CHAPTER SEVEN

SIMPLE INTEREST

N/B: The formula S.I = $\frac{P \text{ x R x T}}{100}$ can also be written as S.I = $\frac{\text{PRT}}{100}$ or I = $\frac{\text{PRT}}{100}$.

(Q1)(i) Given the simple interest formula I = $\frac{PRT}{100}$, find the simple interest on ¢¢200 for 5 years at 2% per annum.

(ii) Make R the subject.

(iii) At what rate per annum will ¢600 earn ¢150 simple interest in 2 years.

Soln:

(i) P = ¢200, R = 2% per annum and T = 5 years.

From I = $\frac{PRT}{100}$ => I = $\frac{200 \text{ x } 2 \text{ x } 5}{100}$

= ¢20

(ii) From I = $\frac{PRT}{100}$ => I x 100 = PRT

=> 100I = PRT.

Dividing through using PT

=> $\frac{100\text{I}}{PT} = \frac{PRT}{PT}$

=> $\frac{100\text{I}}{PT} = \text{R} => R = \frac{100\text{I}}{PT}$.

P = ¢600, I = ¢150 and T = 2 years.

Since R = $\frac{100\text{I}}{\text{PT}}$ => R = $\frac{100(150)}{(600)(2)}$

= $\frac{15000}{1200} = 12.5\%$.

(Q2) (i) Find the simple interest on ¢88000:00 for $2\frac{1}{2}$ years at $3\frac{1}{4}\%$ per annum.

(ii) Akosua was granted a loan of ¢9,600 at an interest rate of 24% per annum. Calculate

(a) the interest at the end of the second year.

(b) the amount she paid back to the bank, at the end of the second year.

(c) the amount she still owes the bank, if she was able to pay ₵6,000 at the end of the fourth year.

Soln:

(i) P = ₵88000:00 = ₵88000

Time = $2\frac{1}{2} yrs = \frac{5}{2} yrs$

Rate = $3\frac{1}{4}\% = \frac{13}{4}\%$.

From S.I = $\frac{P \text{ x R x T}}{100}$

=> S.I = $\frac{88000 \text{ x } \frac{13}{4} \text{ x } \frac{5}{2}}{100}$

= $\frac{88000 \text{ x } 13 \text{ x } 5}{100 \text{ x } 4 \text{ x } 2} = 7150,$

=> the interest = ₵7150

(ii)(a) P = ₵9,600, R = 24% and T = 2yrs.

Since S.I = $\frac{P \text{ x R x T}}{100}$

=> S.I = $\frac{9600 \text{ x } 24 \text{ x } 2}{100}$

= ₵4,608.

(b) Interest paid = ₵4,608 and P (principal) = ₵9600. Amount paid back to the bank = interest + principal = 4608 + 9600 = ₵14,208.

(c) Amount paid to the bank after 4yrs or at the end of the 4^{th} year = ₵6,000.

Loan granted = the principal = P = ₵9,600.

Since she was able to repay the loan at the end of the 4^{th} year, then T = 4yrs.

Interest paid on the loan = $\frac{\text{P x R x T}}{100} = \frac{9600 \text{ x } 24 \text{ x } 4}{100}$

= ₵9216.

The amount she was supposed to pay back to the bank at the end of the 4^{th} year = the principal + Interest

= 9600 + 9216 = ₵18,816.

Since she was able to pay ₵6000 out of this amount to the bank, then the amount she still owes the bank = 18816 – 6000 = ₵12,816.

(Q3)(a) A trader took a loan of ₵18000:00 at an interest rate of $1\frac{1}{2}\%$ per anum. It was agreed that the loan and the interest must be paid in one year equal monthly installments. Calculate

(i) the interest earned on the loan.
(ii) the amount she paid back to the bank at the end of the year.

(b) Another trader took a loan at the same rate and conditions. If she had to pay ₵200000:00 monthly installments, find how much she took as loan.

Soln:

(a) Principal = P = the loan = ₵18000:00 = ₵18000.

Rate = R = $12\frac{1}{2}\% = \frac{25}{2}\%$

Time = T = 1yr.

(i) Interest earned = $\frac{P \text{ x R x T}}{100}$

$= \frac{18000 \text{ x } \frac{25}{2} \text{x } 1}{100} = \frac{18000 \text{ x } 25 \text{ x } 1}{100 \text{ x } 2}$ = ₵₵45,000.

(i) Amount paid back to the bank at the end of the year = the principal + the interest.

= 18000 + 45000 = ₵63000.

(ii) Since there are 12 months within a year, then the monthly installment payment = $\frac{63000}{12}$ = ₵5250.

(a) Amount taken by the trader as loan = the principal = P =?

Time = 1yr.

Rate = $12\frac{1}{2}\% = \frac{25}{2}\%$.

The interest paid on this loan in one year = $\frac{\text{P x R x T}}{100} = \frac{\text{P x } \frac{25}{2} \text{x 1}}{100}$

= $\frac{\text{p x 25 x 1}}{\text{100 x 2}} = \frac{25P}{200} = \frac{1}{8}P$= 0.125P.

Since the total amount paid by the trader as monthly installment for the year = 12 x 200000 = ₵2400000,=> the amount returned to the bank = ₵2400000.

Since the amount returned to the bank = the principal + the interest, then P + 0.125P

= ₵2400000, => 1P + 0.125P= ₵2400000, => 1.125P = 2400000

=> P = $\frac{2400000}{1.125}$ = 2133333.

Therefore the amount she took from the bank = ₵2133333.

(Q4) Ama and kofi shared the profit earned from their business in the ratio 3:4 respectively, and the profit was ₵1,743000.

(i) Find how much of the profit each of them got.

(ii) Kofi lent his share of the profit at 20% per annum for 2 years. Find the interest he earned.

(iii) What will be Kofi`s total amount at the end of 2 years?

Soln:

(i) Amount shared = the profit = ₵1743000.

	Ama	:	Kofi
Ratio	3	:	4

Total ratio = 3 + 4 = 7

Ama`s share = $\frac{3}{7}$ x 1743000= ₵747000.

Kofi`s share = $\frac{4}{7}$ x 1743000=₵ 996000

(i) Since amount lent by Kofi = his share = the principal, then P = ₵996000.

Rate = 20% and T = 2yrs.

The interest earned = $\frac{P \text{ x R x T}}{100}$= $\frac{996000 \text{ x } 20 \text{ x } 2}{100}$ = ₵398400

(ii) Kofi`s total amount at the end of the year = the principal + the interest

= 996000 + 398400= ₵1394400.