Simple Interest is an important topic asked under the Arithmetic section in Mathematics. It is asked in various Defence Exams such as CDS, AFCAT, Air Force Group X & Y etc

We will discuss the basic questions that are usually asked in this topic and how you can solve them using the normal as well as Shortcut approach.

Tricks on Simple Interest

Simple Interest (SI)

If the interest on a sum borrowed for a certain period is calculated uniformly, it is called simple interest(SI). (fix percentage of principal)

What is Principal (sum)?

Principal (or the sum) is the money borrowed or lent out for a certain period. It is denoted by P.

What is Amount?

The Addition of Simple Interest and Principle is called the Amount.

A = S.I + P (Principal)

Interest

Interest is the extra money paid by the borrower to the owner (lender) as a form of compensation for the use of the money borrowed calculated on the basis of Principle.

Time

This is the duration for which money is lent/borrowed.

Rate of Interest

It is the rate at which the interest is charged on principal.

What does per annum mean?

"Rate of interest R% per annum" means that the interest for one year on a sum. If not stated explicitly, the rate of interest is assumed to be for one year.

Formulas Need to Remember:

S.I =[(P X R X T)/(100)].

Where **P** = Principle, **R** = Rate of per annul, **T** = Number of years

From the above formula, we can derive the followings

P=(100×SI)/ RT

R=(100×SI)/ PT

T=(100×SI)/ PR

Conversion of Time Period – Rate of Interest			
Given (r%)	**Given (t)**	**Required (r%)**	**Required (t)**
r% annual	t Year	r/2 (%) half – yearly	2t
r% annual	t Year	r/4 (%) quarterly	4t
r% annual	t Year	r/12 (%) monthly	12t

Some Tricks to Solve easily

Trick 1:- If a sum of money becomes **"n"** times in **"T years"** at simple interest, then the rate of interest per annum can be given be

$$R = \frac{100\ (n-1)}{T}$$

Trick 2:- If an amount **P1** is lent out at simple interest of **R1%** per annum and another amount **P2** at simple interest rate of **R2%** per annum, then the rate of interest for the whole sum can be given by

$$\mathbf{R} = \frac{P1R1+P2\ R2}{P1+P2}$$

Trick 3:- A sum of money at simple interest **n1** itself in **t1 year**. It will become **n2** times of itself in (If Rate is constant)

$$\frac{t1}{t2} = \frac{(n1-1)}{(n2-1)}$$

Trick 4:- In what time will the simple interest be **"n"** of the principal at **"r %"** per annum:-

rt =n x 100

Trick 5:- If a certain sum of money is lent out in n parts in such a manner that equal sum of money is obtained at simple interest on each part where interest rates are **R1, R2, ... , Rn** respectively and time periods are **T1, T2, ... , Tn** respectively, then the ratio in which the sum will be divided in n parts can be given by

$$\frac{1}{R1T1} : \frac{1}{R2T2} : \ldots\ldots\ldots\ldots \frac{1}{Rn.Tn}$$

Some Important examples based on Simple Interest

Example 1: A sum amounts to Rs. 702 in 2 years and Rs. 783 in 3 years. Calculate the sum, rate of interest and the amount after 5 years?

Solution:
Amount for 2 years(A_2) = 702
Amount for 3 years (A_3)= 783
Interest for 1 year (I) = 783-702 = 81
So Sum = $A_2 - 2I = 702 - 2\times81$
= 702-162 = 540
rate of interest = $(81/540)\times100$
= 15%
Amount after 5 years = Sum+5I
= 540+ 5×81
= 945

Example 2: A sum of money doubles itself in 3 yrs at simple interest. In how many yrs will it amount to 8 times itself?

Solution: Doubles in 3 yrs
3 times in 3×2 = 6yrs
4 times in 3×3 = 9yrs
8 times in 3×7 = 21yrs

Example 3: Atul and Vijay are friends. Atul borrowed a sum of Rs.400 at 5% per annum simple interest from Vijay. He returns the amount with interest after 2 yrs. Vijay returns to Atul 2% of the total amount returned. How much did Atul receive?

Solution: After 2 yrs, amount returned to Vijay = 400+ (400*5*2)/100 = Rs 440
Amount returned to Atul = 2% of 440 = 8.8

Annual Instalments for Simple Interest:

Let's discuss a real example to understand instalment concepts:
A person deposit Rs.140 to the bank every year up to 5 yrs. The bank gives him a 5% rate of

interest simple annually. And at the end of 5 yrs, he gets total amount of Rs.770
So, 140 is the instalment, time is 5 years rate of interest is 5% and the amount or debt is Rs.770
This Instalment is also known as an annual payment. Debt is the total amount, so don't confuse between these two terms.

Installment = where A = debt, r = rate of interest and t = time period

$$\text{Installment} = \frac{100A}{100t+rt\frac{(t-1)}{2}} \text{ where A = debt, r = rate of interest and t = time period}$$

Example 4: What annual payment will discharge a debt of Rs.848 in 4yrs at 4% per annum simple interest?

Solution: Given, A = 848, r = 4% and t = 4yrs

$$\text{Using formula: Annual payment} = \frac{100\times848}{100\times4+4\times4\frac{(4-1)}{2}}$$

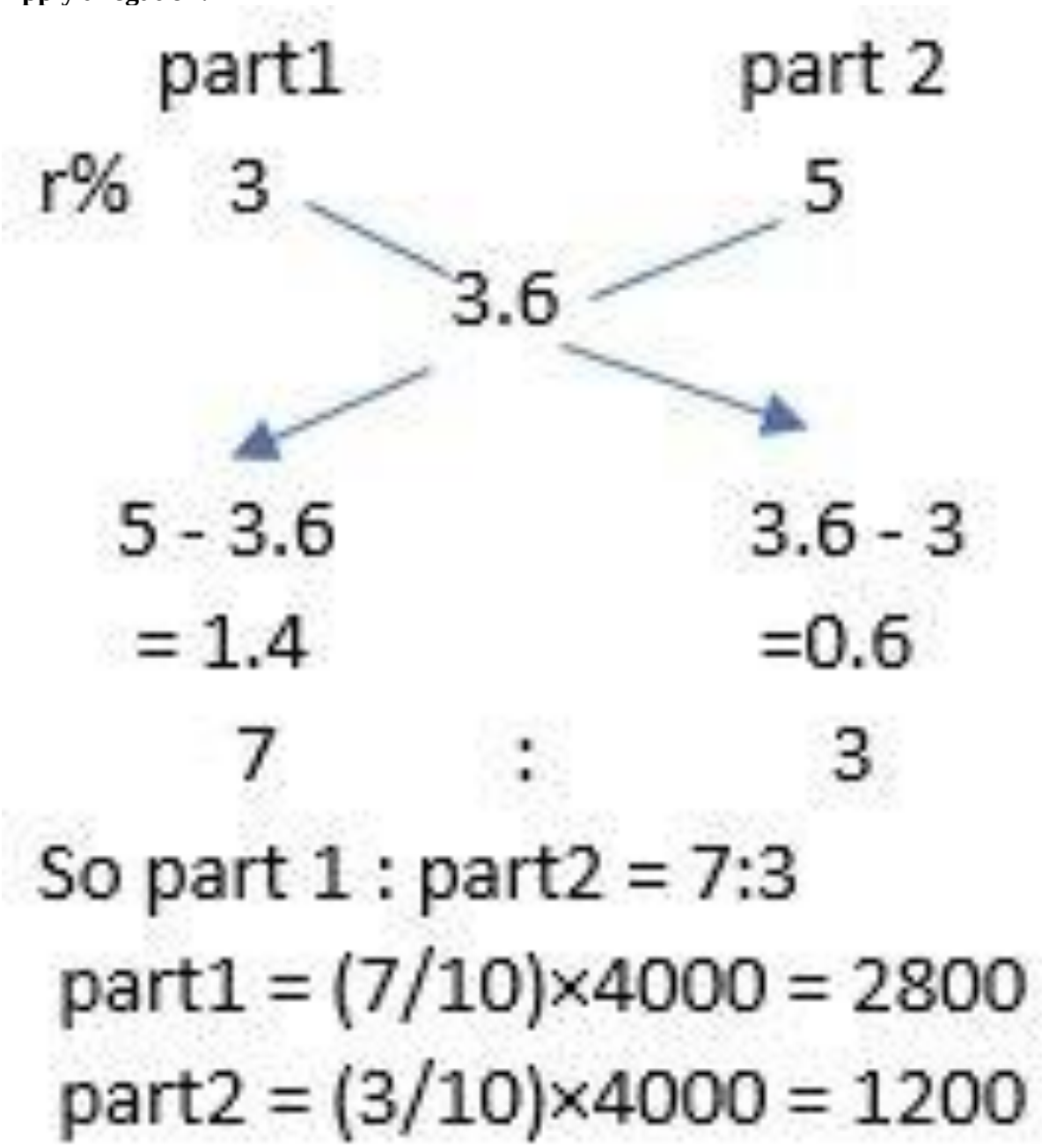
$$\text{Annual payment} = \frac{100\times848}{400+24} = 200$$

In case if you forget formula then how to approach this question.
Let installment is X. There are 4 installments and rate of interest is also 4%
Debt (A) = four installments + (r%) × installments × (0+1+2+… (t-1))
So, 848 = 4X + (4%)(X)(0+1+2+3)
848 = 4X+
848 = 4X+
848 = 424X/100
X = 200

Example 5: Rs.4000 is divided into two parts such that if one part be invested at 3% and the other at 5%, the annual interest from both the investments is Rs. 144. Find each part.
Solution: Let the amount lent at 3% rate be Rs.X, then amount lent at 5% rate is 4000-X
So, 3% of X + 5% of (4000-X) = 144
5% of 4000 – 2% of X = 144
200 – 2% of X = 144
2% of X = 56
X = (56/2)×100
X = 2800
4000 - X = 1200

How to solve this Question by Alligation Method:
First we will calculate net rate of interest for Rs. 144 on 4000
So, net rate = (144/4000)× 100 = 3.6%

Apply allegation:



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