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Question-wise Analysis

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Question 1.



Arundhati divided her total savings of ₹780600 between her two daughters. Her daughters are 13 years old and 15 years old, respectively. She divides the money and invests her daughter's share in such a way that, when each of them is 18 years old, then the amount received by them at that point of time is the same. Consider that she invests their share at 4% interest compounded annually. Then, calculate the amount of shares invested by Arundhati for her younger daughter.

A ₹285000

B ₹375000

C ₹400000

D ₹401500

[See Solution](#)

Suppose, Arundhati gives ₹P to 13 years old daughter and the remaining amount to her old daughter.

At the age of 18 years, each daughter gets the same amount. This means the amount invested for 5 years is same as the amount of ₹(780600 – P) invested for 3 years.

$$P (1 + 4/100)^5 = (780600 - P) (1 + 4/100)^3$$

$$P (1 + 4/100)^2 = 780600 - P$$

$$P (1 + 1/25)^2 = 780600 - P$$

$$P (26/25)^2 = 780600 - P$$

$$P [(26/25)^2 + 1] = 780600$$

$$P [(676 + 625)/625] = 780600$$

$$P [1301/625] = 780600$$

$$P = (780600 \times 625)/1301 = ₹375000$$

Therefore, the 13 years old daughter gets ₹375000

Hence, option B.

Syllabus

01. Percentages

02. Profit, Loss and Discount

03. SI – CI & Instalments

03. SI - CI & Instalments

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Question 2.

₹1,00,000 was invested by Aamir Khan in fixed deposits with SBI as it gives a high rate of interest. However, he has to pay a 33.33% penalty on the yearly interest if he withdraws the money after two years on the maturity of the fixed deposit, as he was caught by the IT department during tax audit. How much net interest does Aamir Khan earn after two years?

(A) ₹39960

(B) ₹37500

(C) ₹30940

(D) ₹65000

04. Averages

05. Ratio, Proportion & Variation

06 Mixture & Alligation

07. Time and Work

08. Basic TSD

09. Linear motion

10. Boat & Streams, Train and escalators

11. Circular Motion

[See Solution](#)

For the first year,

$$\text{Amount} = 100000 \times 1.21 = 121000$$

$$\text{Interest} = 21000$$

As Amir Khan is paying 33.33% penalty to Income tax department,

$$\text{Penalty for first year} = 21000/3 = 7000$$

For second year,

Amount = $121000 \times 1.21 = 146410$

Interest = $121000 - 146410 = 25410$

Penalty for second year = $25410/3 = 8470$

Money left with him = $146410 - (7000 + 8470) = ₹130940$

Therefore, interest earned = $130940 - 100000 = 30940$

Hence, option C.

Question 3.



When ₹ x is invested at 24% p.a. simple interest for 4 years, the interest received is ₹ $(x - 130)$. Find the interest received when ₹ $(x + 250)$ is invested at 20% p.a. compound interest, compounded annually for 2 years.

I. ₹ $\{(x/2) - 85\}$ II. ₹ $\{(x/5) + 860\}$ III. ₹ $(2x - 4980)$

A Only I

B Only II and III

C Only III

D Only I and II

See Solution

According to the question,

$$(x \times 24 \times 4)/100 = (x - 130)$$

$$\text{Or, } 24x = 25x - 3250$$

$$\text{Or, } x = ₹3250$$

Therefore, interest received at compound interest

$$= (x + 250)(1 + 20/100)^2 - (x + 250) = 3500(1.2)^2 - 3500 = ₹1540$$

For I:

$$\{(x/2) - 85\} = \{3250/2 - 85\} = (1625 - 85) = ₹1540$$

Therefore, I can be the answer.

For II:

$$\{(x/5) + 860\} = \{(3250/5) + 860\} = (650 + 860) = ₹1510$$

Therefore, II cannot be the answer.

For III:

$$(2x - 4980) = (2 \times 3250 - 4980) = ₹1520$$

Therefore, III cannot be the answer.

Hence, option A.

Question 4.



The interest accumulated on a certain amount in 4 years and in 2 years is Rs 1,07,360 and Rs 44,000 respectively. If the rate of interest is compounded yearly, then find the amount and the rate of interest.

- (A) Rs 1,00,000 and 20% per annum
 - (B) Rs 90,000 and 20% per annum
 - (C) Rs 95,000 and 25% per annum
 - (D) Rs 94,000 and 20% per annum

See Solution

Let the amount be Rs p and rate of interest be $r\%$ per annum
Interest earned in four years is

Interest earned in two years is

$$p \left(1 + \frac{r}{100}\right)^2 - p = 44000$$

Equation(2) ÷ Equation(1) gives

$$\left(1 + \frac{r}{100}\right)^2 = \frac{p + 107360}{p + 44000}$$

Putting the value from Equation (3) in Equation (2), we get

$$p \left[\frac{p + 107360}{p + 44000} \right] = p + 44000$$

$$p(p + 107360) = (p + 44000)^2$$

$$p^2 + 107360p = p^2 + 88000p - (44000)^2$$

19360p = 1936000000

p = Rs. 1,00,000

Putting the value of p in Equation (2), we get

$$100000 \left(1 + \frac{r}{100}\right)^2 = 100000 + 44000$$

$$\left(1 + \frac{r}{100}\right)^2 = \frac{144000}{100000}$$

$$\frac{r}{100} = \frac{1}{5}$$

$$r = 20\%$$

Hence, the correct answer is option (A).

Question 5.



Ram invests Rs A in a firm which gives him returns at 21% annually and another investment of Rs. B in stock exchange which gives him returns of 10% compounded half yearly. If Ram gets the same returns from both the investments after 1 year, then what is the square root of the ratio of A to B?

A 11: 21

B 21: 22

C 21: 25

D 1: 4

[See Solution](#)

According to question,

Amount earned from firm after one year;

$$A_1 = (100 + \text{Interest}) \times \text{Principal} = 121\% \text{ of } A$$

Applying net% effect in the 2nd case to get the effective rate of interest compound half-yearly, we get

$$\begin{aligned}\text{Net \% effect} &= \left(x + y + \frac{xy}{100} \right) \% \\ &\Rightarrow \left(5 + 5 + \frac{5 \times 5}{100} \right) \% = 10.25\%\end{aligned}$$

∴ Amount earned from stock exchange,

$$A_2 = (100 + \text{interest}) \times \text{Principal} = (100 + 10.25) \% = 110.25\% \text{ of } B$$

Given, $A_1 = A_2$

$$121\% \text{ of } A = 110.25\% \text{ of } B$$

$$\therefore \frac{A}{B} = \frac{110.25}{121} = \frac{441}{484}$$

On taking square root on both sides of equation,

$$\therefore \sqrt{\frac{A}{B}} = \sqrt{\frac{441}{484}} = \frac{21}{22} = 21: 22$$

So, the correct answer is 21: 22.

Hence, the correct answer is option (B).

Question 6.



Compound interest and simple interest on a sum after 2 years at some rate of interest is 11: 10 respectively. What is the rate of interest?

A 20%

B 28%

C 10%

D 16%

[See Solution](#)

year	S.I. (10)	C.I. (11)
1 st year	5	5
2 nd year	5	6

Difference of interest for 2nd year = $6 - 5 = 1$

Therefore, Required rate of interest $\Rightarrow \frac{1}{5} \times 100 = 20\%$

OR

Let sum = Rs. a, rate = r%, time = 2 years

$$\frac{CI}{SI} = \frac{11}{10}$$

$$SI = a \times r \times \frac{2}{100}$$

$$CI = a \times \left(\left(1 + \left(\frac{r}{100} \right) \right)^2 - 1 \right)$$

$$\frac{CI}{SI} = \frac{11}{10} = \frac{a \times \left(1 + \left(\frac{r}{100} \right) \right)^2 - 1}{a \times r \times \frac{2}{100}}$$

$$\Rightarrow r = 20\%$$

Hence, the correct answer is option (A).

Question 7.



A man invested a sum at compound interest of 20% p.a., compounded annually. At the same time, he invested another sum in two different parts in a scheme, where he invested 40% of the sum at a simple interest of $(92/3)\%$ p.a. and the rest at a simple interest of 20% p.a. If the total interest earned by the man at the end of 3 years after making these investments is ₹1,09,200, then how much more amount the man would've earned had he invested the whole amount on a simple interest of 40% for three years?

A ₹1,80,000

B ₹1,50,000

C ₹70,800

D ₹40,800

See Solution

Let the amount invested at compound interest be ₹'y' and the amount invested at simple interest be ₹'5x'

So, amount invested at $(92/3)\%$ p.a. simple interest = $5x \times 0.4 = ₹'2x'$

And, amount invested at 20% p.a. simple interest = $5x \times 0.6 = ₹'3x'$

ATQ;

$$[(2x \times (92/3) \times 3)/100] + \{(3x \times 20 \times 3)/100\} + [y \times \{(1.2)^3 - 1\}] = 109200$$

$$Or, (46x/25) + (9x/5) + (0.728y) = 109200$$

$$Or, (46x + 45x) + 0.728y \times 25 = 109200 \times 25$$

$$Or, 91x + 18.2y = 109200 \times 25$$

$$Or, 5x + y = 6000 \times 25$$

$$\therefore - - - - - 150000$$

So, $5x + y = 150000$

So, the amount invested by the man = ₹1,50,000

So, interest the man would've earned had he invested the whole amount at 40% simple interest =

$$\{(150000 \times 40 \times 3) / 100\} = ₹1,80,000$$

So required profit = $180000 - 109200 = ₹70,800$

Hence, option C.

Question 8.



Rajesh and Radhika have sums in the ratio 12:5, respectively. The sum of the interest received by Rajesh if he invests his sum equally at simple interest of three different rates 10% p.a., 15% p.a. and 12% p.a., respectively, each for two years, is ₹285 more than the interest received by Radhika if she invested her sum at 20% p.a. compound interest, compounded annually for 2 years. The amount received by Radhika is as follows:

- I. ₹1875 more than the interest received by her.
- II. ₹2400
- III. ₹825 more than the sum invested by her.

A Only II

B Only I

C Only I and III

D Only II and III

See Solution

Let the sum Rajesh and Radhika have be ₹ $12x$ and ₹ $5x$ respectively.

According to the question,

$$\{(4x \times 2)(10 + 15 + 12)/100\} - \{5x(1 + 20/100)^2 - 5x\} = 285$$

$$\text{Or, } (74x/25) - 2.2x = 285$$

$$\text{Or, } 19x/25 = 285$$

$$\text{Or, } x = ₹375$$

Therefore, amount received by Radhika = $5x(1 + 20/100)^2 = ₹2700$

Sum invested by Radhika = $5x = 1875$

For I:

Interest received by her = $2700 - 1875 = 825$

Amount = $1875 + 825 = 2700$

Therefore I can be the answer.

For II:

Amount received by Radhika = ₹2700

Therefore, II cannot be the answer.

For III:

$$\text{Amount received by Radhika} = 5x + 825 = 1875 + 825 = ₹2700$$

Therefore, III can be the answer.

Hence, option C.

Question 9.



Two different principal amounts are invested at 9% p.a. simple interest and 11% p.a. compound interest for 3 and 2 years, respectively and the interest obtained on the second principal during the 2 years is kept aside, and the principal is invested at 12% p.a. simple interest for one more year. If the sum of the two principals is ₹54000 and the difference between the interests obtained by the two principals is ₹4083, find the difference between the two principals.

A ₹8000

B ₹7500

C ₹6000

D ₹9000

See Solution

Let the two principals be P_1 and P_2 respectively.

$$P_1 + P_2 = 54000 \quad \dots \dots (1)$$

$$\text{For } P_1, \text{S.I.} = P_1 \times 9 \times 3/100 = 0.27 P_1$$

$$\text{For } P_2, \text{C.I.} = P_2 \times 1.11^2 - P_2 = 0.2321P_2$$

Also, P_2 is invested at 12% p.a. simple interest for one more year.

$$\text{Hence S.I.} = P_2 \times 12/100 = 0.12 P_2$$

$$\text{Difference in interests} = 0.2321P_2 + 0.12P_2 - 0.27P_1 = 0.3521P_2 - 0.27P_1 = ₹4083 \quad \dots \dots (2)$$

Multiplying (1) by 0.27 and adding to (2), we have $0.3521P_2 + 0.27P_2 = 14580 + 4083 = 18663$

$$\text{Hence } P_2 = 18663/0.6221 = ₹30000$$

$$\text{Hence } P_1 = 54000 - 30000 = ₹24000$$

$$\text{Difference in principals} = 30000 - 24000 = ₹6000.$$

Hence, option C.

Question 10.



A moneylender lends an equal sum of money at the same rate of interest to Viraj and Anusha. The money lent to Viraj becomes twice the original amount in just five years at simple interest. The moneylender lends money to Anusha at compound interest for the first 2 years and the amount after accumulating the compound interest for two years at simple interest for the next three years. If the difference between Viraj's and Anusha's amounts after five years is ₹7600. Find the total sum lent by the moneylender to them.

A ₹12500

B ₹25000

C ₹50000

D ₹100000

[See Solution](#)

Let the moneylender lends ₹P to both of them. As the money lent to Viraj become twice of the original amount in five years.

$$S.I = (P \times R \times T)/100$$

$$P = (P \times R \times 5)/100$$

$$R = 100/5 = 20$$

$$\text{Rate of interest} = 20\%.$$

$$\text{Amount} = P (1 + R/100)^t$$

$$\text{Amount} = P (1 + 20/100)^2$$

$$\text{Anusha's amount after two years} = (36/25) \times P$$

$$\text{Anusha's amount after five years} = 36P/25 + (36P/25) \times 20 \times 3/100 = 288P/125$$

$$\text{Viraj's amount after 5 years} = 2P.$$

$$\text{Difference} = 38P/125 = 7600.$$

$$\text{Hence } P = ₹25000.$$

$$\text{Total money lent} = ₹50000$$

Hence, option C.

Question 11.

The average of the simple interest obtained on 3 equal principal sums deposited at 7.5%, 8% and 10% p.a., respectively, for one year is ₹4250. What percentage of the total principal is the total interest obtained if one of the sums is invested for 2 years at 11% p.a. simple interest and the remaining two are invested at 10% p.a. compound interest compounded annually for 2 years?

B 23.67% C 24.33% D 22.67%**See Solution**

Let the principals be x .

$$\text{Hence } (x \times 7.5/100 + x \times 8/100 + x \times 10/100)/3 = ₹4250.$$

$$\text{Thus } 25.5x / (100 \times 3) = ₹4250.$$

$$\text{Thus } 25.5x = 425000 \times 3.$$

$$\text{Thus } x = 425000 \times 3 / 25.5 = ₹50000.$$

Now one sum is invested at a rate of 11% p.a. simple interest and for 2 years

$$\text{Interest obtained} = 50000 \times 11 \times 2 / 100 = 500 \times 22 = ₹11000.$$

$$\text{Two sums are invested at 10% p.a. compounded annually and for 2 years. } 100000 \times (1.1)^2 - 100000 = 100000(1.21 - 1) = 100000 \times 0.21 = ₹210000$$

$$\text{Thus, total interest earned} = 11000 + 21000 = ₹32000$$

$$\text{Total principal} = 3 \times 50000 = ₹150000.$$

$$\text{Required percentage} = 32000 \times 100 / 150000 = 21.33\%.$$

Hence, option A.

Question 12.

Shantanu invests a total of ₹17261 in two different schemes, A and B. The rate of interest in both schemes was 5% per annum compounded annually. The amount which Shantanu gets at the end of the second year from scheme A is the same as that which he gets at the end of the fifth year from scheme B. What is the difference between the principal invested by Shantanu in scheme A and that invested by him in scheme B?

 A ₹1121 B ₹1141 C ₹1261 D ₹1281**See Solution**

Let Shantanu invests ₹ x in scheme A. then amount invested in scheme B is ₹ $(17261 - x)$.

So, amount which Shantanu got after 2 years from scheme A = $x (1 + 5/100)^2$

And amount which Shantanu got after 5 years from scheme B = $(17261 - x) (1 + 5/100)^5$

$$ATQ, x \times (1 + 5/100)^2 = (17261 - x) \times (1 + 5/100)^5$$

$$x = (17261 - x) (21/20)^3$$

$$8000/9261 = 17261/x - 1$$

$$8000/9261 + 1 = 17261/x$$

$$17261/9261 = 17261/x$$

$$x = ₹9261$$

Amount invested by Shantanu in scheme B = 17261 - 9261 = ₹8000

Required difference = 9261 - 8000 = ₹1261

Question 13.



A sum of ₹ 12500 is invested in a bank for 3 years at an interest rate of r1% per annum compounded annually, and another sum of ₹21600 is invested in another bank for 9 months at an interest rate of r2% per annum compounded quarterly. The amounts received from both investments are the same. Find the relation between two interest rates.

- (A) $r_2 = 40 + 2r_1$ (B) $6r_2 = 200 + 4r_1$
 (C) $6r_2 = 36 + 24r_1$ (D) $20r_1 = 400 + 6r_2$

A A.

B

C. C.

D.

See Solution

$$\text{Amount in 1st bank} = 12500(1 + r_1/100)^3$$

$$\text{Amount in 2nd bank} = 21600(1 + r_2/(4 \times 100))^{9 \times 4/12}$$

According to question both amounts same –

$$12500(1 + r_1/100)^3 = 21600(1 + r_2/(4 \times 100))^{9 \times 4/12}$$

$$125/216 = (1 + r_2/(4 \times 100))^3 / (1 + r_1/100)^3$$

$$5/6 = (1 + r_2/(4 \times 100)) / (1 + r_1/100)$$

$$20r_1 = 400 + 6r_2$$

Question 14.



A and B each invested a certain sum at compound interest for 2 years such that A invested ₹800 less than B. Interest received on A's amount at 20% rate of interest per annum is $\frac{16}{27}$ times the interest received on B's amount at 25% rate of interest per annum, both interests being compounded annually. Find A's investment.

A ₹2000

B ₹3000

C ₹3200

D ₹2500

[See Solution](#)

We know, $CI = \text{sum} \times ((1 + \text{rate}/100)^2 - 1)$

Let A and B invested ₹a and ₹(a + 800) respectively.

$$\text{Now, CI received by A} = a \times ((1 + 20/100)^2 - 1) = a \times (36/25 - 1) = ₹11a/25$$

$$\text{CI received by B} = (a + 800) \times ((1 + 25/100)^2 - 1) = (a + 800) \times (25/16 - 1) = ₹((9/16) \times (a + 800))$$

$$\text{Now, } 11a/25 = (16/27) \times (9/16) \times (a + 800)$$

$$33a = 25(a + 800)$$

$$a = 2500$$

Question 15.



Amit borrowed ₹30000 from a loan company and returned ₹11200 after 3 years. After 5 years from starting, he returned ₹23228 and settled his account. Find the rate of simple interest. (up to one correct decimal)

A 12.5%

B 9.9%

C 3.5%

D 8.2%

[See Solution](#)

Let R be the rate of interest.

Interest on ₹30,000 in 3 years

With $R\% = 900 R$

Now ₹11200 returned, Remaining amount = ₹18,800.

Interest on ₹18,800 for 2 years

With $R\% = 376 R$

Total Amount returned = $23228 + 11200$

= 34428

Total principal = 30,000

Remaining 4428 is Interest

$900 R + 376 R = 4428$

$1276 R = 4428$

$R = 3.47\% = 3.5\%$ (approx.)

Question 16.



Vikram, a money lender, charges simple interest on lent money as per the following rule. The rate of interest is 10% p.a for the first three years, and then for the subsequent two years, it is 5% p.a. and is 2% p.a. for the rest of the period beyond the first five years. A poor farmer Ramesh borrowed some money from Vikram, and he paid ₹25000 at the end of the third year which was adjusted in the principal amount. Finally, he could repay the debt at the end of the tenth year by paying ₹60000. Find out the initial amount which was borrowed.

(A) ₹60000

(B) ₹57700

(C) ₹50700

(D) ₹56900

See Solution

let the borrowed amount be $100x$.

Simple interest for,

1st 3 yrs, $3 \times 10\% = 30\%$

Next 2 yrs $2 \times 5\% = 10\%$

Last 5 yrs, $5 \times 2\% = 10\%$

According to question,

$100x + 30\% \text{ of } 100x + 20\% \text{ of } (100x - 25000) = 85000$

or, $150x = 90000$

or, $100x = 60000$

Hence, Ramesh borrowed Rs. 60,000 from Vikram.

Question 17.



Kiran bought a front load washing machine by paying Rs.30,000 at once or by making 12 instalments. If the first instalment paid is Rs. 4000 and every other instalment is Rs. 200 less than the previous one, find out the total amount(in Rs.) paid by Kiran in this instalment scheme.

A 34600

B 34400

C 34800

D 34200

See Solution

No. of Instalment = 12

First Instalment a = Rs. 4000

Depreciation in Instalment $= d = -200$ Rs.

The total amount paid by Kiran in this instalment scheme = Sum formula of A.P. $= S_{12}$

$$= \frac{n}{2} \{2a + (n - 1)d\}$$

$$= \frac{12}{2} \{2 \times 4000 + (12 - 1)(-200)\}$$

$$= \frac{12}{2} \{2 \times 4000 + (12 - 1)(-200)\}$$

$$= 6\{8000 + 11 \times (-200)\} = 6(8000 - 2200) = 6 \times 5800 = 34800 \text{ Rs.}$$

Hence, the correct answer is option (C).