac{1}{2}\%.$$

Now, $P = ₹ 6875$, $T = 6$ years, $R = 12\frac{1}{2}\%$.

$$\therefore \text{S.I.} = ₹ \left(\frac{6875 \times 25 \times 6}{100 \times 2} \right) = ₹ 5156.25.$$

Ex. 5. A sum of ₹ 800 amounts to ₹ 920 in 3 years at simple interest. If the interest rate is increased by 3%, it would amount to how much?

Sol. S.I. = ₹ (920 – 800) = ₹ 120; $P = ₹ 800$, $T = 3$ years

$$\therefore R = \left(\frac{100 \times 120}{800 \times 3} \right) \% = 5\%. \text{ New rate} = (5 + 3)\% = 8\%.$$

$$\text{New S.I.} = ₹ \left(\frac{800 \times 8 \times 3}{100} \right) = ₹ 192.$$

$$\therefore \text{New amount} = ₹ (800 + 192) = ₹ 992.$$

Ex. 6. Adam borrowed some money at the rate of 6% p.a. for the first two years, at the rate of 9% p.a. for the next three years, and at the rate of 14% p.a. for the period beyond five years. If he pays a total interest of ₹ 11400 at the end of nine years, how much money did he borrow?

Sol. Let the sum borrowed be x . Then,

$$\left(\frac{x \times 6 \times 2}{100} \right) + \left(\frac{x \times 9 \times 3}{100} \right) + \left(\frac{x \times 14 \times 4}{100} \right) = 11400$$

$$\Leftrightarrow \left(\frac{3x}{25} + \frac{27x}{100} + \frac{14x}{25} \right) = 11400 \Leftrightarrow \frac{95x}{100} = 11400 \Leftrightarrow x = \left(\frac{11400 \times 100}{95} \right) = 12000.$$

Hence, sum borrowed = ₹ 12,000.

Ex. 7. A certain sum of money amounts to ₹ 1008 in 2 years and to ₹ 1164 in $3\frac{1}{2}$ years. Find the sum and the rate of interest.

Sol. S.I. for $1\frac{1}{2}$ years = ₹ (1164 – 1008) = ₹ 156.

$$\text{S.I. for 2 years} = ₹ \left(156 \times \frac{2}{3} \times 2 \right) = ₹ 208.$$

$$\therefore \text{Principal} = ₹ (1008 - 208) = ₹ 800.$$

Now, $P = ₹ 800$, $T = 2$ years and S.I. = ₹ 208

$$\therefore \text{Rate} = \left(\frac{100 \times 208}{800 \times 2} \right) \% = 13\%.$$

Ex. 8. At what rate of simple interest a certain sum will be doubled in 15 years?

(R.R.B., 2005)

Sol. Let principal = P . Then, S.I. = P and $T = 15$ yrs.

$$\therefore \text{Rate} = \left(\frac{100 \times P}{P \times 15} \right) \% = 6\frac{2}{3}\%.$$

Ex. 9. On a certain sum, the simple interest at the end of $12\frac{1}{2}$ years becomes $\frac{3}{4}$ of the sum. What is the rate of interest p.c.p.a? (Bank P.O., 2009)

Sol. Let principal = P . Then, S.I. = $\frac{3}{4}P$ and $T = 12\frac{1}{2}$ yrs.

$$\therefore \text{Rate} = \left(\frac{100 \times \frac{3}{4}P}{P \times \frac{25}{2}} \right) \% = \left(\frac{100 \times 3 \times 2}{4 \times 25} \right) \% = 6\%.$$

Ex. 10. In how many years will a sum of money double itself at $6\frac{1}{4}\%$ simple interest per annum? (S.S.C., 2010)

Sol. Let principal = P . Then, S.I. = P and $R = 6\frac{1}{4}\%$.

$$\therefore \text{Time} = \left(\frac{100 \times P}{P \times \frac{25}{4}} \right) \text{yrs} = \left(\frac{100 \times 4}{25} \right) \text{yrs} = 16 \text{ yrs.}$$

Ex. 11. A certain sum of money becomes three times of itself in 20 years at simple interest. In how many years does it become double of itself at the same rate of simple interest? (C.P.O., 2005)

Sol. Let principal = P . Then, S.I. = $2P$ and $T = 20$ yrs.

$$\therefore \text{Rate} = \left(\frac{100 \times 2P}{P \times 20} \right) \% = 10\%.$$

Now, principal = P , S.I. = P , $R = 10\%$.

$$\therefore \text{Time} = \left(\frac{100 \times P}{P \times 10} \right) \text{yrs} = 10 \text{ yrs.}$$

Ex. 12. The simple interest on a sum of money is $\frac{4}{9}$ of the principal. Find the rate percent and time, if both are numerically equal. (S.S.C., 2000)

Sol. Let sum = ₹ x . Then, S.I. = ₹ $\frac{4x}{9}$.

Let rate = $R\%$ and time = R years.

$$\text{Then, } \left(\frac{x \times R \times R}{100} \right) = \frac{4x}{9} \text{ or } R^2 = \frac{400}{9} \text{ or } R = \frac{20}{3} = 6\frac{2}{3}.$$

$$\therefore \text{Rate} = 6\frac{2}{3}\% \text{ and Time} = 6\frac{2}{3} \text{ yrs} = 6 \text{ yrs } 8 \text{ months.}$$

Ex. 13. The simple interest on a certain sum of money for $2\frac{1}{2}$ years at 12% per annum is ₹ 40 less than the simple interest on the same sum for $3\frac{1}{2}$ years at 10% per annum. Find the sum.

Sol. Let the sum be ₹ x . Then, $\left(\frac{x \times 10 \times 7}{100 \times 2} \right) - \left(\frac{x \times 12 \times 5}{100 \times 2} \right) = 40$

$$\Leftrightarrow \frac{7x}{20} - \frac{3x}{10} = 40 \Leftrightarrow x = (40 \times 20) = 800.$$

Hence, the sum is ₹ 800.

Ex. 14. A sum was put at simple interest at a certain rate for 3 years. Had it been put at 2% higher rate, it would have fetched ₹ 360 more. Find the sum.

Sol. Let sum = P and original rate = R . Then, $\left[\frac{P \times (R + 2) \times 3}{100} \right] - \left[\frac{P \times R \times 3}{100} \right] = 360$

$$\Leftrightarrow 3PR + 6P - 3PR = 36000 \Leftrightarrow 6P = 36000 \Leftrightarrow P = 6000.$$

Hence, sum = ₹ 6000.

Ex. 15. What annual instalment will discharge a debt of ₹ 1092 due in 3 years at 12% simple interest ?

Sol. Let each instalment be ₹ x . Then, $\left(x + \frac{x \times 12 \times 1}{100} \right) + \left(x + \frac{x \times 12 \times 2}{100} \right) + x = 1092$

$$\Leftrightarrow \frac{28x}{25} + \frac{31x}{25} + x = 1092 \Leftrightarrow (28x + 31x + 25x) = (1092 \times 25)$$

$$\Leftrightarrow x = \left(\frac{1092 \times 25}{84} \right) = 325.$$

\therefore Each instalment = ₹ 325.

Ex. 16. A sum of ₹ 1550 is lent out into two parts, one at 8% and another one at 6%. If the total annual income is ₹ 106, find the money lent at each rate.

Sol. Let the sum lent at 8% be ₹ x and that at 6% be ₹ $(1550 - x)$.

$$\therefore \left[\frac{x \times 8 \times 1}{100} \right] + \left[\frac{(1550 - x) \times 6 \times 1}{100} \right] = 106$$

$$\Leftrightarrow 8x + 9300 - 6x = 10600 \Leftrightarrow 2x = 1300 \Leftrightarrow x = 650.$$

\therefore Money lent at 8% = ₹ 650. Money lent at 6% = ₹ $(1550 - 650) = ₹ 900$.

Ex. 17. Ashish borrowed a sum of money from a nationalised bank at 12% simple interest per annum and the same amount at 10% simple interest per annum both for the same period. He cleared the first loan 6 months before the scheduled date of repayment and repaid the second loan just at the end of the scheduled period. If in each case he had to pay ₹ 3250 as amount then how much and for what time did he borrow? (P.C.S., 2006)

Sol. Let each sum = ₹ x .

Let first sum be invested for T years and the second sum for $\left(T - \frac{1}{2} \right)$ years.

$$\text{Then, } x + \frac{x \times 12 \times \left(T - \frac{1}{2} \right)}{100} = 3250$$

$$\Rightarrow 100x + 12xT - 6x = 325000 \quad \dots(i)$$

$$\Rightarrow 94x + 12xT = 32500$$

$$\text{And, } x + \frac{x \times 10 \times T}{100} = 3250 \Rightarrow 100x + 10xT = 325000 \quad \dots(ii)$$

From (i) and (ii), we get: $94x + 12xT = 100x + 10xT \Rightarrow 6x = 2xT$

$$\Rightarrow 2T = 6 \Rightarrow T = 3.$$

Putting $T = 3$ in (i), we get: $94x + 36x = 325000 \Rightarrow 130x = 325000 \Rightarrow x = 2500$.

Ex. 18. A person lends out ₹ 9000 on the condition that the loan is payable in 10 months by 10 monthly equal instalments of ₹ 1000 each. Find the rate of simple interest charged. (S.C.S., 2006)

Sol. We have:

₹ 9000 + S.I. on ₹ 9000 for 10 months

= ₹ 10000 + S.I. on ₹ 1000 for $(1 + 2 + \dots + 9)$ months.

\Rightarrow ₹ 9000 + S.I. on ₹ 1000 for 90 months

= ₹ 10000 + S.I. on ₹ 1000 for 45 months

\Rightarrow S.I. on ₹ 1000 for 45 months = ₹ 1000.

$$\therefore \text{Rate} = \left(\frac{100 \times 1000 \times 12}{1000 \times 45} \right) \% = \frac{80}{3} \% = 26\frac{2}{3} \%.$$

Ex. 19. A man invested $\frac{1}{3}$ of his capital at 7%; $\frac{1}{4}$ at 8% and the remainder at 10%. If his annual income is ₹ 561, find the capital.

(M.B.A., 2006)

Sol. Let the total capital be ₹ x .

$$\text{Then, } \left(\frac{x}{3} \times \frac{7}{100} \times 1 \right) + \left(\frac{x}{4} \times \frac{8}{100} \times 1 \right) + \left[\left\{ 1 - \left(\frac{1}{3} + \frac{1}{4} \right) \right\} x \times \frac{10}{100} \times 1 \right] = 561$$

$$\Rightarrow \frac{7x}{300} + \frac{x}{50} + \frac{x}{24} = 561 \Rightarrow 51x = 561 \times 600 \Rightarrow x = \left(\frac{561 \times 600}{51} \right) = 6600.$$

Hence, capital = ₹ 6600.

EXERCISE

(OBJECTIVE TYPE QUESTIONS)

Directions: Mark (✓) against the correct answer:

- What would be the simple interest obtained on an amount of ₹ 5760 at the rate of 6 p.c.p.a. after 3 years?
(a) ₹ 1036.80 (b) ₹ 1063.80
(c) ₹ 1336.80 (d) ₹ 1666.80
(e) None of these
(Bank Recruitment, 2007)
- A farmer borrowed ₹ 3600 at 15% simple interest per annum. At the end of 4 years, he cleared this account by paying ₹ 4000 and a cow. The cost of the cow is
(a) ₹ 1000 (b) ₹ 1200
(c) ₹ 1550 (d) ₹ 1760
(Civil Services, 2006)
- Ram borrows ₹ 520 from Gaurav at a simple interest of 13% per annum. What amount of money should Ram pay to Gaurav after 6 months to be absolved of the debt?
(a) ₹ 353.80 (b) ₹ 453.80
(c) ₹ 552.80 (d) ₹ 553.80
(CLAT, 2010)
- At the rate of $8\frac{1}{2}\%$ p.a. simple interest, a sum of ₹ 4800 will earn how much interest in 2 years 3 months?
(a) ₹ 796 (b) ₹ 816
(c) ₹ 918 (d) ₹ 956
- What will be the simple interest earned on an amount of ₹ 16,800 in 9 months at the rate of $6\frac{1}{4}\%$ p.a. ?
(a) ₹ 787.50 (b) ₹ 812.50
(c) ₹ 860 (d) ₹ 887.50
- The simple interest on ₹ 1820 from March 9, 2012 to May 21, 2012 at $7\frac{1}{2}\%$ rate will be
(a) ₹ 22.50 (b) ₹ 27.30
(c) ₹ 28.80 (d) ₹ 29
- A shopkeeper with an overdraft facility at 18 percent with a bank borrowed ₹ 15000 on Jan 8, 2011 and returned the money on June 3, 2011 so as to clear the debt. The amount that he paid was
(a) ₹ 16080 (b) ₹ 16280
(c) ₹ 16400 (d) None of these
- A person borrows ₹ 5000 for 2 years at 4% p.a. simple interest. He immediately lends it to another person at $6\frac{1}{4}\%$ p.a. for 2 years. Find his gain in the transaction per year.
(a) ₹ 112.50 (b) ₹ 125
(c) ₹ 150 (d) ₹ 167.50
(S.S.C., 2005)
- Ramakant invested amounts in two different schemes A and B for five years in the ratio of 5 : 4 respectively. Scheme A offers 8% simple interest and bonus equal to 20% of the amount of interest earned in 5 years on maturity. Scheme B offers 9% simple interest. If the amount invested in scheme A was ₹ 20000, what was the total amount received on maturity from both the schemes?
(a) ₹ 50800 (b) ₹ 51200
(c) ₹ 52800 (d) ₹ 58200
(Bank P.O., 2005)
- ₹ 1000 is invested at 5% per annum simple interest. If the interest is added to the principal after every 10 years, the amount will become ₹ 2000 after
(a) 15 years (b) $16\frac{2}{3}$ years
(c) 18 years (d) 20 years
(S.S.C., 2007)
- How much time will it take for an amount of ₹ 450 to yield ₹ 81 as interest at 4.5% per annum of simple interest ?
(a) 3.5 years (b) 4 years
(c) 4.5 years (d) 5 years
(IGNOU, 2003)

12. Asmita invests an amount of ₹ 9534 @ 4 p.c.p.a. to obtain a total amount of ₹ 11442 on simple interest after a certain period. For how many years did she invest the amount to obtain the total sum?
(M.A.T., 2009)
- (a) 2 years (b) 4 years
(c) 5 years (d) 10 years
13. Deepak invested an amount of ₹ 21250 for 6 years. At what rate of simple interest will he obtain the total amount of ₹ 26350 at the end of 6 years?
(Bank Recruitment, 2008)
- (a) 5 p.c.p.a (b) 6 p.c.p.a
(c) 8 p.c.p.a (d) 12 p.c.p.a
(e) None these
14. A sum of ₹ 1600 gives a simple interest of ₹ 252 in 2 years and 4 months. The rate of interest per annum is
- (a) 6% (b) $6\frac{1}{4}\%$
(c) $6\frac{1}{2}\%$ (d) $6\frac{3}{4}\%$
15. At what rate of simple interest per annum can an amount of ₹ 1553.40 be obtained on the principal amount of ₹ 8630 after 3 years? (Bank Recruitment, 2007)
- (a) 4 p.c.p.a (b) 5 p.c.p.a
(c) 7 p.c.p.a (d) 8 p.c.p.a
(e) None of these
16. If simple interest on ₹ 600 for 4 years and on ₹ 600 for 2 years combined together is ₹ 180, find the rate of interest.
(R.R.B., 2009)
- (a) 4% (b) 5%
(c) 5.5% (d) 6.25%
17. Veena obtained an amount of ₹ 8376 as simple interest on a certain amount at 8 p.c.p.a. after 6 years. What is the amount invested by Veena?
(S.B.I.P.O., 2008)
- (a) ₹ 16660 (b) ₹ 17180
(c) ₹ 17450 (d) ₹ 18110
(e) None of these
18. At which sum the simple interest at the rate of $3\frac{3}{4}\%$ per annum will be ₹ 210 in $2\frac{1}{3}$ years?
(R.R.B., 2006)
- (a) ₹ 1580 (b) ₹ 2400
(c) ₹ 2800 (d) None of these
19. What is the present worth of ₹ 132 due in 2 years at 5% simple interest per annum?
- (a) ₹ 112 (b) ₹ 118.80
(c) ₹ 120 (d) ₹ 122
20. A sum fetched a total simple interest of ₹ 4016.25 at the rate of 9 p.c.p.a. in 5 years. What is the sum?
(a) ₹ 4462.50 (b) ₹ 8032.50
(c) ₹ 8900 (d) ₹ 8925
(e) None of these
21. The simple interest at $x\%$ for x years will be ₹ x on a sum of :
- (a) ₹ x (b) ₹ $\left(\frac{100}{x}\right)$
(c) ₹ $100x$ (d) ₹ $\left(\frac{100}{x^2}\right)$
22. In 4 years, ₹ 6000 amounts to ₹ 8000. In what time at the same rate will ₹ 525 amount to ₹ 700?
- (a) 2 years (b) 3 years
(c) 4 years (d) 5 years
23. ₹ 6200 amounts to ₹ 9176 in 4 years at simple interest. If the interest rate is increased by 3% it would amount to how much? (E.S.I.C., 2006)
- (a) ₹ 8432 (b) ₹ 9820
(c) ₹ 9920 (d) ₹ 10920
24. Simple interest on ₹ 500 for 4 years at 6.25% per annum is equal to the simple interest on ₹ 400 at 5% per annum for a certain period of time. The period of time is
(S.S.C., 2007)
- (a) 4 years (b) 5 years
(c) $6\frac{1}{4}$ years (d) $8\frac{2}{3}$ years
25. A certain amount earns simple interest of ₹ 1750 after 7 years. Had the interest been 2% more, how much more interest would it have earned ?
- (a) ₹ 35 (b) ₹ 245
(c) ₹ 350 (d) Cannot be determined
(e) None of these
26. ₹ 6000 becomes ₹ 7200 in 4 years at a certain rate of simple interest. If the rate becomes 1.5 times of itself, the amount of the same principal in 5 years will be
(S.S.C., 2007)
- (a) ₹ 8000 (b) ₹ 8250
(c) ₹ 9000 (d) ₹ 9250
27. In how many years, ₹ 150 will produce the same interest @ 8% as ₹ 800 produce in 3 years @ $4\frac{1}{2}\%$?
- (a) 6 (b) 8
(c) 9 (d) 12
28. The simple interest accrued on a certain principal in 5 years at the rate of 12 p.c.p.a. is ₹ 1536. What amount of simple interest would one get if one invests ₹ 1000 more than the previous principal for 2 years and at the same rate p.c.p.a.?
(Bank Recruitment, 2010)

- (a) ₹ 614.40 (b) ₹ 845.40
(c) ₹ 1536 (d) ₹ 2136
(e) None of these
29. If ₹ 64 amounts to ₹ 83.20 in 2 years, what will ₹ 86 amount to in 4 years at the same rate percent per annum ?
(a) ₹ 114.80 (b) ₹ 124.70
(c) ₹ 127.40 (d) ₹ 137.60
30. The simple interest on a certain sum of money at the rate of 5% p.a. for 8 years is ₹ 840. At what rate of interest the same amount of interest can be received on the same sum after 5 years ?
(a) 6% (b) 8%
(c) 9% (d) 10%
31. The interest on a certain deposit at 4.5% p.a. is ₹ 202.50 in one year. How much will the additional interest in one year be on the same deposit at 5% p.a. ?
(a) ₹ 20.25 (b) ₹ 22.50
(c) ₹ 25 (d) ₹ 42.75
32. A sum invested at 5% simple interest per annum grows to ₹ 504 in 4 years. The same amount at 10% simple interest per annum in $2\frac{1}{2}$ years will grow to :
(a) ₹ 420 (b) ₹ 450
(c) ₹ 525 (d) ₹ 550
33. If x, y, z are three sums of money such that y is the simple interest on x , z is the simple interest on y for the same time and at the same rate of interest, then we have (G.B.O., 2007)
(a) $x^2 = yz$ (b) $y^2 = xz$
(c) $z^2 = xy$ (d) $xyz = 1$
34. What will be the ratio of simple interest earned by certain amount at the same rate of interest for 6 years and that for 9 years ?
(a) 1 : 3 (b) 1 : 4
(c) 12 : 3 (d) Data inadequate
(e) None of these
35. Arun borrowed a sum of money from Jayant at the rate of 8% per annum simple interest for the first four years, 10% per annum for the next 6 years and 12% per annum for the period beyond 10 years. If he pays a total of ₹ 12160 as interest only at the end of 15 years, how much money did he borrow? (N.M.A.T., 2005)
(a) ₹ 8000 (b) ₹ 9000
(c) ₹ 10000 (d) ₹ 12000
36. Kruti took a loan at simple interest rate of 6 p.c.p.a. in the first year and it increased by 1.5 p.c.p.a. every year. If she pays ₹ 8190 as interest at the end of 3 years, what was her loan amount? (Bank P.O., 2010)
(a) ₹ 35400 (b) ₹ 36000
(c) ₹ 36800 (d) Cannot be determined
(e) None of these
37. A person deposited ₹ 400 for 2 years, ₹ 550 for 4 years and ₹ 1200 for 6 years. He received the total simple interest of ₹ 1020. The rate of interest per annum is (S.S.C., 2007)
(a) 5% (b) 10%
(c) 15% (d) 20%
38. The simple interest on a sum of money will be ₹ 600 after 10 years. If the principal is trebled after 5 years, what will be the total interest at the end of the tenth year?
(a) ₹ 600 (b) ₹ 900
(c) ₹ 1200 (d) ₹ 1500
(e) Data inadequate
39. The simple interest on ₹ 10 for 4 months at the rate of 3 paise per rupee per month is
(a) ₹ 1.20 (b) ₹ 1.60
(c) ₹ 2.40 (d) ₹ 3.60
40. An automobile financier claims to be lending money at simple interest, but he includes the interest every six months for calculating the principal. If he is charging an interest of 10%, the effective rate of interest becomes
(a) 10% (b) 10.25%
(c) 10.5% (d) None of these
41. A sum of money at simple interest amounts to ₹ 815 in 3 years and to ₹ 854 in 4 years. The sum is
(a) ₹ 650 (b) ₹ 690
(c) ₹ 698 (d) ₹ 700
42. A sum of money lent out at simple interest amounts to ₹ 720 after 2 years and to ₹ 1020 after a further period of 5 years. The sum is (S.S.C., 2004)
(a) ₹ 500 (b) ₹ 600
(c) ₹ 700 (d) ₹ 710
43. A sum of money amounts to ₹ 5200 in 5 years and to ₹ 5680 in 7 years at simple interest. The rate of interest per annum is : (S.S.C., 2007)
(a) 3% (b) 4%
(c) 5% (d) 6%
44. A sum of money becomes ₹ 20925 in 2 years and ₹ 24412.50 in 5 years. Find the rate of interest and the sum of money. (R.R.B., 2006)
(a) 6.25%, ₹ 18600 (b) 6.75%, ₹ 17775
(c) 7%, ₹ 18000 (d) 8%, ₹ 17560
45. A certain sum of money at simple interest amounts to ₹ 1012 in $2\frac{1}{2}$ years and to ₹ 1067.20 in 4 years.

- The rate of interest per annum is
 (a) 2.5% (b) 3%
 (c) 4% (d) 5%
46. In how many years will a sum of money double itself at 18.75% per annum simple interest?
 (R.R.B., 2006)
 (a) 4 years 5 months (b) 5 years 4 months
 (c) 6 years 2 months (d) 6 years 5 months
47. At what rate percent of simple interest will a sum of money double itself in 12 years?
 (a) $8\frac{1}{4}\%$ (b) $8\frac{1}{3}\%$
 (c) $8\frac{1}{2}\%$ (d) $9\frac{1}{2}\%$
48. The rate at which a sum becomes four times of itself in 15 years at S.I., will be
 (a) 15% (b) $17\frac{1}{2}\%$
 (c) 20% (d) 25%
49. A sum of money at a simple rate of interest i_1 , doubles in 5 years. At another simple rate of interest i_2 , it becomes three times in 12 years. Then, the two rates of interest i_1 and i_2 respectively are
 (a) 10%, $16\frac{2}{3}\%$ (b) 10%, 20%
 (c) 20%, $16\frac{2}{3}\%$ (d) 20%, 30%
50. A sum of money at simple interest doubles in 7 years. It will become four times in: (R.R.B., 2006)
 (a) 18 years (b) 21 years
 (c) 38 years (d) 42 years
51. A sum of money trebles itself in 15 years 6 months. In how many years would it double itself?
 (a) 6 years 3 months (b) 7 years 9 months
 (c) 8 years 3 months (d) 9 years 6 months
52. If a sum doubles in 6 years, how much will it be in 8 years?
 (R.R.B., 2006)
 (a) $1\frac{1}{2}$ times (b) $1\frac{1}{3}$ times
 (c) $1\frac{1}{4}$ times (d) $1\frac{3}{4}$ times
53. Consider the following statements
 If a sum of money is lent at simple interest, then the
 1. money gets doubled in 5 years if the rate of interest is $16\frac{2}{3}\%$
 2. money gets doubled in 5 years if the rate of interest is 20%
 3. money becomes four times in 10 years if it gets doubled in 5 years.
 Of these statements,
 (a) 1 and 3 are correct (b) 2 alone is correct
 (c) 3 alone is correct (d) 2 and 3 are correct
54. The simple interest on a sum of money at 8% per annum for 6 years is half the sum. The sum is :
 (a) ₹ 4800 (b) ₹ 6000
 (c) ₹ 8000 (d) Data inadequate
55. At what rate percent per annum will the simple interest on a sum of money be $\frac{2}{5}$ of the amount in 10 years?
 (a) 4% (b) $5\frac{2}{3}\%$
 (c) 6% (d) $6\frac{2}{3}\%$
56. In how much time would the simple interest on a certain sum be 0.125 times the principal at 10% per annum?
 (Assistant Grade, 1997)
 (a) $1\frac{1}{4}$ years (b) $1\frac{3}{4}$ years
 (c) $2\frac{1}{4}$ years (d) $2\frac{3}{4}$ years
57. How long will it take a sum of money invested at 5% p.a. S.I. to increase its value by 40%?
 (a) 5 years (b) 6 years
 (c) 7 years (d) 8 years
58. A sum of money becomes $\frac{7}{6}$ of itself in 3 years at a certain rate of simple interest. The rate per annum is
 (a) $5\frac{5}{9}\%$ (b) $6\frac{5}{9}\%$
 (c) 18% (d) 25%
59. If the simple interest for 6 years be equal to 30% of the principal, it will be equal to the principal after
 (Bank P.O., 2006)
 (a) 10 years (b) 20 years
 (c) 22 years (d) 30 years
60. Simple interest on a certain sum at a certain annual rate of interest is $\frac{1}{9}$ of the sum. If the numbers representing rate percent and time in years be equal, then the rate of interest is
 (a) $3\frac{1}{3}\%$ (b) 5%
 (c) $6\frac{2}{3}\%$ (d) 10%

61. Simple interest on a certain amount is $\frac{9}{16}$ of the principal. If the numbers representing the rate of interest in percent and time in years be equal, then time, for which the principal is lent out, is
- (a) $5\frac{1}{2}$ years (b) $6\frac{1}{2}$ years
(c) 7 years (d) $7\frac{1}{2}$ years
62. A lends ₹ 2500 to B and a certain sum to C at the same time at 7% p.a. simple interest. If after 4 years, A altogether receives ₹ 1120 as interest from B and C, then the sum lent to C is :
- (a) ₹ 700 (b) ₹ 1500
(c) ₹ 4000 (d) ₹ 6500
63. Two equal sums of money were lent at simple interest at 11% p.a. for $3\frac{1}{2}$ years and $4\frac{1}{2}$ years respectively. If the difference in interests for two periods was ₹ 412.50, then each sum is:
- (a) ₹ 3250 (b) ₹ 3500
(c) ₹ 3750 (d) ₹ 4250
64. If the simple interest on a certain sum for 15 months at $7\frac{1}{2}\%$ per annum exceeds the simple interest on the same sum for 8 months at $12\frac{1}{2}\%$ per annum by ₹ 32.50, then the sum (in ₹) is :
- (a) ₹ 3000 (b) ₹ 3060
(c) ₹ 3120 (d) ₹ 3250
65. Sujata invested ₹ 7500 at simple interest @ 11 p.c.p.a. She further invested some amount at simple interest @ 15 p.c.p.a. Total interest earned at the end of the year became 12 p.c.p.a. Find the amount invested at the rate of 15 p.c.p.a.
- (a) ₹ 2000 (b) ₹ 2500
(c) ₹ 3000 (d) ₹ 3500
66. A man invests a certain sum of money at 6% p.a. simple interest and another sum at 7% p.a. simple interest. His income from interest after 2 years was ₹ 354. One-fourth of the first sum is equal to one-fifth of the second sum. The total sum invested was:
- (a) ₹ 2600 (b) ₹ 2700
(c) ₹ 2880 (d) ₹ 2900
67. Rahul borrowed a sum of ₹ 1150 from Amit at the simple interest rate of 6 p.c.p.a. for 3 years. He then added some more money to the borrowed sum and lent it to Sachin for the same time at 9 p.c.p.a. simple interest. If Rahul gains ₹ 274.95 by way of interest on borrowed sum as well as his own amount from the whole transaction, then what is the sum lent by him to Sachin? (Bank P.O., 2008)
- (a) ₹ 1200 (b) ₹ 1285
(c) ₹ 1690 (d) ₹ 1785
(e) None of these
68. A person invested some amount at the rate of 12% simple interest and a certain amount at the rate of 10% simple interest. He received yearly interest of ₹ 130. But if he had interchanged the amounts invested, he would have received ₹ 4 more as interest. How much did he invest at 12% simple interest? (M.A.T., 2010)
- (a) ₹ 400 (b) ₹ 500
(c) ₹ 700 (d) ₹ 800
69. A person borrowed ₹ 500 @ 3% per annum S.I. and ₹ 600 @ $4\frac{1}{2}\%$ per annum on the agreement that the whole sum will be returned only when the total interest becomes ₹ 126. The number of years, after which the borrowed sum is to be returned, is :
- (a) 2 years (b) 3 years
(c) 4 years (d) 5 years
70. Two equal sums of money are lent at the same time at 8% and 7% per annum simple interest. The former is recovered 6 months earlier than the latter and the amount in each case is ₹ 2560. The sum and the time for which the sums of money are lent out are (M.A.T., 2005)
- (a) ₹ 2000, 3.5 years × 4 years
(b) ₹ 1500, 3.5 years × 4 years
(c) ₹ 2000, 4 years × 5.5 years
(d) ₹ 3000, 4 years × 4.5 years
71. A lent ₹ 5000 to B for 2 years and ₹ 3000 to C for 4 years on simple interest at the same rate of interest and received ₹ 2200 in all from both of them as interest. The rate of interest per annum is
- (a) 5% (b) 7%
(c) $7\frac{1}{8}\%$ (d) 10%
72. A sum of ₹ 725 is lent in the beginning of a year at a certain rate of interest. After 8 months, a sum of ₹ 362.50 more is lent but at the rate twice the former. At the end of the year, ₹ 33.50 is earned as interest from both the loans. What was the original rate of interest ?
- (a) 3.6% (b) 4.5%
(c) 5% (d) 6%
(e) None of these

73. The difference between the simple interest received from two different sources on ₹ 1500 for 3 years is ₹ 13.50. The difference between their rates of interest is
 (a) 0.1% (b) 0.2%
 (c) 0.3% (d) 0.4%
 (e) None of these
74. Peter invested an amount of ₹ 12,000 at the rate of 10 p.c.p.a. simple interest and another amount at the rate of 20 p.c.p.a. simple interest. The total interest earned at the end of one year on the total amount invested became 14 p.c.p.a. Find the total amount invested.
 (a) ₹ 20,000 (b) ₹ 22,000
 (c) ₹ 24,000 (d) ₹ 25,000
 (e) None of these
75. A man invested ₹ 5000 at some rate of simple interest and ₹ 4000 at 1 percent higher rate of interest. If the interest in both the cases after 4 years is same, the rate of interest in the former case is (A.T.M.A., 2004)
 (a) 4% p.a. (b) 5% p.a.
 (c) $6\frac{1}{4}\%$ p.a. (d) $8\frac{1}{3}\%$ p.a.
76. What should be the least number of years in which the simple interest on ₹ 2600 at $6\frac{2}{3}\%$ will be an exact number of rupees ?
 (a) 2 years (b) 3 years
 (c) 4 years (d) 5 years
77. The rates of simple interest in two banks A and B are in the ratio 5 : 4. A person wants to deposit his total savings in two banks in such a way that he received equal half-yearly interest from both. He should deposit the savings in banks A and B in the ratio:
 (a) 2 : 5 (b) 4 : 5
 (c) 5 : 2 (d) 5 : 4
78. A sum was put at simple interest at a certain rate for 3 years. Had it been put at 1% higher rate, it would have fetched ₹ 5100 more. The sum is (M.A.T., 2010)
 (a) ₹ 1,20,000 (b) ₹ 1,25,000
 (c) ₹ 1,50,000 (d) ₹ 1,70,000
79. If the annual rate of simple interest increases from 10% to $12\frac{1}{2}\%$, a man's yearly income increases by ₹ 1250. His principal (in ₹) is (S.S.C., 2004)
 (a) ₹ 45,000 (b) ₹ 50,000
 (c) ₹ 60,000 (d) ₹ 65,000
80. A moneylender finds that due to a fall in the annual rate of interest from 8% to $7\frac{3}{4}\%$, his yearly income diminishes by ₹ 61.50. His capital is
 (a) ₹ 22,400 (b) ₹ 23,800
 (c) ₹ 24,600 (d) ₹ 26,000
81. What equal instalment of annual payment will discharge a debt which is due as ₹ 848 at the end of 4 years at 4% per annum simple interest ? (C.P.O., 2007)
 (a) ₹ 200 (b) ₹ 212
 (c) ₹ 225 (d) ₹ 250
82. A sum of ₹ 10 is lent to be returned in 11 monthly instalments of ₹ 1 each, interest being simple. The rate of interest is :
 (a) $9\frac{1}{11}\%$ (b) 10%
 (c) 11% (d) $21\frac{9}{11}\%$
83. A person takes a loan of ₹ 200 at 5% simple interest. He returns ₹ 100 at the end of 1 year. In order to clear his dues at the end of 2 years, he would pay :
 (a) ₹ 105 (b) ₹ 110
 (c) ₹ 115 (d) ₹ 115.50
84. The price of a T.V. set worth ₹ 20,000 is to be paid in 20 instalments of ₹ 1000 each. If the rate of interest be 6% per annum, and the first instalment be paid at the time of purchase, then the value of the last instalment covering the interest as well will be :
 (a) ₹ 1050 (b) ₹ 2050
 (c) ₹ 3000 (d) None of these
85. A computer is available for ₹ 39000 cash or ₹ 17000 as cash down payment followed by five monthly instalments of ₹ 4800 each. What is the rate of interest under the instalment plan? (M.A.T., 2006)
 (a) 35.71% p.a. (b) 36.71% p.a.
 (c) 37.71% p.a. (d) 38.71% p.a.
86. If the rate increases by 2%, the simple interest received on a sum of money increases by ₹ 108. If the time period is increased by 2 years, the simple interest on the same sum increases by ₹ 180. The sum is:
 (a) ₹ 1800 (b) ₹ 3600
 (c) ₹ 5400 (d) Data inadequate
 (e) None of these
87. Vishwas borrowed a total amount of ₹ 30000, part of it on simple interest rate of 12 p.c.p.a. and remaining on simple interest rate of 10 p.c.p.a. If at the end of 2 years he paid in all ₹ 36480 to settle the loan amount, what was the amount borrowed at 12 p.c.p.a? (Bank P.O., 2008)
 (a) ₹ 12000 (b) ₹ 16000
 (c) ₹ 17500 (d) ₹ 18000
88. A man divided his share between his sons A and B in such a way that the interest received by A at

- 15% p.a. for 3 years is double the interest received by B at 12% p.a. for 5 years. In what ratio was his share divided? (M.A.T., 2010)
- (a) $\frac{2}{3}$ (b) $\frac{3}{2}$
(c) $\frac{3}{8}$ (d) $\frac{8}{3}$
89. A sum of ₹ 18750 is left by a will by a father to be divided between the two sons, 12 and 14 years of age, so that when they attain maturity at 18, the amount (principal + interest) received by each at 5 per cent simple interest will be the same. Find the sum allotted at present to each son. (N.M.A.T., 2005)
- (a) ₹ 9500, ₹ 9250 (b) ₹ 8000, ₹ 1750
(c) ₹ 9000, ₹ 9750 (d) None of these
90. A certain sum of money is invested at an interest rate of 5% per annum and a second sum, twice as large as the first, is invested at 5.5% p.a. The total amount of interest earned from the two investments together is ₹ 1000 per year and the interest is withdrawn every year. The second sum invested is (J.M.E.T., 2007)
- (a) ₹ 6250 (b) ₹ 10500
(c) ₹ 12500 (d) ₹ 15000
91. I had ₹ 10000 with me. Out of this money I lent some money to A for 2 years @ 15% simple interest. I lent the remaining money to B for an equal number of years @ 18% simple interest. After 2 years, I found that A had given me ₹ 360 more as interest as compared to B. The amount of money which I had lent to B must have been
- (a) ₹ 2000 (b) ₹ 3000
(c) ₹ 4000 (d) ₹ 5000
92. A sum of ₹ 2600 is lent out in two parts in such a way that the interest on one part at 10% for 5 years is equal to that on another at 9% for 6 years. The sum lent out at 10% is :
- (a) ₹ 1150 (b) ₹ 1250
(c) ₹ 1350 (d) ₹ 1450
93. A sum of ₹ 1550 was lent partly at 5% and partly at 8% p.a. simple interest. The total interest received after 3 years was ₹ 300. The ratio of the money lent at 5% to that lent at 8% is : (R.R.B., 2008)
- (a) 5 : 8 (b) 8 : 5
(c) 16 : 15 (d) 31 : 6
94. A man lends ₹ 10,000 in four parts. If he gets 8% on ₹ 2000; $7\frac{1}{2}\%$ on ₹ 4000 and $8\frac{1}{2}\%$ on ₹ 1400; what percent must he get for the remainder, if his average annual interest is 8.13% ?
- (a) 7% (b) 9%
(c) $9\frac{1}{4}\%$ (d) $10\frac{1}{2}\%$
95. An amount of ₹ 1,00,000 is invested in two types of shares. The first yields an interest of 9% p.a. and the second, 11% p.a. If the total interest at the end of one year is $9\frac{3}{4}\%$, then the amount invested in each share was (M.B.A., 2007)
- (a) ₹ 52,500; ₹ 47,500 (b) ₹ 62,500; ₹ 37,500
(c) ₹ 72,500; ₹ 27,500 (d) ₹ 82,500; ₹ 17,500
96. David invested certain amount in three different schemes A, B and C with the rate of interest 10% p.a., 12% p.a. and 15% p.a. respectively. If the total interest accrued in one year was ₹ 3200 and the amount invested in Scheme C was 150% of the amount invested in Scheme A and 240% of the amount invested in Scheme B, what was the amount invested in Scheme B ?
- (a) ₹ 5000 (b) ₹ 6500
(c) ₹ 8000 (d) Cannot be determined
(e) None of these
97. A sum of ₹ 1440 is lent out in three parts in such a way that the interests on first part at 2% for 3 years, second part at 3% for 4 years and third part at 4% for 5 years are equal. Then the difference between the largest and the smallest sum is (N.M.A.T., 2005)
- (a) ₹ 200 (b) ₹ 400
(c) ₹ 460 (d) ₹ 560
98. A person invests money in three different schemes for 6 years, 10 years and 12 years at 10 percent, 12 percent and 15 percent simple interest respectively. At the completion of each scheme, he gets the same interest. The ratio of his investments is (S.S.C., 2006)
- (a) 2 : 3 : 4 (b) 4 : 3 : 2
(c) 3 : 4 : 6 (d) 6 : 3 : 2
99. Divide ₹ 2379 into 3 parts so that their amounts after 2, 3 and 4 years respectively may be equal, the rate of interest being 5% per annum at simple interest. The first part is
- (a) ₹ 759 (b) ₹ 792
(c) ₹ 818 (d) ₹ 828
100. A man invested $\frac{1}{3}$ of his capital at 7%; $\frac{1}{4}$ at 8% and the remainder at 10%. If his annual income is ₹ 561, the capital is (M.B.A., 2006; Hotel Management, 2010)
- (a) ₹ 5400 (b) ₹ 6000
(c) ₹ 6600 (d) ₹ 7200

101. Find the amount to be received after 2 years 6 months at the rate of 5% p.a. of simple interest on a sum of ₹ 3200. [ESIC—UDC Exam, 2016]
 (a) ₹ 3800 (b) ₹ 3500
 (c) ₹ 3600 (d) ₹ 3900
102. A man buys a TV priced at ₹ 16000. He pays ₹ 4000 at once and the rest after 15 months on which he is charged a simple interest at the rate of 12% per year. The total amount he pays for the TV is [SSC—CHSL (10+2) Exam, 2015]
 (a) ₹ 18200 (b) ₹ 17800
 (c) ₹ 17200 (d) ₹ 16800
103. A sum becomes its double in 10 years. Find the annual rate of simple interest. [Indian Railway Gr. 'D' Exam, 2014]
 (a) 8% (b) 5%
 (c) 10% (d) 20%
104. The interest earned on ₹ 4000 when invested in Scheme A for two years at 7% p.a. simple interest is half of the interest earned when ₹ 'X' is invested for five years in the same scheme at the same rate of interest. What is the value of X?
 (a) 2000 (b) 2800
 (c) 3000 (d) 3200
 (e) 3600 [IBPS Mktg Off. (Scale-I), Exam, 2016]
105. The interest earned on ₹ 15000 in 3 years at simple interest is ₹ 5400. Find the rate of interest per annum [IBPS—RRB Office Assistant (Online) Exam, 2015]
 (a) 11.5% (b) 12%
 (c) 12.5% (d) 15%
106. The sum invested in Scheme B is thrice the sum invested in Scheme A. The investment in Scheme A is made for 4 years at 8% p.a. simple interest and in Scheme B for 2 years at 13% p.a. simple interest. The total interest earned from both the schemes is ₹ 1320. How much amount was invested in Scheme A? [IBPS—Bank PO/PT Exam, 2015]
 (a) ₹ 1200 (b) ₹ 1140
 (c) ₹ 960 (d) ₹ 1500

ANSWERS

- | | | | | | | | | | |
|----------|----------|----------|----------|----------|----------|---------|---------|---------|----------|
| 1. (a) | 2. (d) | 3. (d) | 4. (c) | 5. (a) | 6. (b) | 7. (a) | 8. (a) | 9. (c) | 10. (b) |
| 11. (b) | 12. (c) | 13. (e) | 14. (d) | 15. (e) | 16. (b) | 17. (c) | 18. (b) | 19. (c) | 20. (d) |
| 21. (b) | 22. (c) | 23. (c) | 24. (c) | 25. (d) | 26. (b) | 27. (c) | 28. (e) | 29. (d) | 30. (b) |
| 31. (b) | 32. (c) | 33. (b) | 34. (c) | 35. (a) | 36. (e) | 37. (b) | 38. (c) | 39. (a) | 40. (b) |
| 41. (c) | 42. (b) | 43. (d) | 44. (a) | 45. (c) | 46. (b) | 47. (b) | 48. (c) | 49. (c) | 50. (b) |
| 51. (b) | 52. (a) | 53. (b) | 54. (d) | 55. (a) | 56. (a) | 57. (d) | 58. (a) | 59. (b) | 60. (a) |
| 61. (d) | 62. (b) | 63. (c) | 64. (c) | 65. (b) | 66. (b) | 67. (d) | 68. (b) | 69. (b) | 70. (a) |
| 71. (d) | 72. (e) | 73. (c) | 74. (a) | 75. (a) | 76. (b) | 77. (b) | 78. (d) | 79. (b) | 80. (c) |
| 81. (a) | 82. (d) | 83. (c) | 84. (d) | 85. (d) | 86. (d) | 87. (a) | 88. (d) | 89. (c) | 90. (c) |
| 91. (c) | 92. (c) | 93. (c) | 94. (b) | 95. (b) | 96. (a) | 97. (d) | 98. (d) | 99. (d) | 100. (c) |
| 101. (c) | 102. (b) | 103. (c) | 104. (d) | 105. (b) | 106. (a) | | | | |

SOLUTIONS

1. $P = ₹ 5760$, $R = 6\%$, $T = 3$ yrs.

$$\therefore \text{S.I.} = ₹ \left(\frac{5760 \times 6 \times 3}{100} \right) = ₹ 1036.80.$$

2. $P = ₹ 3600$, $R = 15\%$, $T = 4$ yrs.

$$\therefore \text{S.I.} = ₹ \left(\frac{3600 \times 15 \times 4}{100} \right) = ₹ 2160.$$

Hence, amount after 4 years = ₹ $(3600 + 2160) = ₹ 5760$.

\therefore Cost of the cow = ₹ $(5760 - 4000) = ₹ 1760$.

3. $P = ₹ 520$, $R = 13\%$, $T = \frac{1}{2}$ yr.

$$\therefore \text{S.I.} = ₹ \left(\frac{520 \times 13}{100 \times 2} \right) = ₹ 33.80.$$

Hence, amount after 6 months = ₹ $(520 + 33.80) = ₹ 553.80$.

4. $P = ₹ 4800$, $R = 8\frac{1}{2}\% = \frac{17}{2}\%$,

$$T = 2 \text{ yrs } 3 \text{ mths} = 2\frac{1}{4} \text{ yrs} = \frac{9}{4} \text{ yrs.}$$

$$\therefore \text{S.I.} = ₹ \left(4800 \times \frac{17}{2} \times \frac{9}{4} \times \frac{1}{100} \right) = ₹ 918.$$

5. $P = ₹ 16800$, $R = 6\frac{1}{4}\% = \frac{25}{4}\%$, $T = 9 \text{ mths} = \frac{3}{4} \text{ yr.}$

$$\therefore \text{S.I.} = ₹ \left(16800 \times \frac{25}{4} \times \frac{3}{4} \times \frac{1}{100} \right) = ₹ 787.50.$$

$$6. \text{ Time} = \left(\overset{\text{Mar}}{22} + \overset{\text{Apr}}{30} + \overset{\text{May}}{21} \right) \text{ days} = 73 \text{ days} = \frac{1}{5} \text{ year.}$$

$$\therefore \text{ S.I.} = ₹ \left(1820 \times \frac{15}{2} \times \frac{1}{5} \times \frac{1}{100} \right) = ₹ 27.30.$$

$$7. \text{ Time} = \left(\overset{\text{Jan}}{23} + \overset{\text{Feb}}{28} + \overset{\text{Mar}}{31} + \overset{\text{Apr}}{30} + \overset{\text{May}}{31} + \overset{\text{Jun}}{3} \right) \text{ days} = 146 \text{ days} \\ = \frac{2}{5} \text{ years.}$$

$$\therefore \text{ S.I.} = ₹ \left(15000 \times 18 \times \frac{2}{5} \times \frac{1}{100} \right) = ₹ 1080.$$

Hence, amount paid = ₹ (15000 + 1080) = ₹ 16080.

$$8. \text{ Gain in 2 yrs} = \left[\left(5000 \times \frac{25}{4} \times \frac{2}{100} \right) - \left(\frac{5000 \times 4 \times 2}{100} \right) \right] \\ = ₹ (625 - 400) = ₹ 225. \\ \therefore \text{ Gain in 1 year} = ₹ \left(\frac{225}{2} \right) = ₹ 112.50.$$

9. Let the amounts invested in Schemes A and B be ₹ 5x and ₹ 4x respectively. Then,
 $5x = 20000 \Rightarrow x = 4000.$

\therefore Amount invested in Scheme B = ₹ 16000.

Total interest received on maturity

$$= ₹ \left[120\% \text{ of } \left(\frac{20000 \times 8 \times 5}{100} \right) + \left(\frac{16000 \times 9 \times 5}{100} \right) \right] \\ = ₹ (120\% \text{ of } 8000 + 7200) = ₹ (9600 + 7200) \\ = ₹ 16800.$$

$$\therefore \text{ Total amount} = ₹ (20000 + 16000 + 16800) = ₹ 52800.$$

$$10. \text{ Amount after 10 years} = ₹ \left[1000 + \frac{1000 \times 5 \times 10}{100} \right] = ₹ 1500.$$

Now, S.I. = ₹ (2000 - 1500) = ₹ 500, $P = ₹ 1500$, $R = 5\%$.

$$\therefore \text{ Time} = \left(\frac{500 \times 100}{1500 \times 5} \right) \text{ yrs} = 6 \frac{2}{3} \text{ yrs.}$$

$$\text{Hence, required time} = \left(10 + 6 \frac{2}{3} \right) \text{ yrs} = 16 \frac{2}{3} \text{ yrs.}$$

$$11. P = ₹ 450, \text{ S.I.} = ₹ 81, R = 4.5\%.$$

$$\text{Time} = \left(\frac{100 \times 81}{450 \times 4.5} \right) \text{ years} = 4 \text{ years.}$$

$$12. P = ₹ 9534, \text{ S.I.} = ₹ (11442 - 9534) = ₹ 1908, R = 4\%.$$

$$\therefore \text{ Time} = \left(\frac{100 \times 1908}{9534 \times 4} \right) \text{ yrs} = \left(\frac{47700}{9534} \right) \text{ yrs} \approx 5 \text{ yrs.}$$

$$13. P = ₹ 21250, \text{ S.I.} = ₹ (26350 - 21250) = ₹ 5100, T = 6 \text{ years.}$$

$$\therefore \text{ Rate} = \left(\frac{100 \times 5100}{21250 \times 6} \right) \% = 4\%.$$

$$14. \text{ Time} = 2 \text{ years } 4 \text{ months} = 2 \frac{1}{3} \text{ years} = \frac{7}{3} \text{ years,}$$

S.I. = ₹ 252, $P = ₹ 1600$.

$$\text{Rate} = \left(\frac{100 \times 252 \times 3}{1600 \times 7} \right) \% = 6 \frac{3}{4} \%.$$

$$15. P = ₹ 8630, \text{ S.I.} = ₹ 1553.40, T = 3 \text{ yrs.}$$

$$\therefore \text{ Rate} = \left(\frac{100 \times 1553.40}{8630 \times 3} \right) \% = 6\%.$$

16. Let the rate of be $R\%$ p.a.

$$\text{Then, } \left(\frac{600 \times R \times 4}{100} \right) + \left(\frac{600 \times R \times 2}{100} \right) = 180$$

$$\Rightarrow 2400R + 1200R = 18000 \Rightarrow 3600R = 18000$$

$$\Rightarrow R = 5\%.$$

$$17. \text{ S.I.} = ₹ 8376, R = 8\%, T = 6 \text{ yrs.}$$

$$\therefore \text{ Sum} = ₹ \left(\frac{100 \times 8376}{8 \times 6} \right) = ₹ 17450.$$

$$18. \text{ S.I.} = ₹ 210, R = 3 \frac{3}{4} \% = \frac{15}{4} \%, T = 2 \frac{1}{3} \text{ yrs} = \frac{7}{3} \text{ yrs.}$$

$$\therefore \text{ Sum} = ₹ \left(\frac{100 \times 210}{\frac{15}{4} \times \frac{7}{3}} \right) = ₹ \left(\frac{100 \times 210 \times 4 \times 3}{15 \times 7} \right) = ₹ 2400.$$

19. Let the present worth be ₹ x. Then, S.I. = ₹ (132 - x).

$$\therefore \left(\frac{x \times 5 \times 2}{100} \right) = 132 - x \Leftrightarrow 10x = 13200 - 100x$$

$$\Leftrightarrow 110x = 13200 \Leftrightarrow x = 120.$$

$$20. \text{ Principal} = ₹ \left(\frac{100 \times 4016.25}{9 \times 5} \right) = ₹ \left(\frac{401625}{45} \right) = ₹ 8925.$$

$$21. \text{ Sum} = \left(\frac{100 \times \text{S.I.}}{R \times T} \right) = ₹ \left(\frac{100 \times x}{x \times x} \right) = ₹ \left(\frac{100}{x} \right).$$

$$22. P = ₹ 6000, \text{ S.I.} = ₹ (8000 - 6000) = ₹ 2000, T = 4 \text{ years.}$$

$$\therefore \text{ Rate} = \left(\frac{100 \times 2000}{6000 \times 4} \right) \% = \frac{25}{3} \% = 8 \frac{1}{3} \%.$$

$$\text{Now, } P = ₹ 525, \text{ S.I.} = ₹ (700 - 525) = ₹ 175, R = 8 \frac{1}{3} \%.$$

$$\therefore \text{ Time} = \left(\frac{175 \times 100 \times 3}{525 \times 25} \right) \text{ years} = 4 \text{ years.}$$

$$23. P = ₹ 6200, \text{ S.I.} = ₹ (9176 - 6200) = ₹ 2976, T = 4 \text{ years.}$$

$$\therefore \text{ Rate} = \left(\frac{100 \times 2976}{6200 \times 4} \right) \% = 12\%.$$

New rate = (12 + 3)% = 15%.

$$\text{New S.I.} = ₹ \left(\frac{6200 \times 15 \times 4}{100} \right) = 3720.$$

Now amount = ₹ (6200 + 3720) = ₹ 9920.

24. Let the required time be T years.

$$\text{Then, } \frac{500 \times 6.25 \times 4}{100} = \frac{400 \times 5 \times T}{100}$$

$$\Rightarrow T = \left(\frac{500 \times 6.25 \times 4}{400 \times 5} \right) \text{ yrs} = 6 \frac{1}{4} \text{ yrs.}$$

25. We need to know the S.I; principal and time to find the rate. Since the principal is not given, so data is inadequate.

$$26. P = ₹ 6000, \text{ S.I.} = ₹ (7200 - 6000) = ₹ 1200, T = 4 \text{ yrs.}$$

$$\therefore \text{ Rate} = \left(\frac{100 \times 1200}{6000 \times 4} \right) \% = 5\%.$$

New rate = (1.5 × 5)% = 7.5%.

$$\text{New S.I.} = ₹ \left(\frac{6000 \times 7.5 \times 5}{100} \right) = ₹ 2250.$$

$$\therefore \text{New amount} = ₹ (6000 + 2250) = ₹ 8250.$$

$$27. P = ₹ 800, R = 4\frac{1}{2}\% = \frac{9}{2}\%, T = 3 \text{ years.}$$

$$\text{Then, S.I.} = ₹ \left(800 \times \frac{9}{2} \times \frac{3}{100} \right) = ₹ 108.$$

$$\text{Now, } P = ₹ 150, \text{ S.I.} = ₹ 108, R = 8\%.$$

$$\therefore \text{Time} = \left(\frac{100 \times 108}{150 \times 8} \right) \text{ years} = 9 \text{ years.}$$

$$28. \text{Sum} = ₹ \left(\frac{100 \times 1536}{12 \times 5} \right) = ₹ 2560.$$

$$\text{Now, } P = ₹ (2560 + 1000) = ₹ 3560, T = 2 \text{ yrs, } R = 12\%.$$

$$\therefore \text{S.I.} = ₹ \left(\frac{3560 \times 12 \times 2}{100} \right) = ₹ 854.40.$$

$$29. P = ₹ 64, \text{ S.I.} = ₹ (83.20 - 64) = ₹ 19.20, T = 2 \text{ years.}$$

$$\text{So, rate} = \left(\frac{100 \times 19.20}{64 \times 2} \right) \% = 15\%.$$

$$\text{Now, } P = ₹ 86, R = 15\%, T = 4 \text{ years.}$$

$$\therefore \text{S.I.} = ₹ \left(\frac{86 \times 15 \times 4}{100} \right) = ₹ 51.60.$$

$$\text{Amount} = ₹ (86 + 51.60) = ₹ 137.60.$$

$$30. \text{S.I.} = ₹ 840, R = 5\%, T = 8 \text{ years.}$$

$$\text{Principal} = ₹ \left(\frac{100 \times 840}{5 \times 8} \right) = ₹ 2100.$$

$$\text{Now, } P = ₹ 2100, \text{ S.I.} = ₹ 840, T = 5 \text{ years.}$$

$$\therefore \text{Rate} = \left(\frac{100 \times 840}{2100 \times 5} \right) \% = 8\%.$$

$$31. \text{S.I.} = ₹ 202.50, R = 4.5\%, T = 1 \text{ year.}$$

$$\text{Principal} = ₹ \left(\frac{100 \times 202.50}{4.5 \times 1} \right) = ₹ 4500.$$

$$\text{Now, } P = ₹ 4500, R = 5\%, T = 1 \text{ year.}$$

$$\text{S.I.} = ₹ \left(\frac{4500 \times 5 \times 1}{100} \right) = ₹ 225.$$

$$\therefore \text{Difference in interest} = ₹ (225 - 202.50) = ₹ 22.50.$$

$$32. \text{Let the sum be } ₹ x. \text{ Then, S.I.} = ₹ (504 - x).$$

$$\therefore \left(\frac{x \times 5 \times 4}{100} \right) = 504 - x \Leftrightarrow 20x = 50400 - 100x$$

$$\Leftrightarrow 120x = 50400 \Leftrightarrow x = 420.$$

$$\text{Now, } P = ₹ 420, R = 10\%, T = \frac{5}{2} \text{ years.}$$

$$\text{S.I.} = ₹ \left(\frac{420 \times 10}{100} \times \frac{5}{2} \right) = ₹ 105.$$

$$\therefore \text{Amount} = ₹ (420 + 105) = ₹ 525.$$

$$33. \text{Let time be } T \text{ years and rate be } R\% \text{ p.a.}$$

$$\text{Then, } y \text{ is the S.I. on } x \Rightarrow \frac{xRT}{100} = y \quad \dots (i)$$

$$\text{And, } z \text{ is the S.I. on } y \Rightarrow \frac{yRT}{100} = z \Rightarrow y = \frac{100z}{RT} \quad \dots (ii)$$

$$\text{From (i) and (ii) we have: } \frac{xRT}{100} = \frac{100z}{RT}$$

$$\Rightarrow \frac{xR^2T^2}{(100)^2} = z \Rightarrow \frac{y^2}{x} z \Rightarrow y^2 = xz.$$

$$34. \text{Let the principal be } P \text{ and rate of interest be } R\%$$

$$\therefore \text{Required ratio} = \left[\frac{\left(\frac{P \times R \times 6}{100} \right)}{\left(\frac{P \times R \times 9}{100} \right)} \right] = \frac{6PR}{9PR} = \frac{6}{9} = 2:3.$$

$$35. \text{Let the sum be } ₹ x. \text{ Then,}$$

$$\left(\frac{x \times 8 \times 4}{100} \right) + \left(\frac{x \times 10 \times 6}{100} \right) + \left(\frac{x \times 12 \times 5}{100} \right) = 12160$$

$$\Rightarrow 32x + 60x + 60x = 1216000$$

$$\Rightarrow 152x = 1216000 \Rightarrow x = 8000.$$

$$36. \text{Let the loan amount be } ₹ x. \text{ Then,}$$

$$\frac{6x}{100} + \frac{7.5x}{100} + \frac{9x}{100} = 8190 \Rightarrow 22.5x = 819000 \Rightarrow x = 36400.$$

$$37. \text{Let the rate of interest be } R\% \text{ p.a.}$$

$$\text{Then, } \left(\frac{400 \times R \times 2}{100} \right) + \left(\frac{550 \times R \times 4}{100} \right) + \left(\frac{1200 \times R \times 6}{100} \right) = 1020$$

$$\Rightarrow 800R + 220R + 7200R = 102000$$

$$\Rightarrow 10200R = 102000$$

$$\Rightarrow R = 10.$$

$$38. \text{Let the sum be } ₹ x. \text{ Now, S.I.} = ₹ 600, T = 10 \text{ years.}$$

$$\text{Rate} = \left(\frac{100 \times 600}{x \times 10} \right) \% = \left(\frac{6000}{x} \right) \%$$

$$\text{S.I. for first 5 years} = ₹ \left(\frac{x \times 5 \times 6000}{x \times 100} \right) = ₹ 300.$$

$$\text{S.I. for last 5 years} = ₹ \left(3x \times 5 \times \frac{6000}{x \times 100} \right) = ₹ 900.$$

$$\therefore \text{Total interest} = ₹ 1200.$$

$$39. \text{S.I.} = ₹ \left(10 \times \frac{3}{100} \times 4 \right) = ₹ 1.20.$$

$$40. \text{Let the sum be } ₹ 100. \text{ Then,}$$

$$\text{S.I. for first 6 months} = ₹ \left(\frac{100 \times 10 \times 1}{100 \times 2} \right) = ₹ 5.$$

$$\text{S.I. for last 6 months} = ₹ \left(\frac{105 \times 10 \times 1}{100 \times 2} \right) = ₹ 5.25.$$

$$\text{So, amount at the end of 1 year} = ₹ (100 + 5 + 5.25) = ₹ 110.25.$$

$$\therefore \text{Effective rate} = (110.25 - 100) = 10.25\%.$$

$$41. \text{S.I. for 1 year} = ₹ (854 - 815) = ₹ 39.$$

$$\text{S.I. for 3 years} = ₹ (39 \times 3) = ₹ 117.$$

$$\therefore \text{Principal} = ₹ (815 - 117) = ₹ 698.$$

$$42. \text{S.I. for 5 years} = ₹ (1020 - 720) = ₹ 300.$$

$$\text{S.I. for 2 years} = ₹ \left(\frac{300}{5} \times 2 \right) = ₹ 120.$$

$$\therefore \text{Principal} = ₹ (720 - 120) = ₹ 600.$$

43. S.I. for 2 years = ₹ (5680 - 5200) = ₹ 480.

$$\text{S.I. for 5 years} = ₹ \left(\frac{480}{2} \times 5 \right) = ₹ 1200.$$

$$\therefore \text{Principal} = ₹ (5200 - 1200) = ₹ 4000.$$

$$\text{Hence, rate} = \left(\frac{100 \times 1200}{4000 \times 5} \right) \% = 6\%.$$

44. S.I. for 3 years = ₹ (24412.50 - 20925) = ₹ 3487.50.

$$\text{S.I. for 2 years} = ₹ \left(\frac{3487.50}{3} \times 2 \right) = ₹ 2325.$$

$$\therefore \text{Principal} = ₹ (20925 - 2325) = ₹ 18600.$$

$$\text{Hence, rate} = \left(\frac{100 - 2325}{18600 \times 2} \right) \% = 6.25\%.$$

45. S.I. for $1\frac{1}{2}$ years = ₹ (1067.20 - 1012) = ₹ 55.20.

$$\text{S.I. for } 2\frac{1}{2} \text{ years} = ₹ \left(55.20 \times \frac{2}{3} \times \frac{5}{2} \right) = ₹ 92.$$

$$\therefore \text{Principal} = ₹ (1012 - 92) = ₹ 920.$$

$$\text{Hence, rate} = \left(\frac{100 \times 92 \times 2}{920 \times 5} \right) \% = 4\%.$$

46. Let sum = ₹ x . Then, S.I. = ₹ x .

$$\begin{aligned} \therefore \text{Time} &= \left(\frac{100 \times \text{S.I.}}{P \times R} \right) = \left(\frac{100 \times x}{x \times 18.75} \right) \text{years} = \frac{26}{3} \text{ years} \\ &= 5\frac{1}{3} \text{ years} = 5 \text{ years 4 months.} \end{aligned}$$

47. Let sum = ₹ x . Then, S.I. = ₹ x .

$$\therefore \text{Rate} = \left(\frac{100 \times \text{S.I.}}{P \times T} \right) = \left(\frac{100 \times x}{x \times 12} \right) \% = \frac{25}{3} \% = 8\frac{1}{3}\%.$$

48. Let sum = ₹ x . Then, S.I. = ₹ $3x$.

$$\therefore \text{Rate} = \left(\frac{100 \times \text{S.I.}}{P \times T} \right) = \left(\frac{100 \times 3x}{x \times 15} \right) \% = 20\%.$$

49. **Case I.** Let sum = ₹ x . Then, S.I. = ₹ x .

$$\therefore \text{Rate} = \left(\frac{100 \times \text{S.I.}}{P \times T} \right) = \left(\frac{100 \times x}{x \times 5} \right) \% = 20\%.$$

Case II. Let sum = ₹ x . Then, S.I. = ₹ $2x$.

$$\therefore \text{Rate} = \left(\frac{100 \times \text{S.I.}}{P \times T} \right) = \left(\frac{100 \times 2x}{x \times 12} \right) \% = \frac{50}{3} \% = 16\frac{2}{3}\%.$$

50. Let sum = ₹ x . Then, S.I. = ₹ x .

$$\therefore \text{Rate} = \left(\frac{100 \times x}{x \times 7} \right) \% = \frac{100}{7} \%.$$

$$\text{Now, sum} = ₹ x, \text{ S.I.} = ₹ 3x, \text{ Rate} = \frac{100}{7} \%.$$

$$\therefore \text{Time} = \left(\frac{100 \times 3x}{x \times \frac{100}{7}} \right) \text{yrs} = 21 \text{ years.}$$

51. Let sum = ₹ x .

$$\text{Then, S.I.} = ₹ 2x, \text{ Time} = 15\frac{1}{2} \text{ years} = \frac{31}{2} \text{ years.}$$

$$\therefore \text{Rate} = \left(\frac{100 \times 2x}{x \times \frac{31}{2}} \right) \% = \frac{400}{31} \%.$$

$$\text{Now, sum} = ₹ x, \text{ S.I.} = ₹ x, \text{ Rate} = \frac{400}{31} \%.$$

$$\therefore \text{Time} = \frac{100 \times x}{x \times \frac{400}{31}} = \frac{31}{4} \text{ years} = 7 \text{ years 9 months.}$$

52. Let sum = ₹ x . Then, S.I. = ₹ x , Time = 16 years.

$$\therefore \text{Rate} = \left(\frac{100 \times x}{x \times 16} \right) \% = \frac{25}{4} \% = 6\frac{1}{4}\%.$$

$$\text{Now, sum} = ₹ x, \text{ Time} = 8 \text{ years, Rate} = 6\frac{1}{4}\%.$$

$$\therefore \text{S.I.} = ₹ \left(\frac{x \times 25 \times 8}{100 \times 4} \right) = ₹ \frac{x}{2}.$$

$$\text{So, amount} = ₹ \left(x + \frac{x}{2} \right) = ₹ \frac{3x}{2} = 1\frac{1}{2} \text{ times}$$

53. Let sum be x . Then, S.I. = x .

$$1. \text{ Time} = \frac{100 \times x}{x \times \frac{50}{3}} = 6 \text{ years (False)}$$

$$2. \text{ Time} = \frac{100 \times x}{x \times 20} = 5 \text{ years (True)}$$

3. Suppose sum = x . Then, S.I. = x and Time = 5 years.

$$\text{Rate} = \left(\frac{100 \times x}{x \times 5} \right) \% = 20\%.$$

$$\text{Now, sum} = x, \text{ S.I.} = 3x \text{ and Rate} = 20\%.$$

$$\therefore \text{Time} = \left(\frac{100 \times 3x}{x \times 20} \right) \text{years} = 15 \text{ years (False)}$$

So, 2 alone is correct.

54. Let sum = x .

$$\text{Then, S.I.} = \frac{x}{2}.$$

$$\therefore \frac{x}{2} = \frac{x \times 8 \times 6}{100}. \text{ Clearly, data is inadequate.}$$

55. Let sum = x . Then, S.I. = $\frac{2x}{5}$, Time = 10 years.

$$\therefore \text{Rate} = \left(\frac{100 \times 2x}{x \times 5 \times 10} \right) \% = 4\%.$$

56. Let sum = x . Then, S.I. = $0.125x = \frac{1}{8}x$, $R = 10\%$.

$$\therefore \text{Rate} = \left(\frac{100 \times x}{x \times 8 \times 10} \right) \text{years} = \frac{5}{4} \text{ years} = 1\frac{1}{4} \text{ years.}$$

57. Let the sum be x .

$$\text{Then, S.I.} = 40\% \text{ of } x = \frac{2x}{5}; \text{ Rate} = 5\%.$$

$$\therefore \text{Time} = \left(100 \times \frac{2x}{5} \times \frac{1}{x \times 5} \right) = 8 \text{ years.}$$

58. Let sum = x . Then, amount = $\frac{7x}{6}$.

$$\text{S.I.} = \left(\frac{7x}{6} - x \right) = \frac{x}{6}; \text{ Time} = 3 \text{ years.}$$

$$\therefore \text{Rate} = \left(\frac{100 \times x}{x \times 6 \times 3} \right) \% = \frac{50}{9} \% = 5\frac{5}{9} \%.$$

59. Let sum = ₹ x . Then, S.I. = 30% of ₹ $x = ₹ \frac{3x}{10}$.

Time = 6 years.

$$\therefore \text{Rate} = \left(\frac{100 \times 3x}{10 \times x \times 6} \right) \% = 5\%.$$

Now, sum = ₹ x , S.I. = ₹ x , Rate = 5%.

$$\therefore \text{Time} = \left(\frac{100 \times x}{x \times 5} \right) \text{ years} = 20 \text{ years.}$$

60. Let sum = x . Then, S.I. = $\frac{x}{9}$.

Let rate = $R\%$ and time = R years.

$$\therefore \left(\frac{x \times R \times R}{100} \right) = \frac{x}{9} \Leftrightarrow R^2 = \frac{100}{9} \Leftrightarrow R = \frac{10}{3} = 3\frac{1}{3}.$$

Hence, rate = $3\frac{1}{3}\%$.

61. Let sum = x . Then, S.I. = $\frac{9}{16}x$.

Let rate = $R\%$ and time = R years.

$$\therefore \left(\frac{x \times R \times R}{100} \right) = \frac{9x}{16} \Leftrightarrow R^2 = \frac{900}{16} \Leftrightarrow R = \frac{30}{4} = 7\frac{1}{2}.$$

Hence, time = $7\frac{1}{2}$ years.

62. Let the sum lent to C be ₹ x .

$$\text{Then, } \left(\frac{2500 \times 7 \times 4}{100} \right) + \left(\frac{x \times 7 \times 4}{100} \right) = 1120$$

$$\Leftrightarrow \frac{7}{25}x = (1120 - 700) \Rightarrow x = \left(\frac{420 \times 25}{7} \right) = 1500.$$

63. Let each sum be ₹ x .

$$\text{Then, } \left(\frac{x \times 11 \times 9}{100 \times 2} \right) - \left(\frac{x \times 11 \times 7}{100 \times 2} \right) = 412.50$$

$$\Leftrightarrow (99x - 77x) = 82500 \Leftrightarrow 22x = 82500 \Leftrightarrow x = 3750.$$

64. Let the sum be ₹ x .

$$\text{Then, } \left(x \times \frac{15}{2} \times \frac{5}{4} \times \frac{1}{100} \right) - \left(x \times \frac{25}{2} \times \frac{2}{3} \times \frac{1}{100} \right) = 32.50$$

$$\Leftrightarrow \frac{75x}{8} - \frac{25x}{3} = 3250 \Leftrightarrow 25x = (3250 \times 24)$$

$$\Leftrightarrow x = \left(\frac{3250 \times 24}{25} \right) = 3120.$$

65. Let the required sum be ₹ x .

Then, 11% of 7500 + 15% of $x = 12\%$ of $(7500 + x)$

$$\Rightarrow \left(\frac{11}{100} \times 7500 \right) + \left(\frac{15}{100}x \right) = \frac{12}{100}(7500 + x)$$

$$\Rightarrow 82500 + 15x = 90000 + 12x \Rightarrow 3x = 7500$$

$$\Rightarrow x = 2500.$$

Hence, required sum = ₹ 2500.

66. Let the sums be x and y .

$$\frac{x \times 6 \times 2}{100} + \frac{y \times 7 \times 2}{100} = 354 \text{ or } 6x + 7y = 17700. \quad \dots(i)$$

$$\text{Also, } \frac{x}{4} = \frac{y}{5} \text{ or } 5x - 4y = 0 \quad \dots(ii)$$

Solving (i) and (ii), we get : $x = 1200$ and $y = 1500$.

\therefore Total sum = ₹ 2700.

67. Let the money added by Rahul be ₹ x .

$$\text{Then, } \frac{(1150 + x) \times 9 \times 3}{100} - \frac{1150 \times 6 \times 3}{100} = 274.95$$

$$\Leftrightarrow 1150 \times 27 + 27x - 1150 \times 18 = 27495$$

$$\Leftrightarrow 27x + 1150 \times (27 - 18) = 27495$$

$$\Rightarrow 27x = 27495 - 10350 = 17145 \Rightarrow x = 635.$$

So, sum lent by Rahul to Sachin = ₹ $(1150 + 635) = ₹ 1785$.

68. Let the amount invested at 12% be ₹ x and that invested at 10% be ₹ y .

Then, 12% of x + 10% of $y = 130$

$$\Rightarrow 12x + 10y = 13000 \Rightarrow 6x + 5y = 6500 \quad \dots(i)$$

And, 10% of x + 12% of $y = 134$

$$\Rightarrow 10x + 12y = 13400 \Rightarrow 5x + 6y = 6700 \quad \dots(ii)$$

Adding (i) and (ii), we get: $11(x + y) = 13200$

$$\Rightarrow x + y = 1200 \quad \dots(iii)$$

Subtracting (i) from (ii), we get: $-x + y = 200 \quad \dots(iv)$

Adding (iii) and (iv), we get: $2y = 1400$ or $y = 700$.

Hence, amount invested at 12% = $(1200 - 700) = ₹ 500$.

69. Let the time be x years.

$$\text{Then, } \left(\frac{500 \times 3 \times x}{100} \right) + \left(\frac{600 \times 9 \times x}{100 \times 2} \right) = 126$$

$$\Leftrightarrow 15x + 27x = 126 \Leftrightarrow 42x = 126 \Leftrightarrow x = 3.$$

\therefore Required time = 3 years.

70. Let each sum = ₹ x .

Let the first sum be invested for $\left(T - \frac{1}{2}\right)$ years and the second sum for T years.

$$\text{Then, } x + \frac{x \times 8 \times \left(T - \frac{1}{2}\right)}{100} = 2560$$

$$\Rightarrow 100x + 8xT - 4x = 256000$$

$$\Rightarrow 96x + 8xT = 256000 \quad \dots(i)$$

$$\text{And, } x + \frac{x \times 7 \times T}{100} = 2560 \Rightarrow 100x + 7xT = 256000 \quad \dots(ii)$$

From (i) and (ii), we get: $96x + 8xT = 100x + 7xT$

$$\Rightarrow 4x = xT \Rightarrow T = 4.$$

Putting $T = 4$ in (i), we get: $96x + 32x = 256000$

$$\Rightarrow 128x = 256000 \Rightarrow x = 2000.$$

Hence, each sum = ₹ 2000; time periods = 4 yrs and $3\frac{1}{2}$ yrs.

71. Let the rate be $R\%$ p.a. Then,

$$\left(\frac{5000 \times R \times 2}{100}\right) + \left(\frac{3000 \times R \times 4}{100}\right) = 2200$$

$$\Leftrightarrow 100R + 120R = 2200 \Rightarrow R = \left(\frac{2200}{220}\right) = 10.$$

\therefore Rate = 10%.

72. Let the original rate be $R\%$. Then, new rate = $(2R)\%$.

$$\therefore \left(\frac{725 \times R \times 1}{100}\right) + \left(\frac{362.50 \times 2R \times 1}{100 \times 3}\right) = 33.50$$

$$\Leftrightarrow (2175 + 725) R = 33.50 \times 100 \times 3 = 10050$$

$$\Leftrightarrow R = \frac{10050}{2900} = 3.46.$$

\therefore Original rate = 3.46%.

73. $\left(\frac{1500 \times R_1 \times 3}{100}\right) - \left(\frac{1500 \times R_2 \times 3}{100}\right) = 13.50$

$$\Leftrightarrow 4500 (R_1 - R_2) = 1350 \Rightarrow R_1 - R_2 = \frac{1350}{4500} = 0.3\%.$$

74. Let the second amount be ₹ x . Then,

$$\left(\frac{12000 \times 10 \times 1}{100}\right) + \left(\frac{x \times 20 \times 1}{100}\right) = \left[\frac{(12000 + x) \times 14 \times 1}{100}\right]$$

$$\Leftrightarrow 12000 + 20x = 168000 + 14x$$

$$\Leftrightarrow 6x = 48000 \Rightarrow x = 8000.$$

\therefore Total investment = ₹ $(12000 + 8000)$ = ₹ 20000.

75. Let the rates of interest in the former and latter cases be $R\%$ and $(R + 1)\%$ p.a.

$$\text{Then, } 5000 \times R \times 4 = 4000 \times (R + 1) \times 4$$

$$\Rightarrow \frac{R + 1}{R} = \frac{5000 \times 4}{4000 \times 4} \Rightarrow 1 + \frac{1}{R} = 1 + \frac{1}{4} \Rightarrow R = 4.$$

Hence, required rate = 4% p.a.

76. S.I. = ₹ $\left(2600 \times \frac{20}{3} \times \frac{1}{100} \times T\right)$ = ₹ $\left(\frac{520}{3} \times T\right)$.

which is an exact number of rupees when $T = 3$ years.

77. Let the savings be X and Y and the rates of simple interest be $5x$ and $4x$ respectively.

$$\text{Then, } X \times 5x \times \frac{1}{2} \times \frac{1}{100} = Y \times 4x \times \frac{1}{2} \times \frac{1}{100}$$

$$\text{or } \frac{X}{Y} = \frac{4}{5}, \text{ i.e., } X : Y = 4 : 5.$$

78. Let the sum be ₹ x and original rate be $R\%$.

$$\text{Then, } \frac{x \times (R + 1) \times 3}{100} - \frac{x \times R \times 3}{100} = 5100$$

$$\Rightarrow 3Rx + 3x - 3Rx = 510000$$

$$\Rightarrow 3x = 510000 \Rightarrow x = 170000.$$

Hence, sum = ₹ 170000.

79. Let the sum be ₹ x .

$$\text{Then, } \left(x \times \frac{25}{2} \times \frac{1}{100}\right) - \left(\frac{x \times 10 \times 1}{100}\right) = 1250$$

$$\Leftrightarrow 25x - 20x = 250000 \Leftrightarrow 5x = 250000 \Leftrightarrow x = 50000.$$

80. Let the capital be ₹ x .

$$\text{Then, } \left(\frac{x \times 8 \times 1}{100}\right) - \left(x \times \frac{31}{4} \times \frac{1}{100}\right) = 61.50$$

$$\Leftrightarrow 32x - 31x = 6150 \times 4 \Leftrightarrow x = 24600.$$

81. Let the annual instalment be ₹ x .

$$\begin{aligned} \text{Then, } & \left[x + \left(\frac{x \times 3 \times 4}{100}\right)\right] + \left[x + \left(\frac{x \times 2 \times 4}{100}\right)\right] \\ & + \left[x + \left(\frac{x \times 1 \times 4}{100}\right)\right] + x = 848 \end{aligned}$$

$$\Leftrightarrow \frac{28x}{25} + \frac{27x}{25} + \frac{26x}{25} + x = 848$$

$$\Leftrightarrow 106x = 848 \times 25 = 21200 \Leftrightarrow x = 200.$$

Short Cut Method: The annual payment that will discharge a debt of ₹ A due in t years at the rate of interest $r\%$ p.a.

$$\text{is } \frac{100A}{100t + \frac{rt(t-1)}{2}}.$$

\therefore Annual instalment

$$= ₹ \left[\frac{100 \times 848}{100 \times 4 + \frac{4 \times 4 \times 3}{2}} \right] = ₹ \left(\frac{100 \times 848}{424} \right) = ₹ 200.$$

82. ₹ 10 + S.I. on ₹ 10 for 11 months

$$= ₹ 11 + \text{S.I. on ₹ 1 for } (1 + 2 + 3 + 4 + \dots + 10) \text{ months}$$

$$\Rightarrow ₹ 10 + \text{S.I. on ₹ 1 for 110 months}$$

$$= ₹ 11 + \text{S.I. on ₹ 1 for 55 months}$$

$$\Rightarrow \text{S.I. on ₹ 1 for 55 months} = ₹ 1.$$

$$\therefore \text{Rate} = \left(\frac{100 \times 12}{1 \times 55}\right)\% = 21\frac{9}{11}\%.$$

83. Amount to be paid = ₹ $\left(100 + \frac{200 \times 5 \times 1}{100} + \frac{100 \times 5 \times 1}{100}\right)$
= ₹ 115.

84. Money paid in cash = ₹ 1000.

$$\text{Balance payment} = ₹ (20000 - 1000) = ₹ 19000.$$

85. Total cost of the computer = ₹ 39000.

$$\text{Down payment} = ₹ 17000$$

$$\text{Balance} = ₹ (39000 - 17000) = ₹ 22000.$$

Let the rate of interest be $R\%$ p.a.

Amount of ₹ 22000 for 5 months

$$= ₹ \left(22000 + 22000 \times \frac{5}{12} \times \frac{R}{100}\right)$$

$$= ₹ \left(22000 + \frac{275R}{3}\right).$$

The customer pays the shopkeeper ₹ 4800 after 1 month, ₹ 4800 after 2 months,..... and ₹ 4800 after 5 months.

Thus, the shopkeeper keeps ₹ 4800 for 4 months, ₹ 4800 for 3 months, ₹ 4800 for 2 months, ₹ 4800 for 1 month and gets ₹ 4800 at the end.

∴ Sum of the amounts of these instalments
 = (₹ 4800 + S.I. on ₹ 4800 for 4 months) + (₹ 4800 + S.I. on ₹ 4800 for 3 months) + ... + (₹ 4800 + S.I. on ₹ 4800 for 1 month + ₹ 4800)
 = ₹ (4800 × 5) + S.I. on ₹ 4800 for (4 + 3 + 2 + 1) months
 = ₹ 24000 + S.I. on ₹ 4800 for 10 months
 = ₹ $\left(24000 + 4800 \times R \times \frac{10}{12} \times \frac{1}{100}\right)$ = ₹ (24000 + 40R).

$$\therefore 22000 + \frac{275R}{3} = 24000 + 40R$$

$$\Rightarrow \frac{155R}{3} = 2000 \Rightarrow R = \frac{2000 \times 3}{155} = 38.71\% \text{ p.a.}$$

86. Let the sum be ₹ x , rate be $R\%$ p.a. and time be T years.

$$\text{Then, } \left[\frac{x \times (R + 2) \times T}{100} \right] - \left(\frac{x \times R \times T}{100} \right) = 108$$

$$\Leftrightarrow 2xT = 10800 \quad \dots (i)$$

$$\text{And, } \left[\frac{x \times R \times (T + 2)}{100} \right] - \left(\frac{x \times R \times T}{100} \right) = 180$$

$$\Leftrightarrow 2xR = 18000 \quad \dots (ii)$$

Clearly, from (i) and (ii), we cannot find the value of x . So, the data is inadequate.

87. Let the sum borrowed at 12% p.a. be ₹ x and that borrowed at 10% p.a. be ₹ (30000 - x).

S.I. at the end of 2 years = ₹ (36480 - 30000) = ₹ 6480.

$$\therefore \left(\frac{x \times 12 \times 2}{100} \right) + \left[\frac{(30000 - x) \times 10 \times 2}{100} \right] = 6480$$

$$\Leftrightarrow 24x + 60000 - 20x = 64800$$

$$\Leftrightarrow 4x = 4800 \quad \Leftrightarrow x = 12000.$$

88. Let A's share = ₹ x and B's share = ₹ y .

$$\text{Then, } \frac{x \times 15 \times 3}{100} = 2 \times \frac{y \times 12 \times 5}{100} \Rightarrow 45x = 120y$$

$$\Rightarrow \frac{x}{y} = \frac{120}{45} = \frac{8}{3}.$$

89. Let the two sums be ₹ x and ₹ (18750 - x).

$$\text{Then, } x + \frac{x \times 5 \times 6}{100} = (18750 - x) + \frac{(18750 - x) \times 5 \times 4}{100}$$

$$\Leftrightarrow x + \frac{30x}{100} = (18750 - x) + 3750 - \frac{20x}{100}$$

$$\Leftrightarrow 2x + \frac{x}{2} = 22500 \quad \Leftrightarrow \frac{5x}{2} = 22500$$

$$\Leftrightarrow x = \left(\frac{22500 \times 2}{5} \right) = 9000.$$

Hence, the two sums are ₹ 9000 and ₹ 9750.

90. Let the two sums be ₹ x and ₹ $2x$.

$$\text{Then, } \frac{x \times 5}{100} + \frac{2x \times 5.5}{100} = 1000$$

$$\Rightarrow 5x + 11x = 100000$$

$$\Rightarrow 16x = 100000 \Rightarrow x = 6250.$$

Hence, second sum ₹ (6250 × 2) = ₹ 12500.

91. Let the sum lent to A be ₹ x and that lent to B be ₹ (10000 - x).

$$\text{Then, } \frac{x \times 15 \times 2}{100} - \frac{(10000 - x) \times 18 \times 2}{100} = 360$$

$$\Rightarrow 30x - 360000 + 36x = 36000 \Rightarrow 66x = 396000$$

$$\Rightarrow x = 6000.$$

Hence, sum lent to B = ₹ (10000 - 6000) = ₹ 4000.

92. Let the sum lent at 10% be ₹ x and that lent at 9% be ₹ (2600 - x). Then,

$$\left(\frac{x \times 10 \times 5}{100} \right) = \frac{(2600 - x) \times 9 \times 6}{100}$$

$$\Leftrightarrow 50x = (2600 \times 54) - 54x$$

$$\Rightarrow x = \left(\frac{2600 \times 54}{104} \right) = 1350.$$

∴ Sum lent at 10% = ₹ 1350.

93. Let the sum lent at 5% be ₹ x and that lent at 8% be ₹ (1550 - x). Then,

$$\left(\frac{x \times 5 \times 3}{100} \right) + \left[\frac{(1550 - x) \times 8 \times 3}{100} \right] = 300$$

$$\Leftrightarrow 15x - 24x + (1550 \times 24) = 30000$$

$$\Leftrightarrow 9x = 7200 \quad \Leftrightarrow x = 800.$$

∴ Required ratio = 800 : 750 = 16 : 15.

94. Let the required rate be R . Then,

$$\left(\frac{2000 \times 8 \times 1}{100} \right) + \left(4000 \times \frac{15}{2} \times \frac{1}{100} \right) + \left(1400 \times \frac{17}{2} \times \frac{1}{100} \right) + \left(2600 \times R \times \frac{1}{100} \right) = \left(\frac{813}{10000} \times 10000 \right)$$

$$\Leftrightarrow 160 + 300 + 119 + 26R = 813 \quad \Leftrightarrow R = 9.$$

95. Let the sum invested at 9% be ₹ x and that invested at 11% be ₹ (100000 - x).

$$\text{Then, } \left(\frac{x \times 9 \times 1}{100} \right) + \left[\frac{(100000 - x) \times 11 \times 1}{100} \right]$$

$$= \left(100000 \times \frac{39}{4} \times \frac{1}{100} \right)$$

$$\Leftrightarrow \frac{9x + 1100000 - 11x}{100} = \frac{39000}{4} = 9750$$

$$\Leftrightarrow 2x = (1100000 - 975000) = 125000 \quad \Leftrightarrow x = 62500.$$

∴ Sum invested at 9% = ₹ 62500.

Sum invested at 11% = ₹ (100000 - 62500) = ₹ 37500.

96. Let x , y and z be the amounts invested in schemes A, B and C respectively. Then,

$$\left(\frac{x \times 10 \times 1}{100} \right) + \left(\frac{y \times 12 \times 1}{100} \right) + \left(\frac{z \times 15 \times 1}{100} \right) = 3200$$

$$\Leftrightarrow 10x + 12y + 15z = 320000 \quad \dots (i)$$

$$\text{Now, } z = 240\% \text{ of } y = \frac{12}{5}y \quad \dots (ii)$$

$$\text{And, } z = 150\% \text{ of } x = \frac{3}{2}x$$

$$\Rightarrow x = \frac{2}{3}z = \left(\frac{2}{3} \times \frac{12}{5}\right)y = \frac{8}{5}y \quad \dots (iii)$$

From (i), (ii) and (iii), we have:

$$16y + 12y + 36y = 320000 \Leftrightarrow 64y = 320000 \Leftrightarrow y = 5000.$$

\therefore Sum invested in Scheme B = ₹ 5000.

97. Let the parts be ₹ x , ₹ y and ₹ $[1440 - (x + y)]$. Then,

$$\frac{x \times 2 \times 3}{100} = \frac{y \times 3 \times 4}{100} = \frac{[1440 - (x + y)] \times 4 \times 5}{100}$$

$$\therefore 6x = 12y \text{ or } x = 2y.$$

$$\text{So, } \frac{x \times 2 \times 3}{100} = \frac{[1440 - (x + y)] \times 4 \times 5}{100}$$

$$\Rightarrow 12y = (1440 - 3y) \times 20 \Rightarrow 72y = 28800 \Rightarrow y = 400.$$

First part = $x = 2y = ₹ 800$, Second part = ₹ 400,

Third part = ₹ $[1440 - (800 + 400)] = ₹ 240$.

\therefore Required difference = ₹ $(800 - 240) = ₹ 560$.

98. Let the three amounts be ₹ x , ₹ y and ₹ z .

$$\text{Then, } \frac{x \times 10 \times 6}{100} = \frac{y \times 12 \times 10}{100} = \frac{z \times 15 \times 12}{100}$$

$$\Rightarrow 60x = 120y = 180z \Rightarrow x = 2y = 3z = k \text{ (say)}$$

$$\Rightarrow x = k, y = \frac{k}{2}, z = \frac{k}{3}$$

$$\Rightarrow x : y : z = k : \frac{k}{2} : \frac{k}{3} = 1 : \frac{1}{2} : \frac{1}{3} = 6 : 3 : 2.$$

99. Let the parts be x , y and z .

$$x + \left(x \times 2 \times \frac{5}{100}\right) = y + \left(y \times 3 \times \frac{5}{100}\right) = z + \left(z \times 4 \times \frac{5}{100}\right)$$

$$\Rightarrow \frac{11x}{10} = \frac{23y}{20} = \frac{6z}{5} = k \Rightarrow x = \frac{10k}{11}, y = \frac{20k}{23}, z = \frac{5k}{6}.$$

$$\text{But } x + y + z = 2379$$

$$\Rightarrow \frac{10k}{11} + \frac{20k}{23} + \frac{5k}{6} = 2379$$

$$\Rightarrow 1380k + 1320k + 1265k = 2379 \times 11 \times 23 \times 6$$

$$\Rightarrow k = \frac{2379 \times 11 \times 23 \times 6}{3965} = \frac{3 \times 11 \times 23 \times 6}{5}$$

$$x = \left(\frac{10}{11} \times \frac{3 \times 11 \times 23 \times 6}{5}\right) = 828.$$

Hence, the first part is ₹ 828.

100. Let total capital be ₹ x .

$$\text{Then, } \left(\frac{x}{3} \times \frac{7}{100} \times 1\right) + \left(\frac{x}{4} \times \frac{8}{100} \times 1\right) + \left(\frac{5x}{12} \times \frac{10}{100} \times 1\right) = 561$$

$$\Leftrightarrow \frac{7x}{300} + \frac{x}{50} + \frac{x}{24} = 561 \Leftrightarrow 51x = (561 \times 600)$$

$$\Leftrightarrow x = \left(\frac{561 \times 600}{51}\right) = 6600.$$

101. Rate of interest = 5% p.a.

Sum = ₹ 3200

$$\text{Time} = 2 \text{ years } 6 \text{ months} = 2\frac{1}{2} \text{ years} = \frac{5}{2} \text{ years}$$

$$\text{S.I.} = \frac{\text{Principal} \times \text{Time} \times \text{Rate}}{100} = \frac{3200 \times 5 \times 5}{2 \times 100} = ₹ 400$$

$$\therefore \text{Amount} = ₹ \text{Sum} + \text{S.I.} = (3200 + 400) = ₹ 3600$$

102. Price paid = ₹ 4000

Rest price = ₹ 12000

Rate = 12%

$$\therefore = \frac{12000 \times 12 \times 5}{100 \times 12} = ₹ 1800$$

\therefore Amount paid after 15 months

$$= 12000 + 1800 = 13800$$

\therefore Total amount paid for TV = 4000 + 13800 = 17800

103. Let sum be ₹ x and let S.I. = ₹ x

Time = 10 years

$$\therefore \text{Rate} = \frac{\text{S.I.} \times 100}{\text{Principal} \times \text{Time}} = \frac{x \times 100}{x \times 10} = 10\% \text{ per annum.}$$

104. Simple Interest earned in scheme

$$A = \frac{PRT}{100} = \frac{4000 \times 7 \times 2}{100} = ₹ 560$$

Interest earned in scheme B = 560 × 2

$$= ₹ 1120$$

Let 'A' be the principal amount invested in scheme B

$$\text{Interest} = \frac{\text{Principal} \times \text{Rate} \times \text{Time}}{100}$$

$$1120 = \frac{A \times 7 \times 5}{100}$$

$$A = ₹ 3200$$

105. Rate = $\frac{\text{S.I.} \times 100}{\text{Principal} \times \text{Time}} = \frac{5400 \times 100}{15000 \times 3} = 12\% \text{ per annum.}$

106. Let the amount invested in scheme A be ₹ x and that in B be ₹ $3x$.

$$\text{Then, } \frac{x \times 4 \times 8}{100} + \frac{3x \times 2 \times 13}{100} = 1320$$

$$\text{or, } \frac{32x}{100} + \frac{78x}{100} = 1320$$

$$\text{or, } \frac{110x}{100} = 1320$$

$$\therefore x = \frac{1320 \times 100}{110} = ₹ 1200$$

EXERCISE

(DATA SUFFICIENCY TYPE QUESTIONS)

Directions (Questions 1–8): Each of the questions given below consists of a statement and/or a question and two statements numbered I and II given below it. You have to decide whether the data provided in the statement(s) is/are sufficient to answer the question. Read both the statements and

Give answer (a) if the data in Statement I alone are sufficient to answer the question, while the data in Statement II alone are not sufficient to answer the question;

Give answer (b) if the data in Statement II alone are sufficient to answer the question, while the data in Statement I alone are not sufficient to answer the question;

Give answer (c) if the data either in Statement I or in Statement II alone are sufficient to answer the question;

Give answer (d) if the data in both Statements I and II together are not sufficient to answer the question;

Give answer (e) if the data in both Statements I and II together are necessary to answer the question.

- What is the rate of simple interest ?
I. The total interest earned was ₹ 4000.
II. The sum was invested for 4 years.
- The simple interest on a sum of money is ₹ 50. What is the sum ? (R.B.I., 2003)
I. The interest rate is 10% p.a.
II. The sum earned simple interest in 10 years.
- How much money did X invest ?
I. An increase in the rate of interest from $4\frac{7}{8}\%$ to $5\frac{1}{8}\%$ per annum increases his yearly income by ₹ 25.
II. The sum invested gets doubled, when invested at 8% p.a. for $12\frac{1}{2}$ years.
- What percentage of simple interest per annum did Anand pay to Deepak ?
I. Anand borrowed ₹ 8000 from Deepak for four years.
II. Anand returned ₹ 8800 to Deepak at the end of two years and settled the loan.
- A man borrowed a total sum of ₹ 24000 from two moneylenders. For one loan, he paid interest @ $7\frac{1}{2}\%$ p.a. and for the other 9% p.a. How much money did he borrow at each rate ?
I. The sum of the interests after one year was ₹ 2025.
II. The interest on one sum was twice that on the other.

- What is the sum which earned interest ?
I. The total simple interest was ₹ 7000 after 7 years.
II. The total of sum and simple interest was double of the sum after 5 years.
- How much money did Gagan borrow from a bank?
I. Gagan paid a total simple interest of ₹ 32000 at the end of 5 years.
II. The interest at the end of 2 years was one-tenth of the money he borrowed.
- What is the rate of interest p.c.p.a.? (Bank P.O., 2009)
I. The amount doubles itself in 10 years.
II. The simple interest accrued in 5 years is ₹ 5000.

Directions (Questions 9–12): Each of the questions given below consists of a question followed by three statements. You have to study the question and the statements and decide which of the statement(s) is/are necessary to answer the question.

- What is the principal sum ?
I. The sum amounts to ₹ 690 in 3 years at S.I.
II. The sum amounts to ₹ 750 in 5 years at S.I.
III. The rate of interest is 5% p.a.
(a) I and III only
(b) II and III only
(c) I and II only
(d) I and III only, or II and III only
(e) Any two of the three
- In how many years will a sum of money put at simple interest treble itself ?
I. The interest earned in 4 years is half the sum.
II. The rate of interest is $12\frac{1}{2}\%$.
III. The sum doubles itself in 8 years at simple interest.
(a) Any one of the three (b) Any two of the three
(c) All I, II and III (d) II and III only
(e) I and II only
- What is the principal sum? (SNAP, 2005)
I. The interest amount after 30 months is half the interest amount after 5 years.
II. The sum amounts to ₹ 1050 in 5 years at simple interest rate.
III. The rate of interest is 8% p.a.
(a) I and II only
(b) II and III only
(c) I and III only
(d) I and III only, or II and III only

12. What is the rate of simple interest per annum?

(R.B.I., 2004)

- I. An amount of ₹ 7500 increases by ₹ 1125 at the end of one year.
 II. The principal amount of ₹ 6000 increases by three times in 20 years.

III. Interest accrued on an amount of ₹ 5200 in 3 years is ₹ 2340.

- (a) Any one of the three
 (b) Only I
 (c) Only III
 (d) Either I and II or III only
 (e) None of these

ANSWERS

1. (d) 2. (e) 3. (a) 4. (e) 5. (c) 6. (e) 7. (e) 8. (a) 9. (e) 10. (a)
 11. (b) 12. (a)

SOLUTIONS

1. We know that, $R = \left(\frac{100 \times \text{S.I.}}{P \times T} \right)$.

Now, I. gives, S.I. = ₹ 4000. II. gives, $T = 4$ years.

But, P is unknown.

So, we cannot find R . So, given data is insufficient to get R .

∴ Correct answer is (d).

2. Given : S.I. = ₹ 50.

I. gives, $R = 10\%$ p.a. II. gives, $T = 10$ years.

$$\therefore \text{Sum} = \left(\frac{100 \times \text{S.I.}}{T \times R} \right) = ₹ \left(\frac{100 \times 50}{10 \times 10} \right) = ₹ 50.$$

Thus, I and II together give the answer.

∴ Correct answer is (e).

3. Suppose X invests ₹ x .

I. gives : $R_1 = \frac{39}{8}\%$, $R_2 = \frac{41}{8}\%$. Increase in S.I. = ₹ 25.

$$\Rightarrow \left(\frac{x \times 1 \times \frac{41}{8}}{100} \right) - \left(\frac{x \times 1 \times \frac{39}{8}}{100} \right) = 25$$

$$\Rightarrow (41x - 39x) = (25 \times 800) \Rightarrow x = \left(\frac{25 \times 800}{2} \right) = 10000.$$

Thus, I only gives the answer.

II. gives, S.I. = ₹ x , $R = 8\%$ and $T = \frac{25}{2}$ years.

$$P = \frac{100 \times \text{S.I.}}{R \times T} = \left(\frac{100 \times x}{8 \times \frac{25}{2}} \right) \times 2$$

Thus, P is not obtained.

∴ I alone is sufficient to get the answer and II is not sufficient to get the answer.

∴ Correct answer is (a).

4. Let the rate be $R\%$ p.a.

I. gives, $P = ₹ 8000$ and $T = 4$ years.

II. gives, S.I. = ₹ $(8800 - 8000) = ₹ 800$.

$$\therefore R = \frac{100 \times \text{S.I.}}{P \times T} = \left(\frac{100 \times 800}{8000 \times 4} \right) \% = 2\frac{1}{2}\% \text{ p.a.}$$

Thus, I and II both are needed to get the answer.

∴ Correct answer is (e).

5. Suppose he borrowed ₹ x at $7\frac{1}{2}\%$ p.a. and ₹ $(24000 - x)$ at 9% p.a.

I. gives, total interest = ₹ 2025.

$$\therefore \left(x \times 1 \times \frac{15}{2} \times \frac{1}{100} \right) + \left\{ (24000 - x) \times 1 \times \frac{9}{100} \right\} = 2025.$$

This gives x .

II. gives, Interest on ₹ $(24000 - x) = 2 \times (\text{interest on ₹ } x)$

$$\Rightarrow (24000 - x) \times \frac{9}{100} \times 1 = \left(2 \times x \times \frac{15}{2} \times \frac{1}{100} \right)$$

This gives x .

Thus, data in I as well as in II are sufficient to answer the question.

∴ Correct answer is (c).

6. Let the sum be ₹ x .

I. gives, S.I. = ₹ 7000 and $T = 7$ years.

II. gives, Sum + S.I. for 5 years = $2 \times \text{Sum}$

$\Rightarrow \text{Sum} = \text{S.I. for 5 years}$

Now, S.I. for 7 years = ₹ 7000

$$\therefore \text{S.I. for 1 year} = \frac{7000}{7} = ₹ 1000.$$

S.I. for 5 years = ₹ $(1000 \times 5) = ₹ 5000$.

Thus, I and II both are needed to get the answer.

∴ Correct answer is (e).

7. Let the sum be ₹ x .

I. gives, S.I. = ₹ 32000, $T = 5$ yrs.

II. gives, S.I. = ₹ $\frac{x}{10}$, $T = 2$ yrs.

$$\text{From II, we have: } R = \left(\frac{100 \times \text{S.I.}}{P \times T} \right) = \left(\frac{100 \times \frac{x}{10}}{x \times 2} \right) \% = 5\%.$$

$$\text{Using I, we get: } x = \left(\frac{100 \times 32000}{5 \times 5} \right) = ₹ 128000.$$

Thus, I and II together give the answer.

∴ Correct answer is (e).

8. I. gives, $P = ₹ x$, S.I. = ₹ x , $T = 10$ yrs.

$$\therefore \text{Rate} = \left(\frac{\text{S.I.} \times 100}{P \times T} \right) = \left(\frac{x \times 100}{x \times 10} \right) \% = 10\%.$$

- II. gives, S.I. = 5000, $T = 5$ yrs.

Since P is still unknown, R cannot be calculated. Thus, only I gives the answer.

\therefore Correct answer is (a).

9. Let the sum be ₹ x .

From I and III, we have: $A = ₹ 690$, $T = 3$ yrs, $R = 5\%$.

$$\begin{aligned} \therefore x + \frac{x \times 5 \times 3}{100} &= 690 \Rightarrow x + \frac{3x}{20} = 690 \Rightarrow \frac{23x}{20} = 690 \\ \Rightarrow x &= \frac{690 \times 20}{23} = 600 \end{aligned}$$

From II and III, we have: $A = ₹ 750$, $T = 5$ yrs, $R = 5\%$

$$\begin{aligned} \therefore x + \frac{x \times 5 \times 5}{100} &= 750 \Rightarrow x + \frac{x}{4} = 750 \Rightarrow \frac{5x}{4} = 750 \\ \Rightarrow x &= \frac{750 \times 4}{5} = 600. \end{aligned}$$

From I and II, we have:

Let the rate be $R\%$ p.a.

$$\text{Then, } x + \frac{x \times R \times 3}{100} = 690 \Rightarrow x \left(1 + \frac{3R}{100} \right) = 690 \quad \dots (i)$$

$$\text{And, } x + \frac{x \times R \times 5}{100} = 750 \Rightarrow x \left(1 + \frac{5R}{100} \right) = 750 \quad \dots (ii)$$

$$\text{Dividing (ii) by (i), we get: } \frac{\left(1 + \frac{5R}{100} \right)}{\left(1 + \frac{3R}{100} \right)} = \frac{750}{690}$$

$$\Rightarrow 69(1000 + 5R) = 75(1000 + 3R)$$

$$\Rightarrow 120R = 600 \Rightarrow R = 5.$$

$$\text{Putting } R = 5 \text{ in (i), we get: } x \left(1 + \frac{15}{100} \right) = 690$$

$$\Rightarrow x = \frac{690 \times 100}{115} = 600.$$

Clearly, any two of the three will give us the answer.

\therefore Correct answer is (e).

10. Let sum be ₹ x . Then, S.I. = ₹ $(3x - x) = ₹ 2x$, $T = ?$

- I. gives : When $T = 4$, then

$$\therefore R = \frac{100 \times \text{S.I.}}{P \times T} = \left(100 \times \frac{x}{2} \times \frac{1}{x} \times \frac{1}{4} \right) = 12\frac{1}{2}\% \text{ p.a.}$$

Now, Sum = ₹ x , S.I. = ₹ $2x$, $T = ?$

$$\therefore T = \frac{100 \times \text{S.I.}}{P \times R} = \left(\frac{100 \times 2x}{x \times 25} \times 2 \right) = 16 \text{ years.}$$

Thus, I only gives the answer.

- II. gives, $R = \frac{25}{2}\% \text{ p.a.}$

$$\therefore T = \frac{100 \times \text{S.I.}}{P \times R} = \left(\frac{100 \times 2x}{x \times 25} \times 2 \right) = 16 \text{ years.}$$

Thus, II only also gives the answer.

- III. gives, $R = 5\% \text{ p.a.}$

$$\therefore T = \frac{100 \times \text{S.I.}}{P \times R} = \left(\frac{100 \times 2x}{x \times 5} \right) = 40 \text{ years}$$

Thus, III only also gives the answer.

\therefore Correct answer is (a).

11. Let the sum be ₹ x

Clearly, the fact given in I always hold true, irrespective of the sum. So, I does not give us the answer.

From II and III, we have: $A = ₹ 750$, $T = 5$ yrs, $R = 8\%$.

$$\therefore x + \frac{x \times 8 \times 5}{100} = 1050 \Rightarrow x + \frac{2x}{5} = 1050 \Rightarrow \frac{7x}{5} = 1050$$

$$\Rightarrow x = \left(\frac{1050 \times 5}{7} \right) = 750.$$

Thus, II and III together give the answer.

\therefore Correct answer is (b).

12. I. gives, $P = ₹ 7500$, S.I. = ₹ 1125, $T = 1$ year.

$$\therefore R = \left(\frac{100 - \text{S.I.}}{P \times T} \right) = \left(\frac{100 \times 1125}{7500 \times 1} \right) \% = 15\%.$$

Thus, I only gives the answer.

- II. gives, $P = ₹ 6000$, S.I. = ₹ 18000, $T = 20$ yrs.

$$\therefore R = \left(\frac{100 \times 18000}{6000 \times 20} \right) \% = 15\%.$$

Thus, II only gives the answer.

- III. gives, $P = ₹ 5200$, S.I. = ₹ 2340, $T = 3$ yrs.

$$\therefore R = \left(\frac{100 \times 2340}{5200 \times 3} \right) \% = 15\%.$$

Thus, III only gives the answer.

\therefore Correct answer is (a).