Answer & Solutions

Level-I

1. **(b)** From the formula, $I = Prt$, with $P = 5000$, $r = .11$, and $t = 11/12$ (in years). The total interest she will pay is

$I = 5000(.11)(11/12) = 504.17$

or ₹504.17

2. **(a)** After first year the amount

$$= 18750\left(1+\frac{4}{100}\right) = 18750\left(\frac{104}{100}\right)$$

After 2nd year the amount $= 18750\left(\frac{104}{100}\right)\left(\frac{108}{100}\right)$

$$= 18750\left(\frac{26}{25}\right)\left(\frac{27}{25}\right) = 21060$$

$\therefore$ C.I. $= 21060 - 18{,}750 =$ ₹2310.

3. **(c)** Rate of interest $= \frac{956-800}{3\times 800}\times 100 = 6.50\%$

$$\therefore \text{ Amount} = 800 + \frac{800\times 9.5\times 3}{100}$$

$= 800 + 228 =$ ₹1028

4. **(c)** Let S.I. = ₹x

$$= \frac{1.53\times 10^5\times 20}{100} = 30600$$

Monthly income $= \frac{30600}{12} =$ ₹2550

5. **(b)** Interest for one year $=$ ₹ $212.50\times\frac{3}{100}\times 1 =$ ₹ $\frac{51}{8}$

Thus in 8 years, the interest is ₹51.

6. **(c)** After first year, the value of the scooter

$= \frac{25000\times 80}{100} =$ ₹20,000

After second year, the value of scooter = ₹ 16,000

After third year, the value of scooter = ₹ 12,800

7. **(c)** Checking with options, we find that after 13 years, population of the village $A = 6800 - 120\times 13 = 5240$

And that of village $B = 4200 + 80\times 13 = 5240$

8. **(b)** Let amount invested at 12% be x and amount invested at 10% be y.

According to question

$$130 = \frac{x\times 12\times 1}{100} + \frac{y\times 10\times 1}{100}$$

$$\Rightarrow 13000 = 12x + 10y \quad \ldots(1)$$

$$\text{And } 134 = \frac{x\times 10\times 1}{100} + \frac{y\times 12\times 1}{100}$$

$$\Rightarrow 13400 = 10x + 12y \quad (2)$$

From equations (1) and (2)

$x = 500$

9. **(b)** Let the sum be ₹x.

$$ATQ = \frac{100\times 2x\times(y+2)}{100} = \frac{5\times 100\times x\times 2}{100}$$

$\Rightarrow y = 3$ years

10. **(b)** It triple itself in 8 years, which makes interest equal to 200% of principal.

So, 200% is added in 8 years

Hence, 400% which makes the whole amount equal to five times of the principal, which will be added in 16 years

11. **(b)** Go through trial and error of the options. You will get:

$20000\times(1.3) = 26000$ (@ simple interest)

$20000\times 1.1\times 1.1\times 1.1 = 26620$ @ compound interest.

Thus 20000 is the correct answer.

12. **(c)** Solve using options. Option (c) fits the situation as:

$12820 = 2000 + 2$ years interest on $2000 + 4000 + 1$ years interest on $4000 + 6000$ (use 10% compound interest for calculation of interest) $\rightarrow$

$12820 = 2000 + 420 + 4000 + 400 + 6000$.

Thus, option (c) fits the situation perfectly.

13. **(c)** Let the principal be P and rate of interest be R%.

$$\therefore \text{ Required ratio} = \left[\frac{\left(\frac{P\times R\times 6}{100}\right)}{\left(\frac{P\times R\times 9}{100}\right)}\right] = \frac{6PR}{9PR} = \frac{6}{9} = 2:3.$$

14. **(c)** The amount man gets after one year

$$= 6000 + \frac{6000\times 5\times 1}{100} - 1200$$

$= 6000 + 300 - 1200 = 5100$

$\therefore$ Amount after two years *i.e.,* at the beginning of the third year

$$= 5100 + \frac{5100\times 5\times 1}{100} - 1200 = 5100 + 255 - 1200 = 4155$$

Hence option (c)

15. **(d)** Let the sum be ₹x.

$$\therefore \frac{x\times 11\times 5}{100} - \frac{x\times 8\times 6}{100} = 1008$$

$$\Rightarrow \frac{7x}{100} = 1008$$

$\Rightarrow x = 14400$

16. **(c)** Difference in interest = 236.25 – 225 = ₹ 11.25

This difference is the simple interest over ₹ 225 for one year. Hence, rate of interest

$$= \frac{11.25\times 100}{225\times 1} = 5\%$$

17. **(b)** Let the time be x years. Then,

$$\left(\frac{500\times3\times x}{100}\right)+\left(\frac{600\times9\times x}{100\times2}\right)=126$$

$\Leftrightarrow 15x + 27x = 126 \Leftrightarrow 42x = 126 \Leftrightarrow x = 3.$

$\therefore$ Required time = 3 years

18. **(b)** Amount = ₹ $\left[1600\times\left(1+\frac{5}{2\times100}\right)^2 + 1600\times\left(1+\frac{5}{2\times100}\right)\right]$

= ₹ $\left[1600\times\frac{41}{40}\times\frac{41}{40}+1600\times\frac{41}{40}\right]$

= ₹ $\left[1600\times\frac{41}{40}\left(\frac{41}{40}+1\right)\right]$ = ₹ $\left(\frac{1600\times41\times81}{40\times40}\right)$

= ₹ 3321.

C.I. = ₹ (3321 – 3200) = ₹ 121

19. **(c)** Tripling in 8 years means that the interest earned in 8 years is equal to 200% of the capital value. Thus, interest per year (simple interest) is 25% of the capital. In 20 years, total interest earned = 500% of the capital and hence the capital would become 6 times it's original value.

20. **(d)** The yearly increase in the population is 3%. Thus, the population would increase by 3% each year. 200000 would become 206000 while 206000 would become 212180.

21. **(b)** Solve through options to see that the value of 1200000 fits the given situation.

22. **(b)** Solve using options. If the price is 27000, the interest on 12000 (after subtracting the down payment) would be 16% of 12000 = 1920. Hence, the total amount paid would be 28920.

23. **(c)** On the second year (in terms of C.I.) is

$$\frac{P\left(1+\frac{r}{100}\right)^2}{\left(P+\frac{Pr}{100}\right)}=\frac{6}{5} \quad \Rightarrow\left(1+\frac{r}{100}\right)=\frac{6}{5}$$

$\Rightarrow r = 20\%$

24. **(b)** Let the principal be x, then

$$\frac{\left(\frac{x}{7}\times4+\frac{x}{2}\times5+\frac{5x}{14}\times6\right)}{100}=730$$

$\Rightarrow x = 14000$

Alternatively : Go through suitable options.

Choose any middlemost option so that if the choosen option is not correct, then you can determine that whether you have to increase or decrease the value of the choices given.

25. **(d)** Go through options

$$1.8+\frac{1.8\times6\times10}{100}=1.6+\frac{1.6\times8\times10}{100}$$

Hence (d) is correct.

Alternatively : $P_1+\frac{P_1\times6\times10}{100}=P_2+\frac{P_2\times8\times10}{100}$

$$\Rightarrow \quad \frac{P_1}{P_2}=\frac{9}{8}$$

Share of elder brother = $\frac{340000\times9}{17}$ = ₹ 180000

26. **(c)** Principal for next month = 440 – 200 = 240

Amount paid after next month = 244

Therefore interest charged at ₹ 240 = 4

$$\therefore \quad 4=\frac{240\times r\times1}{12\times100}$$

r = 20% per annum

27. **(b)** Total amount = $7500\left(1+\frac{4}{100}\right)^2$

$$= 7500\left(\frac{26}{25}\times\frac{26}{25}\right)=8112$$

C I = Total amount – sum

= 8112 – 7500 = ₹ 612

28. **(c)** $P+\frac{p\times r\times t}{100}=5428$

$$\frac{4600\times3\times t}{100}=5428-4600=828$$

$$\Rightarrow t=\frac{828\times100}{4600\times3}=6 \text{ years}$$

29. **(b)** Let the sum of money be ₹ x.

Now, $8x = x\left(1+\frac{r}{100}\right)^3$

or, $\left(1+\frac{r}{100}\right)^3=(2)^3$ or $1+\frac{r}{100}=2$

Again, let the sum becomes 16 times in n years. Then,

$$16x = x\left(1+\frac{r}{100}\right)^n$$

$\Rightarrow 16 = 2^n$ or $2^4 = 2^n$ or $n = 4$

30. **(c)** Let Principal = ₹ P

$$P\left(1+\frac{10}{100}\right)^3-P=993 \Rightarrow\left(\frac{11}{10}\times\frac{11}{10}\times\frac{11}{10}-1\right)P=993$$

$$\Rightarrow\left(\frac{1331-1000}{1000}\right)P=993 \text{ or ,}$$

$$P = \frac{993 \times 1000}{331} = 3000$$

$$\therefore \text{ Simple interest} = ₹\left(\frac{3000 \times 3 \times 10}{100}\right) = ₹900$$

31. (c) Initial salary = 160000
15% pay-rise each year
After 1 year salary = 160000 + 15% of 160000
= 160000 + 24000 = ₹184000
After 2 years salary = 184000 + 15% of 184000
= 184000 + 27600 = ₹211600
After 3 years salary = 211600 + 15% of 211600
= 211600 + 31740 = ₹243340
After 4 years salary = ₹279841

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

$$\Rightarrow 2 = 1\left(1+\frac{R}{100}\right)^5$$

Cubing both sides.

$$2^3 = 1\left(1+\frac{R}{100}\right)^{15}$$

Therefore, T = 15 years.

33. (b) Let P be the principle amount and R be rate of interest.

$$2P = P + \frac{P \times R \times 8}{100}$$

$$R = \frac{100}{8} = 12.5\%$$

34. (d) P = ₹ 12000, Rate = 5 %, Time (n) = ?, Amount = 13230

$$A = P\left(1+\frac{R}{100}\right)^T \Rightarrow 13230 = 12000\left(1+\frac{5}{100}\right)^n$$

$$\Rightarrow \frac{13230}{12000} = \left(\frac{21}{20}\right)^n \Rightarrow \frac{1323}{1200} = \left(\frac{21}{20}\right)^n$$

$$\Rightarrow \frac{441}{400} = \left(\frac{21}{20}\right)^n$$

$$\left(\frac{21}{20}\right)^2 = \left(\frac{21}{20}\right)^n$$

$\therefore$ n = 2 years

35. (d) $P\left(1+\frac{R}{100}\right)^3 = 1.331P \Rightarrow \left(1+\frac{R}{100}\right)^3 = 1.331$

$$\left(1+\frac{R}{100}\right)^3 = \left(\frac{11}{10}\right)^3$$

$$1+\frac{R}{100} = \frac{11}{10} \Rightarrow \frac{R}{100} = \frac{11}{10} - 1 \Rightarrow \frac{R}{100} = \frac{1}{10}$$

$R = 10\%$

36. (c) S.I (Simple Interest)

$$= \frac{\text{Principle}_1 \times \text{Rate} \times \text{Time}_1}{100} + \frac{\text{Principle}_1 + \text{Rate} \times \text{Time}_1}{100}$$

$$190 = \frac{500 \times R \times 4}{100} + \frac{600 \times R \times 3}{100}$$

$190 = 20R + 18R \Rightarrow 38R = 190 \Rightarrow R = 5\%$

37. (c) Let r_1 and r_2 are the rates of interests.
So, the difference in S.I

$$= \frac{\text{principal} \times \text{time} \times \text{difference between the rates of interests}}{100}$$

$$\Rightarrow \quad 2.50 = \frac{500 \times 2 \times (r_1 - r_2)}{100}$$

$$\text{So, } (r_1 - r_2) = \frac{2.50 \times 100}{500 \times 2} = 0.25$$

38. (b) $A = P\left(1+\frac{r_1}{100}\right)\left(1+\frac{r_2}{100}\right)$

$$A = 10000\left(1+\frac{10}{100}\right)\left(1+\frac{12}{100}\right)$$

$$A = 10000\left(\frac{110}{100}\right)\left(\frac{112}{100}\right)$$

A = 12320

39. (c) $2916 = P\left(1+\frac{8}{100}\right)^2$

$$P = \frac{2916}{(1.08)^2} = 2500$$

$$S.I = \frac{2500 \times 9 \times 3}{100} = 675$$

40. (b) Population 2 years ago $= \frac{4410}{\left(1+\frac{5}{100}\right)^2} = \frac{4410}{441} \times 400$

= 4000

41. (a) Principal (P) = 210
Ratio (R) = 10%
Loan has to be paid in the instalments i.e., it take two years to pay.

$$CI = P\left(1+\frac{R}{100}\right)^2$$

$$= 210\left(1+\frac{10}{100}\right)^2 \Rightarrow 210 \times \frac{11}{10} \times \frac{11}{10} = 254$$

$$\text{So, equal instalment} = \frac{254}{2} = 127$$

42. **(d)** For Half yearly, $A = P\left(1+\frac{\frac{R}{2}}{100}\right)^{2n}$

$$68921 = 64000\left(1+\frac{5}{200}\right)^{2n}$$

$$\frac{68921}{64000} = \left(\frac{41}{40}\right)^{2n}$$

$$\left(\frac{41}{40}\right)^{3} = \left(\frac{41}{40}\right)^{2n}$$

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

43. **(c)** Let P be the Principal amount and R be the rate of interest

$$400 = \frac{P \times R \times 2}{100}$$

$$PR = 20000 \text{ or } P = \frac{20000}{R}$$

$$\text{For 2 years, C.I} - \text{S.I.} = P\frac{R^2}{(100)^2}$$

$$420 - 400 = \frac{20000}{R} \times \frac{R^2}{10000}$$

$20 = 2R$

$R = 10$

44. **(d)** $C.I. = P\left[\left(1+\frac{R}{100}\right)^{T} - 1\right] = 1210\left[\left(1+\frac{6}{100}\right)^{1} - 1\right]$

$$1210\left[1+\frac{3}{50} - 1\right] = \frac{1210 \times 3}{50} = \frac{363}{5} = ₹\ 72.60$$

45. **(b)** $S.I. = \frac{13033 \times 13 \times 3}{100} = ₹\ 5082.87$

$$C.I. = 13033\left[\left(1+\frac{13}{100}\right)^{3} - 1\right]$$

$= 13033 \times 0.44$

$= ₹\ 5772.28$

Difference $= 5772.28 - 5082.87$

$= ₹\ 689.41$

46. **(e)** $S.I. = 79900 - 58750 = ₹\ 21150$

$$\text{Rate} = \frac{S.I. \times 100}{\text{Principal} \times \text{Time}}$$

$$= \frac{21150 \times 100}{58750 \times 4} = 9\% \text{ per annum}$$

47. **(e)** $S.I. = \frac{12000 \times 9 \times 13}{100}$

$= ₹\ 14040$

$\therefore$ Amount $= 12000 + 14040$

$= ₹\ 26040$

48. **(e)** Using $SI = \frac{Prt}{100}$

$$3584 = \frac{P \times 7 \times 4}{100}$$

$\Rightarrow P = ₹\ 12800$

Now, amount got by CI

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

$$= 12800\left(1+\frac{4}{100}\right)^{2} = 12800 \times 1.04 \times 1.04$$

$= ₹\ 13844.48$

Hence, $CI = A - P = 13844.48 - 12800 = ₹\ 1044.48$