

## MBA PIONEER 2024

## QUANTITATIVE APTITUDE

DPP: 6

## Simple Interest and Compound Interest - 1

- Q1** Ujjwala deposited 5000 for 6 years, ₹4500 for 8 years, and ₹6500 for 4 years with the same rate of simple interest. She received a total simple interest of 4600. What is the rate of interest per annum?
- (A) 8% (B) 6%  
(C) 5% (D) 7%
- Q2** Out of a certain sum of money,  $\frac{1}{10}$ <sup>th</sup> was invested at 8% p.a simple interest,  $\frac{1}{4}$ <sup>th</sup> at 12% p.a simple interest, and the rest at 10% p.a. simple interest for one year. If at the end of the year the interest earned was Rs 824, find the principal amount.
- (A) Rs 4000 (B) Rs 5000  
(C) Rs 6000 (D) Rs 8000
- Q3** The amounts invested by Rachel, Sakshi, and Chandu were 10:5:2 correspondingly. Find the ratio of their amounts after a year if the schemes gave compound interest at the rates of 10%, 5%, and 15% per annum, respectively.
- (A) 13:15:25 (B) 16:6:5  
(C) 220 : 105 : 46 (D) 121:23:11
- Q4** The compound interest on a certain sum of money invested at  $14\frac{2}{7}\%$  per annum for 2 years is Rs. 960. The simple interest on the sum, at the same rate and for the same time period is:
- (A) Rs. 900 (B) Rs. 880  
(C) Rs. 896 (D) Rs. 920
- Q5** What is the time period required for an amount of Rs. 15,625,000 to earn an interest of Rs. 1,951,000 at a rate of 8% per annum, compounded semi-annually?
- (A) 1 year (B) 1.5 years  
(C) 2 years (D) 2.75 years
- Q6** Riddhi obtained a loan of Rs. 72000 from a bank to buy an iPhone. What payment (in Rs.) will he be required to make after two years and four months if the interest rate is 10% per year compounded annually?
- (A) 90,024 (B) 75,752  
(C) 85,040 (D) 86,350
- Q7** A private bank offers two types of investment schemes: Scheme A with a simple interest rate of 12% per annum, and Scheme B with a compound interest rate of 10% per annum compounded annually. If a person invests \$10,000 in each scheme for 2 years, how much more interest will he earn from Scheme A than Scheme B at the end of the period?
- (A) \$160 (B) \$120  
(C) \$200 (D) \$300
- Q8** An entrepreneur takes a loan of Rs 384000 from a bank, that is to be returned in three years at a rate of 15.25% p.a. compound interest. He returns Rs 73360 and Rs 62303 after first and second year respectively. How much money (in Rs.) will he have to return after the third year to settle the loan?
- (A) 401585 (B) 418588  
(C) 425858 (D) 438505



- Q9** Ms. Larry provided a part of \$90000 to Ms. Adani, one of her colleagues as a loan at 7% p.a SI for 5 years. She invested the remaining amount at 14% p.a SI. Total income from interest after 5 years was \$52500. How much loan (in \$) was provided to Ms. Adani?  
 (A) 30000 (B) 35150  
 (C) 35500 (D) 35550
- Q10** Mr. Bezos invests a certain amount of money in savings account of a bank that pays 10% compound interest per annum for a period of two years. What is the sum of money (in \$) that Mr. Bezos should invest so that he receives \$300 at the end of first year, and \$500 at the end of second year? [Round off to the nearest integer]  
 (A) 680 (B) 686  
 (C) 690 (D) 696
- Q11** A certain sum of money triples itself under simple interest in 10 years. A sum of Rs. 2,00,000 at the same rate of interest when compounded annually will exceed Rs. 4,00,000 for the first time in the  
 (A) 5th year (B) 3rd year  
 (C) 6th year (D) 4th year
- Q12** The compound interest earned is Rs 980 more than the simple interest on the same sum of money for a period of 2 years. Find the sum if the rate of interest is 7% p.a.  
 (A) Rs 200000 (B) Rs 150000  
 (C) Rs 160000 (D) Rs 156000
- Q13** Present age of P is 15 years, and he invested Rs.4500 at 20% annual compound interest while Q invested Rs.5824 at 25% annual compound interest. When they both turn 18 years, the interest amount received by both of them is the same, then how old is Q at present?  
 (A) 14 years (B) 16 years  
 (C) 17 years (D) 12 years
- Q14** Praveen invests Rs. 8000 in simple interest at the rate of 10% per annum for 4 years. If half of the amount originally invested is now invested in a scheme of compound interest, considering the rate of interest and time period also reduce by half, then what is the difference between the simple interest and compound interest?  
 (A) Rs. 2790 (B) Rs. 2890  
 (C) Rs. 2990 (D) Rs. 3300
- Q15** A woman invested Rs. 8800 in scheme A at 10% per annum simple interest for 3 years and the same amount at the same rate for the same time in scheme B compounding annually. What will be the difference between the interest earned from scheme A and B after 3 years?  
 (A) Rs. 272.8 (B) Rs. 264.2  
 (C) Rs. 288.4 (D) Rs. 248.6
- Q16** What is the sum of compound interest on Rs.5000 at 8% rate of interest for one-year when compounded half-yearly and on sum of Rs.3000 at 12% rate of interest for  $\frac{2}{3}$  years compounded every 4 months?  
 (A) Rs. 816 (B) Rs. 489.6  
 (C) Rs. 408 (D) Rs. 652.8
- Q17** The sum of simple interest received on Rs.1300 at 13% rate of interest in 9 years and the simple interest received on Rs.2000 at 10% rate in 't' years is Rs.3201. Find the value of 't'.  
 (A) 8.4 (B) 9.6  
 (C) 7.2 (D) 10.8
- Q18** Mr. Dhoni lent Rs.2400 each to Mr. Ajay and Mr. Vijay. The difference between the simple interests received from Mr. Ajay and Mr. Vijay after 4 years is Rs.28.8. The difference between their rates of interest is:



- (A) 0.8% (B) 0.6%  
(C) 0.3% (D) 0.1%

- Q19** A certain sum amounts to Rs. 10080 in 2 years and to Rs.10710 in 3 years, at a certain rate where interest is compounded annually. How much will be the simple interest on Rs.32000 at the same rate for 3 years?  
(A) Rs. 6000 (B) Rs. 5000  
(C) Rs. 6400 (D) Rs. 5400
- Q20** A certain sum of money is invested at simple interest at 8% per annum for 4 years and the same sum of money is invested at simple interest at 15% per annum for three years. If the difference between simple interest is Rs. 910, then what is the sum of money invested in each of these?  
(A) Rs. 7000 (B) Rs. 6000  
(C) Rs. 7500 (D) Rs. 8000
- Q21** A sum of Rs. 23000 at a certain rate of interest in simple interest for eight years amounts to Rs. 43240. If the same sum of money at the same rate of interest compounded annually for two years, then what is the interest earned after 2 years?  
(A) Rs. 5348.6 (B) Rs. 5338.3  
(C) Rs. 5563.2 (D) Rs. 5526.8
- Q22** If a certain sum of money will become 15 times of itself in 42 years at a certain rate of simple interest, then the same sum of money at the same rate of simple interest will become 17 times of itself in how many years?  
(A) 48 years (B) 54 years  
(C) 50 years (D) 52 years
- Q23** Mahi makes a deposit in a bank at the rate of 20% per annum for  $1\frac{1}{2}$  years. If the maturity value of the money deposited in the bank is

Rs.22627 when compounded half yearly, then find the amount deposited by Mahi.

- (A) Rs.13600 (B) Rs. 15600  
(C) Rs.13000 (D) Rs.17000

- Q24** Vicky invested a total sum of Rs. 60300 in three different schemes of simple interest at 8%, 15% and 21% per annum. At the end of one year, he got the same interest in all three schemes, then what is the sum of money he invested at a rate of interest of 15%?  
(A) Rs. 14500 (B) Rs. 13800  
(C) Rs. 16400 (D) Rs. 16800
- Q25** A certain amount is invested at 30% annual CI for 2.5 years and interest accrued at the end of 2.5 years is Rs.11322, then what is that certain invested amount?  
(A) Rs. 16000 (B) Rs. 12000  
(C) Rs. 20000 (D) Rs. 24000
- Q26** Three friends Sudama, Peyush and Aryan won a lottery of Rs 15,400 and they wish to split the amount among themselves in such a way that, after 1, 2, and 3 years, respectively, the simple interest on each share at 5% per year remains the same. Differences in Sudama and Aryan's share (in Rs.) will be:
- Q27** In 2020, Eli places Rs. 20,000 in a 5-year deposit (Deposit A) that earns simple interest of 15% per annum. In 2023, she wants to place a 2-year deposit (Deposit B) that will provide the same amount at the end of 2025 as Deposit A. If Deposit B earns simple interest at 30% per annum, what is the principal (in Rs.) required for Deposit B?
- Q28** In a housing loan, the interest is compounded quarterly, and the annual interest rate is 8%. If the total interest paid over the course of a 15-



year loan is \$48,000, what is the approximate principal amount of the loan?  $[(1.02)^{60} \approx 3.281]$

- (A) \$12013                      (B) \$15023  
(C) \$18033                      (D) \$21043

**Q29** Xavier makes a three-year investment of Rs. 5000 in a XYZ scheme at a compound interest rate of 5% p.a. At the completion of each year, a 10% tax on interest generated is deducted. Xavier received how much money (in Rs.) at the completion of the third year? (Round your answer to the nearest integer)

**Q30** A father decides to gift his son \$10,000 on his 18th birthday. The present age of his son is 1 year. If he invests a certain sum today in an account that pays 6% per annum compounded annually, how much approximately should he invest today to achieve his goal?  $[(1.06)^{16} \approx 2.54]$

- (A) \$3714                      (B) \$4,122  
(C) \$5,930                      (D) \$6,254



## Answer Key

Q1 (C)  
Q2 (D)  
Q3 (C)  
Q4 (C)  
Q5 (B)  
Q6 (A)  
Q7 (D)  
Q8 (B)  
Q9 (A)  
Q10 (B)  
Q11 (D)  
Q12 (A)  
Q13 (B)  
Q14 (A)  
Q15 (A)

Q16 (D)  
Q17 (A)  
Q18 (C)  
Q19 (A)  
Q20 (A)  
Q21 (B)  
Q22 (A)  
Q23 (D)  
Q24 (D)  
Q25 (B)  
Q26 5600  
Q27 21875  
Q28 (D)  
Q29 5706  
Q30 (A)



## Hints & Solutions

### Q1 Text Solution:

Let the rate of interest be  $r\%$  per annum.

$$\begin{aligned} \text{Therefore, } 4600 &= (5000 \times 6 \times \frac{r}{100}) + (4500 \times 8 \times \frac{r}{100}) + (6500 \times 4 \times \frac{r}{100}) \\ \Rightarrow 4600 &= 300r + 360r + 260r \\ \Rightarrow 4600 &= 920r \\ \Rightarrow r &= 5\% \end{aligned}$$

Hence, option (c) is correct.

### Q2 Text Solution:

Let the principal be '100a' rupees. 10% of 100a is invested at 8%, 25% of 100a at 12%, and the rest 65% of 100a at 10% (all for 1 year)

$$\begin{aligned} \text{Total interest} &= \\ 10a \times 8\% + 25a \times 12\% + 65a \times 10\% &= 824 \\ 0.8a + 3a + 6.5a &= 824 \\ 10.3a &= 824 \end{aligned}$$

Therefore,  $a = 80$

Principal =  $100a = 100 \times 80 = ₹ 8000$ .

Hence, option (D) is the correct answer.

### Q3 Text Solution:

According to the question,

$$\begin{aligned} [10 \times (1 + \frac{10}{100})] : [5 \times (1 + \frac{5}{100})] \\ : [2 \times (1 + \frac{15}{100})] \\ = (10 \times \frac{11}{10}) : (5 \times \frac{21}{20}) : (2 \times \frac{23}{20}) \\ = 220 : 105 : 46 \end{aligned}$$

Hence, the correct answer is option (C).

### Q4 Text Solution:

$$\begin{aligned} CI &= P(1 + \frac{R}{100})^T - P \\ 960 &= P \left[ (1 + \frac{100}{7 \times 100})^2 - 1 \right] \\ 960 &= P \left[ (\frac{8}{7})^2 - 1 \right] \\ 960 &= \frac{15P}{49} \\ P &= \text{Rs. } 3136 \\ SI &= 3136 \times \frac{100 \times 2}{7 \times 100} \\ &= \text{Rs. } 896 \end{aligned}$$

Hence, the correct answer is option (C).

### Q5 Text Solution:

$$A = P + CI$$

$$A = 15625000 + 1951000$$

$$A = 17576000$$

Let time period =  $\frac{n}{2}$  years

Rate of interest =  $R = 8\%$  p.a. =  $\frac{8}{2} = 4\%$  semi-annually

Principal =  $P = 15625000$  and Amount =  $A = 17576000$

$$\begin{aligned} A &= P(1 + (\frac{R}{100}))^n \\ \Rightarrow 17576000 &= 15625000(1 + 0.04)^n \\ \Rightarrow 17576000 &= 15625000(1 + 0.04)^n \\ \Rightarrow \frac{17576000}{15625000} &= (\frac{104}{100})^n \\ \Rightarrow (\frac{26}{25})^3 &= (\frac{26}{25})^n \\ \bullet \quad n &= 3 \end{aligned}$$

$\therefore$  Time period =  $\frac{3}{2} = 1.5$  years.

Hence, the correct answer is option (B).

### Q6 Text Solution:

Principal amount is Rs. 72,000.

Rate of interest is 10% p.a

Time =  $(2 + \frac{1}{3})$  years.

$$\begin{aligned} \text{So, } A &= P(1 + \frac{R}{100})^2 (1 + \frac{R/3}{100}) \\ \Rightarrow A &= 72000(1 + \frac{10}{100})^2 (1 + \frac{10/3}{100}) \\ \Rightarrow A &= 72000(\frac{11}{10})^2 \times (1 + \frac{10}{3 \times 100}) \\ \Rightarrow A &= 72000(\frac{121}{100} \times \frac{31}{30}) \\ \Rightarrow A &= 90,024 \end{aligned}$$

Hence, option (A) is correct.

### Q7 Text Solution:

To solve this question, we need to calculate the interest earned from each scheme and then find the difference between the two.

Scheme A: Simple Interest

The formula for calculating simple interest is:



Simple Interest = Principal  $\times$  Rate  $\times$  Time

In this case, the Principal is \$10,000, the Rate is 12% per annum (0.12 as a decimal), and Time is 2 years.

$$\text{Simple Interest} = \$10,000 \times 0.12 \times 2$$

$$\text{Simple Interest} = \$2,400$$

Scheme B: Compound Interest

The formula for calculating compound interest is:

$$\text{Amount} = \text{Principal} \times (1 + \text{Rate})^{\text{Time}}$$

In this case, the Principal is \$10,000, the Rate is 10% per annum (0.10 as a decimal), and Time is 2 years.

$$\text{Amount} = \$10,000 \times (1 + 0.10)^2$$

$$\text{Amount} = \$10,000 \times (1.10)^2$$

$$\text{Amount} = \$10,000 \times 1.21$$

$$\text{Amount} = \$12,100$$

Now, to find the compound interest earned, we subtract the principal from the final amount:

$$\text{Compound Interest} = \text{Amount} - \text{Principal}$$

$$\text{Compound Interest} = \$12,100 - \$10,000$$

$$\text{Compound Interest} = \$2,100$$

Now we need to find the difference between the interest earned from both the schemes

$$\text{Difference} = \text{Simple Interest (Scheme A)} - \text{Compound Interest (Scheme B)}$$

$$\text{Difference} = \$2,400 - \$2,100$$

$$\text{Difference} = \$300$$

The person will earn \$300 less in Scheme B than in Scheme A at the end of the period.

#### Q8 Text Solution:

$$\text{Money took} = \text{Rs } 384000$$

$$\text{Amount after first year}$$

$$= 384000 \times \left(1 + \frac{15.25}{100}\right)$$

$$= 442560$$

$$\text{Amount paid after first year} = 73360, \text{ amount remaining} = 442560 - 73360 = 369200$$

$$\text{Amount to be paid after second year}$$

$$= 369200 \times \left(1 + \frac{15.25}{100}\right)$$

$$= 425503$$

$$\text{Amount paid after second year} = 62303,$$

$$\text{amount remaining} = 425503 - 62303 = 363200$$

$$\text{Amount to paid after third year}$$

$$= 363200 \times \left(1 + \frac{15.25}{100}\right)$$

$$= \text{Rs } 418588$$

Hence, option (B) is correct.

#### Q9 Text Solution:

Let x be the sum that she lent to his colleague.

$$\text{Therefore, } \frac{(x \times 7 \times 5)}{100} + \frac{[(90000 - x) \times 14 \times 5]}{100} = 52500$$

$$35x + 70(90000 - x) = 5250000$$

$$-35x = -1050000$$

$$x = \$30000$$

#### Q10 Text Solution:

Let, the amount that was invested by Mr. Bezos in the bank is 'C'.

$$1.1(1.1C - 300) = 500$$

$$\Rightarrow 1.1C - 300 = \frac{500}{1.1}$$

$$\Rightarrow 1.1C = \left(\frac{500}{1.1}\right) + 300$$

$$\text{That is, } C \approx 686$$

Option (B) is correct.

#### Q11 Text Solution:

It is given in the question that the sum of money triples itself in 10 years. Let us take  $P = 1$ ,  $A = 3$ ,

$$SI = 3 - 1 = 2$$

$$SI = \frac{P \times 10 \times r}{100} \Rightarrow 2 = \frac{1 \times 10 \times r}{100} \Rightarrow r = 20\%$$

The amount when compounded annually

$$A = P \left(1 + \frac{r}{100}\right)^n$$

Therefore, the sum more than doubles itself when compounded annually as it has been given that 200000 needs to exceed 400000

$$\Rightarrow \left(1 + \frac{r}{100}\right)^n > 2$$

$$\Rightarrow \left(1 + \frac{20}{100}\right)^n > 2$$

$$\Rightarrow 1.2^n > 2$$

putting the values of n, when  $n = 4$ , we observe that the given expression will exceed 2 for the first time in the 4th year.





**Q12 Text Solution:**

Formula for 2 year difference of CI and SI

$$(CI - SI) \text{ for 2 years} = P\left(\frac{R}{100}\right)^2$$

$$980 = P\left(\frac{7}{100}\right)^2$$

$$P = \frac{(980 \times 10000)}{49}$$

$$P = 20 \times 10000$$

$$P = 200000$$

**Q13 Text Solution:**

Let at present Q is 'x' years younger to become 18 years old.

Interest amount received by P when he turns 18 years =  $4500 \times [(1.2)^3 - 1] = \text{Rs.} 3276$

Interest amount received by Q when he turns 18 years =  $5824 \times [(1.25)^x - 1] = 3276$

$$(1.25)^x - 1 = \frac{9}{16}$$

$$1.25^x = \left(\frac{9}{16}\right) + 1$$

$$1.25^x = 1.5625 = 1.25^2$$

$$x = 2$$

Present age of Q =  $18 - 2 = 16$  years

**Q14 Text Solution:**

$$P = \text{Rs. } 8000$$

$$R = 10\%$$

$$T = 4 \text{ years}$$

For simple interest,

$$S.I = \frac{PRT}{100} = \frac{(8000 \times 10 \times 4)}{100} = \text{Rs. } 3200$$

For compound interest,

$$A = P\left(1 + \left(\frac{R}{100}\right)\right)^T$$

$$\Rightarrow A = 4000 \times \left(1 + \left(\frac{5}{100}\right)\right)^2 = 4000 \times \left(\frac{21}{20}\right) \times \left(\frac{21}{20}\right) =$$

$$\text{Rs. } 4410$$

$$\text{Compound Interest} = 4410 - 4000 = \text{Rs. } 410$$

$$\text{Hence, the difference in CI and SI} = 3200 - 410 =$$

$$\text{Rs. } 2790$$

**Q15 Text Solution:**

Simple interest earned from scheme A =  $8800 \times 10 \times \frac{3}{100} = 88 \times 30 = \text{Rs.} 2640$

Compound interest earned from scheme B =  $8800 \times \left[\left(1 + \frac{10}{100}\right)^3 - 1\right]$

$$= 8800 \times \frac{331}{1000} = \text{Rs. } 2912.8$$

$$\text{Required difference} = \text{Rs. } 2912.8 - 2640 = \text{Rs. } 272.8$$

**Q16 Text Solution:**

CI on Rs. P at R% per annum for t years when compounded n-monthly

$$= P\left[\left(1 + \frac{\frac{R}{100}}{n}\right)^{t \times \frac{12}{n}} - 1\right]$$

$$\text{Then, total CI} = 5000\left[\left(1 + \frac{\frac{12}{6}}{100}\right)^{1 \times \frac{12}{6}} - 1\right] +$$

$$3000\left[\left(1 + \frac{\frac{12}{4}}{100}\right)^{\frac{2}{3} \times \frac{12}{4}} - 1\right]$$

$$= 5000 \times \left[\left(1 + \frac{4}{100}\right)^2 - 1\right] + 3000 \times \left[\left(1 + \frac{4}{100}\right)^2 - 1\right]$$

$$= (5000 + 3000) \times \frac{51}{625}$$

$$= \text{Rs. } 652.8$$

**Q17 Text Solution:**

We know,  $SI = \text{principal} \times \text{rate} \times \frac{\text{time}}{100}$

SI on Rs. 1300 at 13% rate of interest in 9 years =  $1300 \times 13 \times \frac{9}{100} = \text{Rs. } 1521$

SI on Rs. 2000 at 10% rate in 't' years =  $2000 \times 10 \times \frac{t}{100} = 200t$

$$\text{Now, } 200t + 1521 = 3201$$

$$\bullet 200t = 1680$$

$$\bullet t = 8.4$$

**Q18 Text Solution:**

Let rate of interest for Mr. Ajay = x% and for Mr. Vijay = y%

Therefore,

$$\left(2400 \times x \times \frac{4}{100}\right) - \left(2400 \times y \times \frac{4}{100}\right) = 28.8$$

[Assuming  $x > y$ ]

$$\bullet 96(x - y) = \frac{288}{10}$$

$$\bullet (x - y) = 0.3\%$$

Difference between their rates of interest = 0.3%

**Q19 Text Solution:**

Let the sum is Rs. P.

According to the condition,

$$10080 = P \times \left(1 + \frac{r}{100}\right)^2 \dots (1)$$

and





$$10710 = P \times \left(1 + \frac{r}{100}\right)^3 \dots (2)$$

From equation (1) and (2),

$$\frac{1008}{1071} = \frac{1}{1 + \frac{r}{100}}$$

$$\frac{112}{119} = \frac{1}{1 + \frac{r}{100}}$$

$$112 + \frac{112r}{100} = 119$$

$$r = \frac{700}{112} = 6.25\%$$

Now,

$$SI = 32000 \times 6.25 \times \frac{3}{100}$$

$$SI = 80 \times 75$$

$$SI = \text{Rs. } 6000$$

#### Q20 Text Solution:

Let the sum of money is Rs. P.

According to the question,

$$\frac{(P \times 15 \times 3)}{100} - \frac{(P \times 8 \times 4)}{100} = 910$$

$$\Rightarrow \frac{45P}{100} - \frac{32P}{100} = 910$$

$$\Rightarrow 13P = 91000$$

$$\Rightarrow P = \text{Rs. } 7000$$

#### Q21 Text Solution:

Let R% be the rate of interest.

$$43240 - 23000 = \frac{(23000 \times R \times 8)}{100}$$

$$\Rightarrow R = \frac{20240}{1840}$$

$$\Rightarrow R = 11\%$$

$$\text{So, CI} = 23000 \times \left[\left(1 + \frac{11}{100}\right)^2 - 1\right]$$

$$\Rightarrow \text{CI} = \text{Rs. } 5338.3$$

#### Q22 Text Solution:

Let principal = Rs. P, and rate = R%, time = 42 years

$$15P - P = \frac{(P \times R \times 42)}{100}$$

$$\Rightarrow 14 = \frac{42R}{100}$$

$$\Rightarrow R = 14 \times \frac{100}{42}$$

$$\Rightarrow R = \frac{100}{3}\%$$

$$\text{Now, } 17P - P = \frac{(P \times \frac{100}{3} \times T)}{100}$$

$$\Rightarrow 16 \times 3 = T$$

$$\Rightarrow T = 48 \text{ years}$$

#### Q23 Text Solution:

Let the amount deposited by Mahi = Rs. P

$$1\frac{1}{2} \text{ years} = \frac{3}{2} \text{ years}$$

Then, maturity value of money when compounded half yearly

$$= \text{sum} \times \left(1 + \frac{\text{rate}}{200}\right)^{2 \times \text{time}}$$

$$\text{Now, } 22627 = P \times \left(1 + \frac{20}{200}\right)^{2 \times 3/2}$$

$$P = 22627 \times \left(\frac{10}{11}\right) \times \left(\frac{10}{11}\right) \times \left(\frac{10}{11}\right)$$

$$P = 17000$$

#### Q24 Text Solution:

Let Rs. X, Rs. Y and Rs. Z is invested in three different schemes of simple interest at 8%, 15% and 21% per annum respectively.

According to the question,

$$X + Y + Z = 60300 \text{ --- (1)}$$

$$\text{And, } \frac{(X \times 8 \times 1)}{100} = \frac{(Y \times 15 \times 1)}{100} = \frac{(Z \times 21 \times 1)}{100}$$

$$\Rightarrow 8X = 15Y = 21Z$$

$$\text{Let } 8X = 15Y = 21Z = k$$

$$\text{So, } X = \frac{k}{8}, Y = \frac{k}{15} \text{ and } Z = \frac{k}{21}$$

Putting values of X, Y and Z in equation (1), we get

$$\frac{k}{8} + \frac{k}{15} + \frac{k}{21} = 60300$$

$$\Rightarrow \frac{(105k + 56k + 40k)}{840} = 60300$$

$$\Rightarrow 201k = 60300 \times 840$$

$$\Rightarrow k = 252000$$

$$\text{So, investment at 15\% rate of interest} = \frac{k}{15} = \frac{252000}{15} = \text{Rs. } 16800$$

#### Q25 Text Solution:

Let the certain amount be Rs. 100x

Interest for the first year = 30% of 100x = 30x

Interest for the second year = (30% of 100x) + (30% of 30x) = 30x + 9x

Interest for the next half year = (15% of 100x) + [15% of (30x + 30x)] + [15% of 9x]

$$= 15x + 9x + 1.35x$$

Interest amount at the end of 2.5 years

$$= 30x + (30x + 9x) + (15x + 9x + 1.35x) = 11322$$

$$\Rightarrow 94.35x = 11322$$

$$x = 120$$

Hence, invested amount = 100x = Rs. 12000



**Q26 Text Solution:**

Let the share of Sudama, Peyush and Aryan be  $x$ ,  $y$  and  $z$ .

$$\frac{x \times 5 \times 1}{100} = \frac{y \times 5 \times 2}{100} = \frac{z \times 5 \times 3}{100}$$

$$x = 2y = 3z = k \text{ (say)}$$

$$x : y : z = k : \frac{k}{2} : \frac{k}{3} = 6 : 3 : 2$$

The difference in Sudama and Aryan's share

$$= \text{Rs. } \frac{4}{11} \times 15400$$

$$= \text{Rs. } 4 \times 1400$$

$$= \text{Rs. } 5600$$

**Q27 Text Solution:**

Let  $P$  be the principal placed as a 2-year deposit (Deposit B) for simple interest at the rate of 30%. Given that Deposit A and Deposit B provide the same amount at the end of 2025.

$$20000 + \frac{20000 \times 5 \times 15}{100} = P + \frac{P \times 2 \times 30}{100}$$

$$35000 = 1.6P = P \times \frac{8}{5}$$

$$P = 21875$$

**Q28 Text Solution:**

We know that the total interest paid over the 15-year loan is \$48,000. Let's denote the principal amount as  $P$ . Then, the Amount (final balance) will be  $P + \$48,000$ .

The annual interest rate is 8% (0.08 as a decimal), and the loan duration is 15 years.

Using the compound interest formula, we get:

$$\text{Amount} = P \times \left(1 + \left(\frac{0.08}{4}\right)\right)^{(4 \times 15)}$$

Since the total interest paid is \$48,000, we can rewrite the equation as:

$$P + \$48,000 = P \times \left(1 + \left(\frac{0.08}{4}\right)\right)^{(4 \times 15)}$$

$$P + \$48,000 = P \times (1 + 0.02)^{(60)}$$

Now we need to isolate  $P$  to find its value.

Divide both sides of the equation by  $(1.02)^{60}$ :

$$\frac{(P + \$48,000)}{(1.02)^{60}} = P$$

Subtract  $P$  from both sides:

$$\$48,000 = P \times ((1.02)^{60} - 1)$$

$$P = \frac{\$48,000}{(1.02)^{60} - 1}$$

$$P = \frac{\$48,000}{2.281} \left( \text{Given } (1.02)^{60} = 3.281 \right)$$

$$P \approx \$21043$$

**Q29 Text Solution:**

Given that 5% is the rate of interest and 10% tax will be charged only on the interest part.

Therefore, effective rate of interest will be  $5 \times 0.9 = 4.5\%$ , therefore the amount after 3 years will be

$$5000 (1.045)^3$$

$$= 5705.830625 \text{ or } 5706 \text{ when rounded off to nearest integer}$$

**Q30 Text Solution:**

To solve this question, we need to find out how much the father should invest today to have \$10,000 when his son turns 18 years old. The account pays 6% interest compounded annually. The son is currently 1 year old, so there are 17 years left until he turns 18.

We can use the compound interest formula to find out the required initial investment:

$$\text{Amount} = \text{Principal} \times (1 + \text{Rate})^{\text{Time}}$$

Where:

- Amount is the final balance (\$10,000)
- Principal is the initial investment (which we want to find)
- Rate is the annual interest rate (6% or 0.06 as a decimal)
- Time is the number of years until the son's 18th birthday (17 years)

We can rewrite the formula to solve for the Principal:

$$\text{Principal} = \frac{\text{Amount}}{(1 + \text{Rate})^{\text{Time}}}$$

Now, we can plug in the values to calculate the initial investment:



$$\text{Principal} = \frac{\$10,000}{(1 + 0.06)^{17}}$$

$$\text{Principal} = \frac{\$10,000}{(1.06)^{17}}$$

$$\text{Principal} = \frac{\$10,000}{2.6924}$$

[Since,  $(1.06)^{16} \approx 2.54$ , so,  $(1.06)^{17} \approx 2.54 \times 1.06 = 2.6924$ ]

Principal  $\approx$  \$3714

So, the father should invest approximately \$3714 today to have \$10,000 on his son's 18th birthday.



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