

1A

Interest for first 6 months in both cases, is $\frac{1}{2}(4\% \text{ of } 5000) = 100$.

In the next 6 months, $\frac{1}{2}(4\% \text{ of } 100) = 2$ will be extra interest in half-year compounding.

In the next 6 months, $\frac{1}{2}(4\% \text{ of } 2) = 0.04$ will be extra interest for half-year compounding.

Therefore, required difference = $2 + 0.4 = 2.04$

2A

Case 1 : ₹1600 deposited on 1st Jan

Interest for 6 months = $\frac{1}{2}[5\%(1600)] = 40$

Interest for next 6 months = $40 + \frac{1}{2}[5\%(40)] = 41$

Total interest = $40 + 41 = 81$

Case 2 : ₹1600 deposited on 1st Jul

Total interest = $\frac{1}{2}[5\%(1600)] = 40$

Required gain = $81 + 40 = 121$

3D

80% increase in 8 years at simple interest. That is, 10% each year interest is 10%.

$10\%(14000) = 1400$

$10\%(1400) = 140$

$10\%(140) = 14$

Required compound interest

= $3(1400 + 140) + 14 = 4634$

4A

Interest for first year = $7\%(30000) = 2100$

2100×2 is close to 4347 and therefore total years will be near to 2

Interest for second year = $2100 + 7\%(2100) = 2247$

$2100 + 2247 = 4347$

Therefore, required period is 2 years.

5D

$$\begin{aligned}
P\left(\frac{4}{100}\right)^2 &= 1 \\
\Rightarrow P\left(\frac{1}{25}\right)^2 &= 1 \\
\Rightarrow \frac{P}{25^2} &= 1 \\
\Rightarrow P &= 625
\end{aligned}$$

6A

$$\text{Rate} = \frac{100 \times \text{SI}}{\text{PT}} = \frac{100 \times 20}{400 \times 1} = 5\%$$

Rs.400 is the interest on the sum for 1st year

$$\text{Hence, sum} = \frac{100 \times \text{SI}}{\text{RT}} = \frac{100 \times 400}{5 \times 1} = \text{Rs. } 8000$$

7C

the sum will become 81 times in 16 yr

8A

$$\begin{aligned}
(\text{A's present share})\left(1 + \frac{5}{100}\right)^5 &= (\text{B's present share})\left(1 + \frac{5}{100}\right)^7 \\
\Rightarrow \frac{(\text{A's present share})}{(\text{B's present share})} &= \frac{\left(1 + \frac{5}{100}\right)^7}{\left(1 + \frac{5}{100}\right)^5} = \left(1 + \frac{5}{100}\right)^{(7-5)} = \left(1 + \frac{5}{100}\right)^2 = \left(\frac{21}{20}\right)^2
\end{aligned}$$

i.e, A's present share : B's present share = 441 : 400

$$\begin{aligned}
\text{Since the total present amount is Rs.3364, A's share} &= 3364 \times \frac{441}{(441 + 400)} \\
&= 3364 \times \frac{441}{841} = 4 \times 441 = \text{Rs. } 1764
\end{aligned}$$

9B

$$\begin{aligned}
1386 &= P \left(1 + \frac{5}{100}\right) \left(1 + \frac{10}{100}\right) \left(1 + \frac{20}{100}\right) \\
1386 &= P \left(\frac{21}{20}\right) \left(\frac{11}{10}\right) \left(\frac{6}{5}\right) \\
P &= \frac{1386 \times 20 \times 10 \times 5}{21 \times 11 \times 6} = \frac{66 \times 20 \times 10 \times 5}{11 \times 6} = 20 \times 10 \times 5 = \text{Rs. } 1000
\end{aligned}$$

10C

$$\frac{882}{\left(1 + \frac{5}{100}\right)^1} + \frac{882}{\left(1 + \frac{5}{100}\right)^2}$$

$$\frac{882}{\left(\frac{105}{100}\right)} + \frac{882}{\left(\frac{105}{100}\right)^2} = \frac{882}{\left(\frac{21}{20}\right)} + \frac{882}{\left(\frac{21}{20}\right)^2} = \frac{882 \times 20}{21} + \frac{882 \times 20 \times 20}{21 \times 21}$$

$$42 \times 20 + \frac{42 \times 20 \times 20}{21} = 840 + 2 \times 20 \times 20 = 840 + 800 = 1640$$

11C

$$P \left(1 + \frac{R}{100}\right)^T = 5458.32$$

$$P \left(1 + \frac{14}{100}\right)^2 = 5458.32$$

$$P \left(\frac{114}{100}\right)^2 = 5458.32$$

$$P = \frac{5458.32 \times 100 \times 100}{114 \times 114} = \frac{47.88 \times 100 \times 100}{114} = 0.42 \times 100 \times 100 = 4200$$

12A

$$\text{Population after 2 years} = P \left(1 - \frac{R}{100}\right)^T = 40000 \left(1 - \frac{2}{100}\right)^2 = 40000 \left(1 - \frac{1}{50}\right)^2$$

$$= 40000 \left(\frac{49}{50}\right)^2 = \frac{40000 \times 49 \times 49}{50 \times 50} = 16 \times 49 \times 49 = 38416$$

13C

$$\begin{aligned} \text{Compound interest for 1 year} \\ &= 2[3\%(P)] + 3\%[3\%(P)] \\ &= 6\%(P) + 0.09\%(P) \\ &= 6.09\%(P) \end{aligned}$$

14D

$$\begin{aligned} \text{Amount after 2 years} \\ &= 20000 \left(1 + \frac{4}{100}\right)^2 = 20000 \left(\frac{104}{100}\right)^2 = 21632 \end{aligned}$$

15B

$$10\%(3000) = 300$$

$$10\%(300) = 30$$

$$\text{Compound interest} = 2(300) + 30 = 630$$

(formula)

$$\text{Simple interest} = \frac{1}{2} \times 630 = 315$$

$$P = \frac{100 \times 315}{5 \times 4} = 1575$$

16C

$$2[10\%(P)] + 10\%[10\%(P)] = 525$$

$$\Rightarrow 20\%(P) + 1\%(P) = 525$$

$$\Rightarrow 21\%(P) = 525$$

$$\Rightarrow P = 2500$$

Simple interest on 2500 for 4 years at 5%

$$= 4 \times 5\%(2500) = 500$$

17A

$$R = \frac{100 \times SI}{PT} = \frac{100 \times 20}{160 \times 1} = 12.5\%$$

18C

$$\text{Rs.20000 after 4 years} = 20000 \left(1 + \frac{10}{100}\right)^4 = 20000 \left(\frac{11}{10}\right)^4 = \text{Rs. 29282}$$

$$\text{Rs.20000 after 3 years} = 20000 \left(1 + \frac{10}{100}\right)^3 = 20000 \left(\frac{11}{10}\right)^3 = \text{Rs. 26620}$$

$$\text{Rs.20000 after 2 years} = 20000 \left(1 + \frac{10}{100}\right)^2 = 20000 \left(\frac{11}{10}\right)^2 = \text{Rs. 24200}$$

$$\text{Rs.20000 after 1 year} = 20000 \left(1 + \frac{10}{100}\right)^1 = 20000 \left(\frac{11}{10}\right) = \text{Rs. 22000}$$

Total amount after 4 years = 29282 + 26620 + 24200 + 22000 = Rs. 102102

19A 1100

20A

$$\frac{x}{\left(1 + \frac{5}{100}\right)^1} + \frac{x}{\left(1 + \frac{5}{100}\right)^2} = 1025$$

$$\frac{x}{\left(\frac{21}{20}\right)} + \frac{x}{\left(\frac{21}{20}\right)^2} = 1025$$

$$\frac{20x}{21} + \frac{400x}{441} = 1025$$

$$\frac{820x}{441} = 1025$$

$$x = \frac{1025 \times 441}{820} = \frac{205 \times 441}{164} = \text{Rs. 551.25}$$

21B

$$15000 \left(\frac{R}{100} \right)^2 = 96$$

$$\Rightarrow R^2 = 64$$

$$\Rightarrow R = 8$$

22B

Difference between compound interest and simple interest

$$= \frac{60}{2} \times \frac{5}{100} = 1.5$$

Therefore, compound interest = $60 + 1.5 = 61.5$

23A

$$\text{Required difference} = 900 \left(\frac{10/2}{100} \right)^2 = 2.25$$

24D

$$11\%(40000) = 4400$$

$$11\%(4400) = 484$$

$$11\%(484) = 53.24$$

Compound interest = $3(4400 + 484) + 53.24 = 14705.24$

25C

$$n = \frac{1573.04}{1400} = \frac{157304}{140000} = \frac{11236}{10000}$$

$$R = 100 \left[\left(\frac{11236}{10000} \right)^{1/2} - 1 \right] = 100 \left(\frac{106}{100} - 1 \right) = 6$$