# STAFF SELECTION COMMISSION – Solved Papers

## SIMPLE INTEREST  (Some Important Exercises)

**1.** Find the interest on Rs.1460 at 10% from 5$^{th}$ February, 1992 to 25$^{th}$ April, 1992.

(1) Rs.32       (2) Rs.36

(3) Rs.40       (4) Rs.34

**Ans : (1)**

P = Rs.1460

R = 10%

1992 is a leap year

$I = \dfrac{PRD}{36500}$

$I = \dfrac{1460 \times 10 \times 80}{36500}$

I = Rs.32

**Note :** We have excluded 5$^{th}$ February but included 25$^{th}$

**2.** Find the amount Ram will get after 2 years when he invests Rs.15000 at 15% interest.

(1) Rs.18500       (2) Rs.19500

(3) Rs.17500       (4) Rs.16500

**Ans : (2)**

Here, P = Rs.15000

R = 15%

T = 2 years

$A = P\left(\dfrac{100 + RT}{100}\right)$

$= 15000\left(\dfrac{100 + 15 \times 2}{100}\right)$

$= 15000 \times \dfrac{130}{100}$

A = Rs.19500

**3.** At what rate per annum will a sum of Rs.5000 amount to Rs.6000 in 4 years?

(1) 6% p.a       (2) 4% p.a

(3) 5% p.a       (4) 4.5% p.a

**Ans : (3)**

Here, P = Rs.5000

A = Rs.6000

T = 4 years

So, I = A – P

= Rs.(6000 – 5000) = Rs.1000

$R = \dfrac{100I}{PT}$

$R = \dfrac{100 \times 1000}{5000 \times 4}$

R = 5%

**4.** Ram lent Rs.1200 to Shyam for 5 years and Rs.1500 to Mohan for 2 years received altogether Rs.900 as interest. Find the rate per annum.

(1) 8.5%       (2) 8%

(3) 9%       (4) 10%

**Ans : (4)**

$I = I_1 + I_2$

$I = \dfrac{P_1RT_1}{100} + \dfrac{P_1RT_2}{100}$

$I = \dfrac{r}{100}(P_1T_1 + P_2T_2)$

or, $\boxed{r = \dfrac{100I}{P_1T_1 + P_2T_2}}$

Here, I = Rs.900

P$_1$ = Rs.1200

T1 = 5 years

P2 = Rs.1500

T2 = 2 years

$R = \dfrac{100 \times 900}{(1200 \times 5) + (1500 \times 2)}$

$R = \dfrac{90000}{9000}$

R = 10%

**Note :** In case of more than two investment, sum the products of principal and time of each case.

**5.** A certain sum of money amounts to Rs.1680 in 3 years and to Rs.1800 in 5 years. Find the sum and the rate of interest.

(1) Rs.1500; 4%

(2) Rs.1200; 4%

(3) Rs.1600; 5%

(4) Rs.1800; 5%

**Ans : (1)**

A = P + I

So, P remains same in both cases. Only amount of interest are different in two cases because the time periods are different.

P + interest for 5 years

= Rs.1800

And P + Interest for 3 years

= Rs.1680

On subtraction we get,

Interest for 2 years = Rs.120

Now, we solve for the case of 3 years.

Interest for 3 years

$= Rs.120 \times \dfrac{3}{2} = Rs.180$

And amount after 3 years

$= Rs.1680$

Principal $(P) = A - I$

$= Rs.(1680 - 180) = Rs.1500$

$R = \dfrac{100I}{PT}$

$\Rightarrow R = \dfrac{100 \times 180}{1500 \times 3}$

$R = 4\%.$

**Note :** Alternatively, we could have solved for 5 years too and got the same answer.

**6.** In how many years will a sum of money double itself at 5% rate of interest?

(1) 18 years  (2) 20 years

(3) 22 years  (4) 15 years

**Ans : (2)**

A sum doubles itself when amount of interest becomes equal to the principal.

So, $I = P$

Given, $R = 5\%$

$T = \dfrac{100I}{PR}$

On substitution we get,

$T = \dfrac{100 \times P}{P \times 5}$

$T = 20$ years.

**7.** At what rate percent per annum will a sum of money double itself in 15 years?

(1) 4%  (2) $5\dfrac{2}{3}\%$

(3) $6\dfrac{2}{3}\%$  (4) 6%

**Ans : (3)**

Here again

$I = P$

$T = 15$ years

$R = \dfrac{100I}{PT}$

$R = \dfrac{100 \times P}{P \times 15}$

$R = \dfrac{20}{3}\% = 6\dfrac{2}{3}\%$

**8.** A man lends a certain sum of money and gets an interest equal to $\dfrac{1}{16}$ th of the principal. The time for which money was lent is equal to the rate of interest. Find the rate of interest per annum.

(1) 4%  (2) 3.5%

(3) 3%  (4) 2.5%

**Ans : (4)**

$I = \dfrac{PRT}{100}$

Given : $I = \dfrac{P}{16}$

and $T = R$

So, on substitution we get

$\dfrac{P}{16} = \dfrac{P \times R \times R}{100}$

$R^2 = \dfrac{100}{16}$

$R = \dfrac{10}{4}\% = \dfrac{5}{2}\% = 2\dfrac{1}{2}\%$

**9.** At what rate of interest will a sum becomes $\dfrac{11}{10}$ times in 5 years?

(1) 2 P.c. P.a  (2) 2.5 P.c. P.a

(3) 3 P.c. P.a  (4) 3.5 P.c. P.a

**Ans : (1)**

$A = \dfrac{11}{10}P$

So, $I = A - P$

$= \dfrac{11}{10}P - P = \dfrac{1}{10}P$

$T = 5$ years

$R = \dfrac{100I}{PT}$

$R = \dfrac{100 \times \dfrac{1}{10}P}{P \times 5}$

$R = 2\%$ per annum

**10.** A man borrowed Rs.16000 from two persons. He paid 6% interest to one and 10% per annum to the other. In one year he paid total interest Rs.1120. How much did he borrow at each rate?

(1) Rs.10000 ; Rs.6000

(2) Rs.12000 ; Rs.4000

(3) Rs.11000 ; Rs.5000

(4) Rs.12500 ; Rs.3500

**Ans : (2)**

Let the sum borrowed at 6% be Rs.$x = P_1$

Then the sum borrowed at 10% $= Rs.(16000 - x) = P_2$
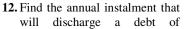
Time is one year in both cases

$R_1 = 6\%$

$R_2 = 10\%$

$I = I_1 + I_2$

$I = \dfrac{P_1R_1T}{100} + \dfrac{P_2R_2T}{100}$

$I = \dfrac{T}{100}(P_1R_1 + P_2R_2)$

or, $P_1R_1 + P_2R_2 = \dfrac{100I}{T}$

On substitution we get,

$(x \times 6) + (16000 - x)10$

$= \dfrac{100 \times 1120}{1}$

$\Rightarrow 160000 - 4x = 112000$

$\Rightarrow 4x = 48000$

$\Rightarrow x = \text{Rs.}12000$

and $16000 - x = \text{Rs.}4000$

**11.** A borrowed Rs.1500 at 4% per annum and Rs.1400 at 5% per annum for the same period. He paid Rs.390 at total interest. Find the time for which he borrowed the sum.

(1) 3.5 years    (2) 2.5 years

(3) 3 years      (4) 4 years

**Ans : (3)**

$I = I_1 + I_2$

$I = \dfrac{P_1R_1T}{100} + \dfrac{P_2R_2T}{100}$

or, $T = \dfrac{100I}{P_1R_1 + P_2R_2}$

$= \dfrac{100 \times 390}{(1500 \times 4) + (1400 \times 5)}$

$= \dfrac{39000}{13000}$

$T = 3$ years

**12.** Find the annual instalment that will discharge a debt of

Rs.12900 due in 4 years at 5% per annum simple interest.

(1) Rs.2750    (2) Rs.2150

(3) Rs.2500    (4) Rs.3000

**Ans : (4)**

Let each equal annual instalment be Rs.$x$

First instalment is paid after 1 year and hence will remain with the lender for the remaining $(4 - 1) = 3$ years.

Similarly, second instalment will remain with the lender for 2 years, third instalment for 1 year and the final fourth instalment remain Rs.x as such.

$A = A_1 + A_2 + A_3 + A_4$

$A = P\left(\dfrac{100 + RT}{100}\right)$

$\Rightarrow A$

$= x \left[ \begin{array}{l} \dfrac{100+5\times3}{100} + \dfrac{100+5\times2}{100} \\ + \dfrac{100+5\times1}{100} + \dfrac{100+5\times0}{100} \end{array} \right]$

$\Rightarrow 12900$

$= x\left[\dfrac{115 + 110 + 105 + 100}{100}\right]$

$\Rightarrow 12900 = \dfrac{430}{100}x$

$x = \dfrac{12900 \times 100}{430}$

$x = \text{Rs.}3000$

**13.** A certain sum of money amounts to Rs.6780 in 2 years and to Rs.7360.50 in $3\frac{1}{2}$ years. Find the sum and the rate of interest.

(1) Rs.6006 ; 6.4 P.c. P.a.

(2) Rs.8006 ; 6.4 P.c. P.a.

(3) Rs.5006 ; 5 P.c. P.a.

(4) Rs.5506 ; 5 P.c. P.a.

**Ans : (1)**

Principal + S.I. for $3\frac{1}{2}$ years =

Rs.7360.50 …. (i)

Principal + S.I. for 2 years = Rs.6780 …. (ii)

On subtracting equation (ii) from (i),

S.I. for $1\frac{1}{2}$ years = Rs.580.50

$\therefore$ S.I. for 2 years

$= \text{Rs.}\left(\dfrac{580.50 \times 2 \times 2}{3}\right)$

$= \text{Rs.}774$

$\therefore$ Principal = Rs.$(6780 - 774)$

$= \text{Rs.}6006$

And, rate of interest

$= \dfrac{774 \times 100}{6006 \times 2} = 6.4\%$ per annum

**14.** If Rs.5600 amounts to Rs.6678 in $3\frac{1}{2}$ years, what will Rs.9600 amount to in $5\frac{1}{4}$ years at the same rate of interest?

(1) Rs.12732    (2) Rs.12372

(3) Rs.12722    (4) Rs.12237

**Ans : (2)**

Interest = Rs.$(6678 - 5600)$

$= \text{Rs.}1078$

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

$$= \frac{1078 \times 100 \times 2}{5600 \times 7}$$

$$= 5\frac{1}{2}\% \text{ per annum}$$

∴ S.I. on Rs.9600 for $5\frac{1}{4}$ years

$$= \text{Rs.}\left( \frac{9600}{100} \times \frac{21}{4} \times \frac{11}{2} \right)$$

= Rs.2772

∴ Amount = Rs.(9600 + 2772)

= Rs.12372

**15.** A man promises to his wife a birthday present, given her each year a number of rupees equal to the number of years in her age. If her birthday falls on August 8, what sum must be placed at simple interest at 7% on January 1 before she is 63 (non leap year) in order to raise the required sum?

(1) Rs.1600    (2) Rs.1550

(3) Rs.1500    (4) Rs.1450

**Ans : (3)**

Let the sum be Rs.100

Number of days from January 1 to August 8 = 31 + 28 + 31 + 30 + 31 + 30 + 31 + 7 = 219

days $= \frac{219}{365}$ year $= \frac{3}{5}$ year

S.I. on Rs.100 for $\frac{3}{5}$ year at

$7\% = \text{Rs.}\left( \frac{100 \times 3 \times 7}{100 \times 5} \right)$

$$= \text{Rs.}\frac{21}{5}$$

If required money is Rs. $\frac{21}{5}$

sum = Rs.100

If required money is Rs.63,

sum = Rs.$\left( 100 \times \frac{5}{21} \times 63 \right)$

= Rs.1500

**16.** It is decided that a loan of Rs.10000 will be paid off at the rate of Rs.800 per month in 15 equal instalments. Find out the rate of return on investment.

(1) 17% P.a.    (2) 18% P.a

(3) 15% P.a.    (4) 16% P.a.

**Ans : (4)**

Number of monthly instalments = 15

Monthly instalment = Rs.800

Time (T) $= \frac{15}{12} = 1\frac{1}{4}$

Total amount paid

= Rs.(800 × 15) = Rs.12000

Interest = Rs.12000 – Rs.10000 = Rs.2000

When

| Investment | Interest | Years |
|---|---|---|
| 10000 | 2000 | $1\frac{1}{4}$ |
| 100 | ? | 1 |

∴ Rate of return (?)

$$= \frac{100 \times 2000 \times 1 \times 4}{10000 \times 5} = 16\%$$

**17.** A person takes loan of Rs.4000 on the condition that he would pay it in the monthly instalment of Rs.500. He has to pay interest @ 6% on the outstanding balances, then find out the average rate of interest received by the creditor.

(1) $3\frac{3}{8}\%$ P.a.    (2) $2\frac{3}{8}\%$ P.a.

(3) $4\frac{3}{8}\%$ P.a.    (4) $3\frac{1}{8}\%$ P.a.

**Ans : (1)**

Monthly instalment

= Rs.500

Total loan = Rs.4000

∴ Number of instalments

$$= \frac{4000}{500} = 8$$

Once the payment starts, outstanding balances will go on diminishing.

Hence, from point of view of interest, principal = 4000 + 3500 + 3000 + 2500 + 2000 + 1500 + 1000 + 500 = Rs.18000

∴ Interest on Rs.18000 for 1 month at 6% p.a.

$$= \frac{18000 \times 6 \times 1}{100 \times 12} = \text{Rs.}90$$

Average rate of interest

$$= \frac{I \times 100}{P \times T}$$

$$\boxed{T = 8\,\text{months} = \frac{8}{12}}$$

$$= \frac{90 \times 100 \times 12}{4000 \times 8}$$

$$= \frac{27}{8}\% = 3\frac{3}{8}\%$$

**18.** Divide Rs.6800 in two parts so that S.I. on the first part for $3\frac{1}{3}$ years at 6% may be equal to the

interest on the second part for

$3\dfrac{1}{2}$ years at 4% P.a.

(1) Rs.2600 ; Rs.4200

(2) Rs.2800 ; Rs.4000

(3) Rs.2500 ; Rs.4300

(4) Rs.2700 ; Rs.4100

**Ans : (2)**

Let the first part be Rs.$x$

Then second part

= Rs.$(6800 - x)$

Interest on first part for $3\dfrac{1}{3}$

years at 6%

$= \dfrac{x \times 6 \times \dfrac{10}{3}}{100} = \dfrac{x}{5}$

Interest on second part for $3\dfrac{1}{2}$

years at 4%

$= \dfrac{(6800 - x) \times 4 \times \dfrac{7}{2}}{100}$

$=$ Rs. $\dfrac{(6800 - x)7}{50}$

According to the problem,

$\dfrac{x}{5} = \dfrac{(6800 - x)7}{50}$

$\Rightarrow 10x = (6800 - x)7$

$\Rightarrow 10x = 47600 - 7x$

$\Rightarrow 17x = 47600$

$\Rightarrow x = 2800$

Hence first part = Rs.2800 and second part
= Rs.$(6800 - 2800)$ = Rs.4000