Solution 1:

Exercise 2(D)

Let principal (p) = Rs. 100

For 1st year

P = Rs. 100

R = 10%

T = 1 year

$$I = \frac{100 \times 100 \times 1}{100} = Rs.10$$

A = 100 + 10 = Rs. 110

For 2nd year

P = Rs. 110

R = 11%

T = 1 year

$$I = \frac{110 \times 11 \times 1}{100} = Rs.12.10$$

A = 110 + 12.10 = Rs. 122.10

If Amount is Rs. 122.10 on a sum of Rs. = 100

If amount is Rs. 1, sum = $\frac{100}{122.10}$

If amount is Rs. 6593.40, sum = $\frac{100}{122.10} \times 6593.40$

= Rs. 5400

Solution 2:

Let the value of machine in the beginning = Rs. 100

For 1st year depreciation = 10% of Rs. 100 = Rs. 100

Value of machine for second year = 100 - 10

= Rs. 90

For 2nd year depreciation = 10% of 90 = Rs. 9

Value of machine for third year = 90 - 9

= Rs. 81

For 3rd year depreciation = 15% of 81

= Rs. 12.15

Value of machine at the end of third year = 81 - 12.15

= Rs. 68.85

Net depreciation = Rs. 100 - Rs. 68.85

= Rs. 31.15

Or 31.15%

Solution 3:

For 1st half-year

P=Rs12,000; R=10% and T=1/2 year

Interest= Rs $\frac{12,000 \times 10 \times 1}{100 \times 2}$ = Rs600

Amount= RS12,000 + Rs600= Rs12,600

Money paid at the end of 1st half year=Rs4,000

Balance money for 2nd half-year= Rs12,600- Rs4,000=Rs8,600

For 2nd half-year

P=Rs8,600; R=10% and T=1/2 year

Interest=Rs $\frac{8,600 \times 10 \times 1}{100 \times 2}$ =Rs430

Amount= Rs8,600+ Rs430= Rs9,030

Money paid at the end of 2nd half-year=Rs4,000

Balance money for 3rd half-year= Rs9,030- Rs4,000=Rs5,030

For 3rd half-year

P=Rs5,030; R=10% and T=1/2 year

Interest = Rs $\frac{5,030 \times 10 \times 1}{100 \times 2}$ = Rs251.50

Amount= Rs5,030 + Rs251.50= Rs5,281.50

Solution 4:

Let Principal= Rs 100

For 1st year

P=Rs100; R=10% and T=1year

Interest= Rs $\frac{100 \times 10 \times 1}{100}$ = Rs10

Amount= Rs100 + Rs10= Rs110

For 2nd year

P=Rs110; R=10% and T= 1year

Interest= Rs $\frac{110 \times 10 \times 1}{100}$ = Rs11

Amount= Rs110 + Rs11= Rs121

For 3rd year

P=Rs121; R=10% and T= 1year

Interest= Rs $\frac{121 \times 10 \times 1}{100}$ = Rs12.10

Sum of C.I. for 1st year and 3rd year=Rs10+Rs12.10=Rs22.10

When sum is Rs22.10, principal is Rs100

When sum is Rs2,652, principal =Rs $\frac{100 \times 2652}{22.10}$ =Rs12,000 Ans.

Solution 5:

Let original value of machine=Rs100

For 1st year

P=Rs100; R=12% and T= 1year

Depreciation in 1st year= Rs $\frac{100 \times 12 \times 1}{100}$ =Rs12

Value at the end of 1st year=Rs100 - Rs12=Rs88

For 2nd year

P= Rs88; R=12% and T= 1year

Depreciation in 2nd year= Rs $\frac{88 \times 12 \times 1}{100}$ =Rs10.56

When depreciation in 2nd year is Rs10.56, original cost is Rs100

When depreciation in 2nd year is Rs2,640, original cost= $\frac{100 \times 2640}{10.56}$

=Rs25,000

Solution 6:

Let ₹x be the sum.

Simple Interest(I) = $\frac{x \times 8 \times 1}{100} = 0.08x$

Compound interest

For 1st year:

P = ₹x, R = 8% and T=1

$\Rightarrow$ Interest(I) = $\frac{x \times 8 \times 1}{100} = 0.08x$

For 2nd year:

P = ₹x+₹0.08x = ₹1.08x

$\Rightarrow$ Interest(I) = $\frac{1.08x \times 8 \times 1}{100} = 0.0864x$

The difference between the simple interest and compound interest at the rate of 8% per annum compounded annually should be ₹64 in 2 years.

$\Rightarrow$₹0.08x - ₹0.0864x = ₹64

$\Rightarrow$₹0.0064x = ₹64

$\Rightarrow$x = ₹10000

Hence the sum is ₹10000.

Solution 7:

For 1st year

P=Rs13,500; R=16% and T= 1year

Interest= Rs $\frac{13,500 \times 16 \times 1}{100}$ = Rs2,160

Amount= Rs13,500 + Rs2,160= Rs15,660

For 2nd year

P=Rs15,660; R=16% and T= 1year

Interest= Rs $\frac{15,660 \times 16 \times 1}{100}$ = Rs2,505.60

=Rs2,506

Solution 8:

For 1st year
P=Rs48,000; R=10% and T= 1year

$$\text{Interest= Rs}\frac{48,000 \times 10 \times 1}{100} = \text{Rs4,800}$$

Amount= Rs48,000+ Rs4,800= Rs52,800
For 2nd year
P=Rs52,800; R=10% and T= 1year

$$\text{Interest= Rs}\frac{52,800 \times 10 \times 1}{100} = \text{Rs5,280}$$

Amount= Rs52,800+ Rs5,280= Rs58,080
For 3rd year
P=Rs58,080; R=10% and T= 1year

$$\text{Interest= Rs}\frac{58,080 \times 10 \times 1}{100} = \text{Rs5,808}$$

Solution 9:

Let $x\%$ be the rate of interest charged.

For 1st year:
P = ₹12,000, R = x% and T = 1

$$\Rightarrow \text{Interest(I)} = \frac{12000 \times x \times 1}{100} = 120x$$

For 2nd year:
After a year, Ashok paid back ₹4,000.
P = ₹12,000 + ₹120x - ₹4,000 = ₹8,000 + ₹120x

$$\Rightarrow \text{Interest(I)} = \frac{(8000 + 120x) \times x \times 1}{100} = \left(80x + 1.20x^2\right)$$

The compound interest for the second year is ₹920
$₹(80x + 1.20x^2) = ₹920$
$\Rightarrow 1.20x^2 + 80x - 920 = 0$
$\Rightarrow 3x^2 + 200x - 2300 = 0$
$\Rightarrow 3x^2 + 230x - 30x - 2300 = 0$
$\Rightarrow x(3x + 230) - 10(3x + 230) = 0$
$\Rightarrow (3x + 230)(x - 10) = 0$
$\Rightarrow x = -230/3$ or $x = 10$

As rate of interest cannot be negative so x = 10.
Therefore the rate of interest charged is 10%.

(ii)

For 1st year:
Interest = ₹120x = ₹1200

For 2nd year:
Interest = $₹(80x + 1.20x^2)$ = ₹920

The amount of debt at the end of the second year is equal to the addition of principal of the second year and interest for the two years.
Debt = Rs.8,000 + Rs.1200 + Rs.920 = Rs.10,120

Solution 10:

Total interest obtained in the first year = Rs. 1500

Interest for the second year – Total interest obtained in the first year

= Rs. 1,725 – Rs. 1,500

= Rs. 225

Rate of interest for the second year

$= \frac{\text{Rs. } 225}{\text{Rs. } 1,500} \times 100 = 15\%$

Interest for the third year – Interest for the second year

= Rs. 2,070 – Rs. 1,725

= Rs. 345

Rate of interest for the third year

$= \frac{\text{Rs. } 345}{\text{Rs. } 1,725} \times 100 = 20\%$

So, rate of interest for the second year and third year are 15% and 20% respectively.