EXERCISE 12A PAGE: 165

Find the simple interest and the amount when:

1. Principal = ₹ 6400, rate = 6% p.a. and time = 2 years.

Solution:-

Given: - P = ₹ 6400, R = 6% p.a. and time = 2years.

If interest is calculated uniformly on the original principal throughout the loan period, it is called simple interest.

SI = (P × R × T)/100

= (6400 × 6 × 2)/ 100

= (64 × 6 × 2)/ 1

= ₹768

Amount = (principal + SI)

= (6400 + 768)

= ₹ 7168

2. Principal = ₹ 2650, rate = 8% p.a. and time = 2 ½ years.

Solution:-

Given: - P = ₹ 2650, R = 8% p.a. and time = 2 ½ years = (5/2)

If interest is calculated uniformly on the original principal throughout the loan period, it is called simple interest.

SI = (P × R × T)/100

= (2650 × 8 × (5/2))/ 100

= 2650 × 8 × (5/2) × (1/100)

= (2650 × 8 × 5 × 1)/ (2 × 100)

= (2650 × 4 × 1 × 1)/ (1 × 20)

= (2650 × 1 × 1 × 1)/ (1 × 5)

= (2650 / 5)

= ₹ 530

Amount = (principal + SI)

= (2650 + 530)

= ₹ 3180

3. Principal = ₹ 1500, rate = 12% p.a. and time = 3 years 3 months.

Solution:-

Given: - P = ₹ 1500, R = 12% p.a. and

Time = 3 years 3 months

We know that, 1 year = 12 months

∴ 3 years 3 months = (39/12) = (13/4)

If interest is calculated uniformly on the original principal throughout the loan period, it is called simple interest.

SI = (P × R × T)/100

= (1500 × 12 × (13/4))/ 100
= 1500 × 12 × (13/4) × (1/100)
= (1500 × 12 × 13 × 1)/ (4 × 100)
= (15 × 3 × 13 × 1)/ (1 × 1)
= (15 × 3 × 13 × 1)
= ₹ 585

Amount = (principal + SI)
= (1500 + 585)
= ₹ 2085

4. Principal = ₹ 9600, rate = 7 ½ % p.a. and time = 5 months.

Solution:-

Given: - P = ₹ 9600, R = 7 ½ % p.a. = (15/2) and time = 5 months = (5/12) years

If interest is calculated uniformly on the original principal throughout the loan period, it is called simple interest.

SI = (P × R × T)/100
= (9600 × (15/2) × (5/12))/ 100
= 9600 × (15/2) × (5/12) × (1/100)
= (9600 × 15 × 5 × 1)/ (2 × 12 × 100)
= (96 × 15 × 5 × 1)/ (2 × 12)
= (7200)/ (24)
= ₹ 300

Amount = (principal + SI)
= (9600 + 300)
= ₹ 9900

Find the time when:

6. Principal = ₹ 6400, SI = ₹ 1152 and rate = 6% p.a.

Solution:-

Given: - P = ₹ 6400. SI = ₹ 1152, R = 6%, T =?

We Know That,

T = (100 × SI) / (P × R)
= (100 × 1152) / (6400 × 6)
= (1152) / (64 × 6)
= (1152) / (384)
= 3 years

7. Principal = ₹ 9540, SI = ₹ 1908 and rate = 8% p.a.

Solution:-

Given: - P = ₹ 9540. SI = ₹ 1908, R = 8%, T =?

We Know That,

T = (100 × SI) / (P × R)
= (100 × 1908) / (9540 × 8)
= (25 ×1908) / (9540 × 2)
= (47700/ 19080)
= 2.5years
= 2 ½ years

8. Principal = ₹ 5000, Amount = ₹ 6450 and rate = 12% p.a.
Solution:-
Given: - P = ₹ 5000, Amount = ₹ 6450, R = 12%, T =?
We Know That,
SI = A – P
= 6450 – 5000
= ₹ 1450
T = (100 × SI) / (P × R)
= (100 × 1450) / (5000 × 12)
= (1 × 145) / (5 × 12)
= (29/ 12)
= 2 years 5 months

Find the rate when:
9. Principal = ₹ 8250, SI = ₹ 1100 and time = 2 years.
Solution:-
Given: - P = ₹ 8250, SI = ₹ 1100, t = 2 years.
We know that,
R = (100 × SI) / (P × T)
= (100 × 1100)/ (8250 × 2)
= (50 × 1100) / (8250 × 1)
= (55000/ 8250)
= 6.67
= 6(2/3) %

10. Principal = ₹ 5200, SI = ₹ 975 and time = 2 ½ years.
Solution:-
Given: - P = ₹ 5200, SI = ₹ 975, t = 2 ½ years = 5/2
We know that,
R = (100 × SI) / (P × T)
= (100 × 975)/ (5200 × (5/2))
= (100 × 975 × 2) / (5200 × 5)
= (1 × 975 × 2) / (52× 5)
= (195 × 1) / (26× 1)
= (195/26)
= 7.5

= 7 ½ % p.a.

11. Principal = ₹ 3560, amount = ₹ 4521.20 and time = 3 years.
Solution:-
Given: - P = ₹ 3560, amount = ₹ 4521.20, t = 3 years.
We know that,
SI = A – P
= 4521.20 – 3560
= ₹ 961.2
R = (100 × SI) / (P × T)
= (100 × 961.20)/ (3560 × 3)
= (100 × 96120) / (8250 × 3 ×100)
= (32040 /3560)
= 9% p.a.

12. Shanta borrowed ₹ 6000 from the State Bank of India for 3 years 8 months at 12% per annum. What amount will clear off her debt?
Solution:-
From the question,
Shanta borrowed ₹ 6000 from the State Bank of India (Principal)
Time = 3 years 8 months
We know that, 1 year = 12 months
∴ 3 years 8 months = (44/12) = (11/3)
SI = 12 % .p.a.
First we have to find Simple Interest,
SI = (P × R × T)/100
= (6000 × 12 × (11/3))/ 100
= 6000 × 12 × (11/3) × (1/100)
= (6000 × 12 × 11 × 1)/ (3 × 100)
= (60 × 4 × 11 × 1)/ (1 × 1)
= (60 × 4 × 11 × 1)
= ₹ 2640
Amount = (principal + SI)
= (6000 + 2640)
= ₹ 8640
∴The amount will clear off her debt is ₹ 8640

EXERCISE 12B PAGE: 166

Mark against the correct answer in each of the following:

1. The simple interest on ₹ 6250 at 4% per annum for 6 months is

(a) ₹ 125 (b) ₹ 150 (c) ₹ 175 (d) ₹ 135

Solution:-

(a) ₹ 125

Because,

Principal = ₹ 6250, SI = 4% p.a. Time = 6 months = (6/12) = (1/2) years

SI = (P × R × T)/ 100

= (6250 × 4 × (1/2))/ (100)

= 6250 × 4 × (1/2) × (1/100)

= (6250 × 4 × 1 × 1)/ (2 × 100)

= (6250 × 2)/ (100)

= (6250/50)

= ₹ 125

2. A sum amounts to ₹ 3605 in 219 days at 5% per annum. The sum is

(a) ₹ 3250 (b) ₹ 3500 (c) ₹ 3400 (d) ₹ 3550

Solution:-

(b) ₹ 3500

Because,

Let the required sum be ₹ x

Then,

SI = (P × R × T)/ 100

Amount = P + SI

= x + [(x × R × T)/ 100]

= x [1 + ((R × T)/ 100)]

x = Amount/ [1 + ((R × T)/ 100)]

= 3605/ [1 + ((5/100) × (219/365))]

= (3605 × 36500)/ 37595

x = ₹ 3500

3. At simple interest a sum becomes (6/5) of itself in 2½ years. The rate of interest per annum is

(a) 6% (b) 7½ (c) 8% (d) 9%

Solution:-

(c) 8%

Because,

Let th required sum be ₹ x

Rate of interest = r %

Time = 2½ years = 5/2 years

Amount = (6/5) × sum

Amount = principal + SI

(6/5) × x = x + [(P × R × T)/100]
= (6/5) x = x + [(x × r × 5)/ (100 × 2)]
= (6/5) = (1 + (r/40))
= r = (40 × (1/5))
= r = 8%

4. In what time will ₹ 8000 amount to ₹ 8360 at 6% per annum simple interest?
(a) 8 months (b) 9 months (c) 1 ¼ years (d) 1½ years
Solutions:-
Because,
Given: - P = ₹ 8000, A = ₹ 8368, R = 6%
We Know That,
Amount = Principal (1+ ((Rate × time)/100))
= (8360/ 8000) = 1 + ((6 × t)/100)
= (8360/ 8000) -1 = ((6 × t)/100)
= t = [(8360 – 8000)/ 8000] × (100/6)
= (360/8000) × (100/6)
= (6/8) × 12 months
= 9 months

5. At what rate percent per annum simple interest will a sum double itself in 10 years?
(a) 8% (b) 10% (c) 12% (d) 12 ½ %
Solution:-
(b) 10%
Because,
Let the sum be ₹ x and the rate be r%
Then,
Amount = 2x
= P + SI = 2x
= P + [(P × R × T)/100] = 2x
= x (1 + ((r × 10)/ 100)) = 2x
= (100 + (10 × r))/100 = 2
= 10 × r = 200 - 100
= r = 100/10
= r = 10 %

6. The simple interst at x % per annum for x years will be ₹ x on a sum of
(a) ₹ x (b) ₹ 100x (c) ₹ (100/x) (d) ₹ (100/x^2)
Solution:-
(c) ₹ (100/x)
Because,
From the question,
SI = ₹ x

Rate = x % .p.a.
Time = x years
Then,
SI = (P × R × T)/ 100
X = (P × X× X)/ 100
P = (100X)/ (X × X)
P = ₹ (100/X)