I. INTRODUCTION

Interest is the amount of money which is paid for the use of other's money. Suppose A borrows some money from B for a certain rate period at certain rate then A will pay some additional money along with the money borrowed, which is called interest.

1. Principal: The actually money borrowed by a borrower from a lender is known as the principal or sum. It is denoted by P.

2. Interest: The additional money paid by the borrower to the lender for the use of his money is called interest. It is denoted by I.

3. Amount: The total sum of principal and interest together is called an Amount. It is denoted by A.

4. Rate Percent Per Annum: If interest is payable yearly for every 100 rupees, then it is called rate percent per annum. Rate is denoted by R but rate percent per annum is donated by $\frac{R}{100}$.

5. Simple Interest: If the interest on a certain money borrowed for a certain period is reckoned uniformly, then it is called Simple Interest. It is denoted by S.I.

6. Time: The duration for which the money is borrowed is called Time and it is denoted by T.

I. SOME USEFUL RELATIONS

1. S.I. = $\frac{P \times R \times T}{100}$

2. A = P+S.I

3. R = $\frac{S.I. \times 100}{P \times T}$

4. T = $\frac{S.I. \times 100}{P \times R}$

5. P = $\frac{S.I. \times 100}{R \times T}$

6. P = A – S.I.

7. S.I. = A – P

8. $A = P\left(1 + \frac{RT}{100}\right)$ {A = P + S.I. = P $+ \frac{PTR}{100} = P\left(1 + \frac{RT}{100}\right)$

9. $A = S.I.\left(1 + \frac{100}{RT}\right)$ $P = \frac{S.I.\times 100}{RT}$

10. $P = \frac{100\times A}{100\times RT}$

II. SHORT CUT METHODS TO SOLVE SPECIAL TYPES OF PROBLEMS

Case I : If rate and time are equal

R = T

S.I. = $\frac{PRT}{100}$

=> R = T = $\sqrt{\frac{S.I.\times 100}{P}}$

Q. Simple Interest on a certain sum is 1/16 of the sum. Find the time in years, if time is numerically equal to the rate percent.

a) $\frac{10}{4}$ b) $\frac{10}{8}$

c) $\frac{10}{6}$ d) $\frac{10}{5}$

Case II : When the principal becomes n times in T years at simple interest, then rate percent is given by

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

Q. At what rate percent per annum will a sum of money double in 8 years?

a) 20% b) 30%

c) 10% d) 40%

Case IV. If a principal amount to A_1 at R_1% per annum and A_2 at R_2% per annum at simple interest, then time is given by

$$T = \frac{(A_2-A_1)\times 100}{A_1R_2-A_2R_1}$$

Q. At what time, a sum amounts to Rs. 1,120 at 4% per annum and to Rs. 1,200 at 5% per annum simple interest?

a) 20 years b) 10 years

c) 15 years d) 25 years

Case V. If a principal amount to A_1 at R_1% per annum in T_1 years and A_2 at R_2% per annum in T_2 years at simple interest is given by

$$P = \frac{A_1R_2-A_2R_1}{R_2-R_1}$$

$$P = \frac{A_1T_2-A_2T_1}{T_2-T_1}$$

Q. A certain sum of money lent out at S.I. amount to Rs. 690 in 3 years and Rs. 750 in 5 years. Find the sum lent.

a) Rs. 600 b) Rs. 556
c) Rs. 660 d) Rs. 663

Case VI. The annual payment of debt of Rs. P due in t years in equal instalments at the rate of interest R% per annum when equal instalment in denoted by 'x'

a) Rs. 85 b) Rs. 75
c) Rs. 82 d) Rs. 80

SOME IMPORTANT POINTS

1. Interest is said to be simple if it is calculated on the original principal throughout the loan period.
2. Number of years = $\frac{Number\ of\ days}{365}$
3. In counting the number of days between two given dates for calculating interest, the first day is not included.
4. In calculating the number of days, we do not count the day on which the money is deposited but the date of withdrawal is counted.

BASIC EXAMPLES

1. Find the simple interest on Rs 68000 at $16\frac{2}{3}$ % per annum for 9 month

a) 8000 b) 8500
c) 9000 d) 8300

2. Find the simple interest on Rs 3000 at $6\frac{1}{4}$ % per annum for the period from 4th February 2005 to 18th April 2005

a) 27.5 b) 35.7
c) 37.5 d) 32.5

3. A simple interest on Rs 1820 from March 9th, 2003, to May 21st 2003 at $7\frac{1}{2}$ %

a) 27.3 b) 33.7
c) 28.7 d) 23.7

4. At the rate of $8\frac{1}{2}$ % PCPA Simple interest a sum of Rs 4800 will have how much interest in 2 years 3 months?

a) 918 b) 618
c) 718 d) 218

5. A sum of Rs 1550 is lent out into two parts one at 8% and another at 6% if the total annual income is Rs 106. Find the money lent at each rate?

a) 650,900 b) 550 1000
c) 750, 800 d) 850, 700

6. The interest earned on Rs 15000 in 3 years at simple interest is 5400. Find the rate percent per annum?

a) 10% b) 12%
c) 15% d) 14%

7. Mr. Sharma takes a loan of Rs 25000 and repays an amount of Rs 31000 at the end of 2 years. What is the rate of Simple Interest at which he repays the loan?

a) 14% b) 12%
c) 10% d) 21%

8. Anil invested an amount for 3 years at a simple interest rate of 9 PCPA, he got an amount of Rs 19050 at the end of 3 years. What principle amount did he invest?

a) 10000 b) 15000
c) 12000 d) 14000

9. in how many years Rs 150 will produce some interest at 8% as Rs 800 produced in 3 years at $4\frac{1}{2}$%?

a) 10 b) 12
c) 9 d) 14

10. Mrs Anusha deposits an amount of Rs 35000 to obtain a simple interest at the rate of 15% pcpa for 4 years. What total amount will she have got at the end of 4 years

a) 21000 b) 56000
c) 28000 d) 42000

11. Out of a certain sum, 1/3rd is invested at 3%, 1/6th at 6% and the rest at 8%. If the simple interest for 2 years from all these investments amounts to Rs. 600, the original sum is

a) Rs. 3500 b) Rs. 4000
c) Rs. 4500 d) Rs. 5000

12. The annual instalment that will discharge a debt of Rs. 4,200 due in 5 years at 10% simple interest is

a) Rs. 500 a year b) Rs. 700 a year
c) Rs. 800 a year d) Rs. 900 a year

13. On a certain sum, the simple interest at the end $6\frac{1}{4}$ years becomes $\frac{3}{8}$ of the sum. The rate percent is

a) 7% b) 6%
c) 5% d) $5\frac{1}{2}$%

14. The annual payment of Rs. 80 in 5 years at 5% p.a. simple interest will discharge a debt of

a) Rs. 400 b) Rs. 440

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c) Rs. 420 D) Rs. 450

15. How long will it take a sum of money invested at 5% p.a. S.I. to increase its value by 40%?

a) 5 years b) 6 years
c) 7 years d) 8 years

16. Rs. 793 is divided into three parts such that their amounts after2, 3 and 4 years may be equal, the rate of interest being 5%. Find the ratio between these parts.

a) $\frac{1}{110}:\frac{1}{115}:\frac{1}{120}$ b) $\frac{1}{11}:\frac{1}{15}:\frac{1}{12}$
c) 110 : 115 : 120 d) $\frac{1}{10}:\frac{1}{55}:\frac{1}{77}$

17. A sum was put at a certain rate of interest for 3 years. Had it been put at 2% higher rate, it would have fetched Rs.72 more. The sum is

a) Rs. 1250 b) Rs. 1400
c) Rs. 1200 d) Rs. 1500

18. Rs. 2000 amounts to Rs. 2600 in 5 years at simple interest. If the interest rate is increased by 3%, it would amount to

a) Rs. 2900 b) Rs. 3200
c) Rs. 3600 d) Rs. 3800

19. A lent Rs.5000 to B for 2 years and Rs.3000 to C for 4 years on simple interest at the same rate of interest and received Rs.2200 in all from both as interest. The rate of interest per annum is

a) 5% b) 7% c) 10% d) $7\frac{1}{8}\%$

20. Rs.500 was invested at 12% per annum simple interest and a certain sum of money invested at 10% per annum simple interest. If the sum of the interest on both the sum after 4 years is Rs.480, the latter sum of money is :

a) Rs.750 b) Rs.450
c) Rs.550 d) Rs.600

21. A sum was lent at simple interest at a certain rate for 2 years. Had it been lent at 3% higher rate; it would have fetched Rs.300 more. The original sum of money was:

a) Rs.6000 b) Rs.5000
c) Rs.4000 d) Rs.7000

22. A sum of Rs. 800 becomes Rs. 956 in 3 years at a certain rate of simple interest. If the rate of interest is increased by 4%, what amount will the same sum become in 3 years ?

a) RS. 1042 b) Rs. 1025
c) Rs. 1024 d) Rs. 1052

23. The rate of simple interest per annum of bank being decreased from 5% to $3\frac{1}{2}$%, the annual income of a person from interest was less by Rs. 105. The sum deposited at the bank was

a) Rs.7, 200 b) Rs.6, 000
c) Rs.7, 000 d) Rs.6, 800

24. At what per cent of simple interest will a sum of money double itself in 15 years?

a) $6\frac{2}{3}$% b) $6\frac{1}{3}$%
c) 6% d) $6\frac{1}{2}$%

25. A sum of money at a certain rate per annum of simple interest doubles in the 5 years and at a different rate becomes three times in 12 years. The lower rate of interest per annum is

a) 20% b) 15%
c) $16\frac{2}{3}$% d) $15\frac{3}{4}$%

26. Ram deposited a certain sum of money in a company at 12% per annum simple interest for 4 years and deposited equal amount in fixed deposit in a bank for 5 years at 15% per annum simple interest. If the difference in the interest from two sources is Rs.1350, then the sum deposited in each case is :

a) Rs.4000 b) Rs.3000
c) Rs.6500 d) Rs.5000

27. Prakash lends a part of Rs.20, 000 at 8% simple interest and remaining at $\frac{4}{3}$% simple interest. His total income after a year was Rs.800. Find the sum lent at 8%.

a) Rs.12, 000 b) Rs.8, 000
c) Rs.10, 000 d) Rs.6, 000

28. The rate of interest per annum at which the total simple interest of a certain capital for 1 year is equal to the total simple interest of the same capital at the rate of 5% per annum for 2 years, is

a) 10% b) $\frac{5}{2}$%
c) 12.5% d) 25%

29. Simple interest on a certain sum for 6 years is $\frac{9}{25}$ of the sum. The rate of interest is

a) $6\frac{1}{2}$% b) 6%
c) $8\frac{1}{2}$% d) 8%

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30. A and B borrowed Rs. 3000 and Rs. 3200 respectively at the same rate of interest for $2\frac{1}{2}$ years. If B paid Rs. 40 more interest than A, find the rate of interest.

a) 7% b) 5%
c) 6% d) 8%

31. In what time will the simple interest be $\frac{2}{5}$ of the principal at 8 per cent per annum?

a) 7 years b) 8 years
c) 6 years d) 5 years

32. At the rate of simple interest per annum, the interest on a certain sum of money for 10 years will be $\frac{2}{3}$ th part of the amount, then the rate of simple interest is

a) $6\frac{2}{3}\%$ b) 5%
c) $4\frac{1}{2}\%$ d) 7%

33. The simple interest on a sum after 4 years is $\frac{1}{5}$ of the sum. The rate of interest per annum is

a) 5% b) 4%
c) 8% d) 6%

34. In a certain time, the ratio of a certain principal and the simple interest obtained from it are in the ratio 10 : 3 at 10% interest per annum. The number of years the money was invested is

a) 3 years b) 1 year
c) 7 years d) 5 years

35. A person lent Rs.5, 000 partly at the rate of 4 per cent and partly at the rate of 5 per cent per annum simple interest. The total interest after 2 years is Rs.440. To find the sum of money lent at each of the above rates, Rs.5,000 is to be divided in the ratio :

a) 3 : 2 b) 4 : 5
c) 2 : 3 d) 5 : 4

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