CAGR, DEPRECIATION

1. (A) 49.53%
2. (B) Rs. 6,000
3. (C) ₹ 6,50,000
4. (D) 56.50%
5. (C) ₹ 600000
6. (B) ₹ 6500
7. (b) 9.8%
8. (C) $\left[\sqrt[4]{6} - 1\right] \times 100$
9. Assume

Sol.

$$\text{CAGR} = \left[\left(\frac{50000}{20000}\right)^{1/3} - 1\right] \times 100 \quad \textbf{(1)}$$

$$= \left[(2.5)^{1/3} - 1\right] \times 100 = (1.355 - 1) \times 100$$

$$= 0.355 \times 100 = 35.5\% \quad \textbf{(1)}$$

10. Abhay

Solution:

(b) Here, original value of mobile phone (C) = ₹30,000

Scrap value of the phone (S) = ₹3,000

Useful life (n) = 3 years

Annual depreciation $\frac{C-S}{n} = \frac{30,000-3000}{3} = 9000$ **[1]**

∴ Book value of the mobile at the end of 2 years = ₹30000 − 2 × ₹9000 = ₹12000 **[1]**

11. The

Ans.

Given $P = ₹\,97{,}200, r = 10\%$ p.a $\Rightarrow i = \frac{10}{100} = 0.1$

(i) Value after 3 years = Present value $\times (1 - 0.1)^3$

$= ₹\,97200(0.9)^3$

$= ₹\,70858.80$ **1**

(ii) Present value = value 2 years ago $\times (1 - 0.1)^2$

$\Rightarrow 97200 =$ Value 2 years ago $\times (0.9)^2$

$\Rightarrow$ Value 2 years ago $= ₹\,\frac{97200}{(0.9)^2} = ₹\,120000$ **1**

12. The

13. The

$$\text{CAGR} = \left[\left(\frac{EV}{SV}\right)^{\frac{1}{n}} - 1\right] \times 100$$

$$\Rightarrow 5 = \left[\left(\frac{125000}{75000}\right)^{\frac{1}{n}} - 1\right] \times 100$$

$$\Rightarrow 1.05 = \left(\frac{5}{3}\right)^{\frac{1}{n}}$$

$$\Rightarrow \log(1.05) = \frac{1}{n}\log(1.67)$$

$$\Rightarrow n = \frac{0.223}{0.021} = 10.6 \approx 11$$

$\therefore$ required number of years $= 11$ years

1 ½ ½

14. A

C = Face value or maturity value = ₹ 56,000,

n = number of periodic interest payments $= 4 \times 6 = 24$

Yield rate $(i) = \frac{9}{400} = 0.0225$

R = Coupon Payment $= \frac{7 \times 56000}{400} =$ ₹ 980

Purchase price of the bond $(V) = R\left[\frac{1-(1+i)^{-n}}{i}\right] + C\,(1+i)^{-n}$

$$= 980\left[\frac{1-(1+0.0225)^{-24}}{0.0225}\right] + 56000(1+0.0225)^{-24}$$

$$= 980\left[\frac{1-0.58}{0.0225}\right] + 56000 \times 0.58$$

$$= ₹\,(18293.33 + 32480) = ₹\,50773.33$$

½ 1 ½ ½

15. A

Sol.

(i) Annual amount of depreciation $= \frac{45200-0}{3} = ₹\ \frac{45200}{3}$

Rate of depreciation $= \frac{\frac{45200}{3}}{45200} \times 100 = 33.3\%$ **(1)**

(ii) $\mathbf{v(t) = mt + C = -\frac{45200}{3}t + 45200}$ **(1)**

(iii) $\mathbf{v\left(1\frac{1}{2}\right) = -\frac{45200}{3} \times \frac{3}{2} + 45200 = ₹\,22600}$ **(1)**

16. An

Sol. Here C = ₹ 4,50,000

S = ₹ 1,00,000

and n = 5 years.

Annual depreciation $D = \frac{C - S}{n} = ₹\ 70{,}000$ **(2)**

Thus, yearly depreciation schedule is as follows:

Years	Book value at the beginning of the year (in ₹)	Depreciation (in ₹)	Book value at the end of the year (in ₹)
1	4,50,000	70,000	3,80,000
2	3,80,000	70,000	3,10,000
3	3,10,000	70,000	2,40,000
4	2,40,000	70,000	1,70,000
5	1,70,000	70,000	1,00,000

(1 for correct table)

17. A

Sol.

$i = \left(\frac{8000}{5000}\right)^{\frac{1}{5}} - 1$ **1**

$= (1.6)^{\frac{1}{5}} - 1$ **1**

$= 0.098$ **½**

$\therefore$ CAGR = 9.8 % **½**

18. The

Sol. Let C denotes the original cost of the Asset.

Then annual depreciation (D) is given by $D = \frac{C - S}{n}$

$\Rightarrow \quad 50000 = \frac{C - 60000}{10}$ **2**

$\Rightarrow \quad C = 5{,}60{,}000$ **1**

So, the original cost of the asset is ₹ 5,60,000

19. A

Ans

Here, $A = ₹(3,00,000 - 30,000) = ₹2,70,000$ ½

We know, $A = R\left[\frac{(1+i)^n - 1}{i}\right]$

$\Rightarrow 270000 = R\left[\frac{(1+0.05)^7 - 1}{0.05}\right]$ 1

$\Rightarrow R = \frac{270000 \times 0.05}{(1.05)^7 - 1} = \frac{270000 \times 0.05}{0.407}$ 1

$\Rightarrow R = ₹33,169.53$ ½

Hence, the company should deposit ₹33,169.53 at the end of each year for 7 years.

20. The

Ans

Remark: Full marks may be awarded to the student who has attempted the question as reducing balance method is not explicitly mentioned in the curriculum. 3

21. Mr

Here, Initial investment value $(IV) = ₹5000$ ½

Final investment value $(FV) = ₹10500$ ½

No of period $(n) = 3$ (starting from 2021 to 2023)

$\Rightarrow r = \left(\frac{FV}{IV}\right)^{\frac{1}{n}} - 1 = \left(\frac{10500}{5000}\right)^{\frac{1}{3}} - 1$ 1

$= 1.2805 - 1 = 0.2805$ ½

$CAGR = 28.05\%$ ½

22. A

We know

CAGR$= \left[\left(\frac{FV}{IV}\right)^{\frac{1}{n}} - 1\right] \times 100$, where, IV= Initial value of investment

FV=Final value of investment 1

$\Rightarrow 8.88 = \left[\left(\frac{25000}{15000}\right)^{\frac{1}{n}} - 1\right] \times 100 \quad \Rightarrow 0.0888 = \left(\frac{5}{3}\right)^{\frac{1}{n}} - 1$ 1

$\Rightarrow 1.089 = (1.667)^{\frac{1}{n}}$

$\Rightarrow \frac{1}{n}\log(1.667) = \log(1.089) \quad \Rightarrow n(0.037) = 0.2219$ 1

$\Rightarrow n = 5.99 \approx 6\ years$

23. Define

Sol. CAGR is the mean annual growth rate of an investment over a specified period of time longer than one year. **(1)**

$$\text{CAGR} = \left[\frac{\text{Ending investment amount}}{\text{Start amount}}\right]^{\frac{1}{\text{no.of years}}} - 1$$ **(1)**

P.V. = ₹ 10,000

F.V. = ₹ 14,000 **(1)**

n = 6 years

So, CAGR $= \left(\frac{14000}{10000}\right)^{1/6} - 1 = (1{\cdot}4)^{1/6} - 1$ $(\frac{1}{2})$

$= 1{\cdot}058 - 1$ $(\frac{1}{2})$

$= 0{\cdot}058$ $(\frac{1}{2})$

Hence, CAGR = 5·8% $(\frac{1}{2})$

24. A

Ans.

$\boldsymbol{C = ₹\,7,40,000 + ₹\,60,000 = ₹\,8,00,000}$ **1**

And $\boldsymbol{S = ₹\,40,000}$

$\therefore$ Annual depreciation $= \frac{C-S}{n} = ₹\,\frac{7,60,000}{5} = \boldsymbol{₹\,1,52,000}$ **1**

Rate of depreciation $= \frac{D}{C-S} \times 100$ **1**

$= \frac{1,52,000}{8,00,000-40,000} \times 100$ **1**

$= 20\%$ **1**

25. A

Solution:

Here, initial value of investment (V_i) = ₹ 300000

Final value of investment (V_{fi}) = ₹ 450000 **[1]**

and n = 5 years.

Now, $i = \left(\frac{V_f}{V_i}\right)^{1/n} - 1$

$\Rightarrow \quad i = \left(\frac{450000}{300000}\right)^{1/5} - 1 = (1.5)^{1/5} - 1 = 1.084 - 1 = 0.084$ **[1+1]**

$\Rightarrow$ CAGR (%) = 8.4%

Thus, the compound annual growth rate is 8.4%. **[1]**

26. Mrs.

27. A