

Chapter 4

Basics of Personal Financial Management



Section I

Time Value of Money

1. B	2. C	3. D	4. B	5. C	6. B	7. C	8. D	9. C	10. B
11. D	12. A	13. C	14. B	15. B	16. B	17. C	18. A	19. A	20. D
21. C	22. D	23. B	24. B	25. C	26. B	27. A	28. A	29. B	30. B
31. D	32. A	33. A	34. A						

- B**
Time value of money means money received today is worth more than that received tomorrow. This is because the money received today could have been used to make investments and earn interest earlier.
- C**
By definition, compounding is a process of turning present values into future values.
- D**
By definition, discounting is a process of turning future values into present values.
- B**
Since the question is asking about the present value of the money, it is simply the amount deposited, i.e. \$100.
- C**
Future value = Present value $\times (1 + r\%)$, where $r\%$ is the annual interest rate.
The future value will be $\$100 \times (1 + 5\%) = \105 .
- B**
Mr. Chan used \$5,000 to buy bonds and he sold the bonds with a return of \$6,000 one year later. Time value of money is applied as the \$5,000 worth more one year later.
- C**
Future value of money = Present value of money $\times (1 + r\%)$, where $r\%$ is the annual interest rate.
Therefore, the future value = $\$2,000 \times (1 + 10\%) = \$2,200$
- D**
The present value is \$300 and the annual interest rate is 8%.
As it is compounded yearly, the future value will be $\$300 \times (1 + 8\%)^3 = \378 .
- C**
The present value is \$5,000 and the annual interest rate is 5%.
As a result, the total amount he can get after three years is given by $\$5,000 \times (1 + 5\%)^3 = \$5,788$.
- B**
 $x(1 + 10\%)^2 + 2x(1 + 10\%) = 300,000$
 $3.41x = 300,000$
 $x = 87,977$

11. **D**

As the nominal rate is an annual rate, it indicates that if the interest is calculated based on yearly compounding, the effective rate of return would be the same as the nominal rate.

12. **A**

(1) is correct. It is true by definition.

(2) is incorrect. The effective rate of return reflects the actual return of an investment while the nominal rate of return may not. We cannot compare two investment plans by just looking at the nominal rates of return, but also the compounding frequency. Therefore, the effective rate of return, which also takes compounding frequency into account, is a better measurement of gain and loss from an investment.

(3) is incorrect. The effective rate of return can be larger than the nominal rate of return, when the amount is compounded more than once within a year.

13. **C**

If the effective rate of return (ERR) is compounded yearly, it will be equal to nominal rate of return. From the equation $ERR = \left(1 + \frac{i}{m}\right)^m - 1$, we can see that when effective rate of return is compounded yearly, i.e. $m = 1$, and there is no difference between nominal rate of return and effective rate of return.

D is incorrect. The effective rate of return can either be equal to or larger than nominal rate of return. It is impossible for the effective rate of return to be smaller than the nominal rate of return.

14. **B**

$$\text{Effective rate of return} = \left(1 + \frac{20\%}{4}\right)^4 - 1 = 2.02\%$$

15. **B**

$$\text{Effective rate of return} = \left(1 + \frac{4\%}{12}\right)^{12} - 1 = 4.07\%$$

16. **B**

Effective rate of return compounded yearly is equal to the nominal rate of return.

17. **C**

It is true by definition.

A is incorrect. Neither of them considers the effect of inflation.

B is incorrect. Both of them are affected by the interest rate.

D is incorrect. Two rates of return have different implications. There is no absolute answer to which one is more widely used.

18. **A**

It is true by definition.

B and C are incorrect. Both of them do not take present values into account.

D is incorrect. The definition ignores the present value of cash outflows.

19. **A**
 An investment with the highest net present value means it is the most profitable.
 B is incorrect. The higher the cost of capital, the less profitable the option is.
 C is incorrect. It does not show the effective rate of return of the investment, i.e. the actual return.
 D is incorrect. It is difficult to compare future values in different periods. The more appropriate approach is to discount future values to present values.
20. **D**
 (1), (2) and (3) are correct. Net present value is the present value of future cash inflows less the original capital (the initial cash outflow). The residual value of the office furniture can be regarded as a future cash inflow. We need the cost of capital to calculate the present value of the future cash inflows.
21. **C**
 The amount she could get = $\$5,000 \times \left(1 + \frac{5\%}{4}\right)^{12} = \$5,804$
22. **D**
 When the frequency of compounding is higher, the effective rate of return will increase, given the same amount of principal.
 A, B and C are incorrect. They do not affect the effective rate of return.
23. **B**
 The amount of down payment = $\$2,000,000 \times 20\% = \$400,000$
 The amount she has to deposit = $\$400,000 \div \left(1 + \frac{3\%}{12}\right)^{36} = \$365,614$
24. **B**
 The interest received from plan A after two years
 = $\$5,000 \times (1 + 10\%)^2 - \$5,000$
 = $\$1,050$
 The interest received from plan B after two years
 = $\$5,000 \times \left(1 + \frac{9.8\%}{2}\right)^4 - \$5,000$
 = $\$1,054$
 The interest received from plan C after two years
 = $\$5,000 \times \left(1 + \frac{9.6\%}{4}\right)^8 - \$5,000$
 = $\$1,045$
 The interest received from plan D after two years
 = $\$5,000 \times \left(1 + \frac{9.4\%}{12}\right)^{24} - \$5,000$
 = $\$1,030$
 From the above, it is shown that Plan B offers the highest return because the interest received after two years is the greatest.

25. **C**

The present value of the amount to be paid for Proposal A

$$= \frac{\$2,500,000}{(1+12\%)^3}$$

$$= \$1,779,451$$

26. **B**

The present value of the amount to be paid for Proposal B

$$= \$ \left(700,000 + \frac{600,000}{(1+12\%)^1} + \frac{500,000}{(1+12\%)^2} + \frac{400,000}{(1+12\%)^3} \right)$$

$$= \$1,919,023$$

27. **A**

The present value of the amount to be paid for proposal A (\$1,779,451) is lower than that of proposal B (\$1,919,023). The difference between their present values lies in two reasons.

Firstly, the whole amount of money of proposal A will be repaid at the end of 20X6 while that of proposal B will be repaid part by part each year. Secondly, the amount to be repaid for proposal B is slightly lower than that for proposal A. Although the future value of the cost of loans under proposal A (\$2,500,000) is larger than that under proposal B (\$2,200,000), the present value of proposal A is lower after discounting. This means that the present value of the cost of loan under proposal A is lower. Lower costs are incurred if it is adopted.

28. **A**

<u>End of Year</u>	<u>Repayment amount</u>
	\$
1	5,000
2	5,000
3	5,000
Total	15,000

$$\text{The annual flat rate} = (\$15,000 - \$12,000) \div \$12,000 \div 3 \times 100\%$$

$$= 8.33\%$$

29. **B**

The net present value of the decision

$$= \$ \left(\frac{12,000}{1.05} + \frac{11,000}{(1.05)(1.07)} + \frac{10,000}{(1.05)(1.07)(1.03)} - 25,000 \right)$$

$$= \$4,861$$

30. **B**

The return in Choice B

$$= \$800,000 \times (1 + 4\% \div 12)^6 - \$800,000$$

$$= \$16,134$$

A is incorrect. The return is just \$15,000.

C is incorrect. Choice C gives no return as the amount is not compounded at the end of the half-year.

D is incorrect.

The return from the original plan

$$= \$800,000 \times (1 + 4\% \div 2) - \$800,000$$

$$= \$16,000$$

The frequency of compounding of the original plan is lower than that of Choice B. The lower the frequency, the lower the return.

31. **D**

$$\text{Total amount} = \$86,000 \times 3 \times 0.3 + \$86,000 \times 3 \times 0.7 \times (1 + 5\% \div 2)^8 = \$297,444$$

32. **A**

For applying a loan, the one with lowest interest should be chosen.

$$\text{Effective interest rate of Bank A} = (1 + 5\% \div 12)^{12} - 1 = 5.12\%$$

$$\text{Effective interest rate of Bank B} = (1 + 5.1\% \div 2)^2 - 1 = 5.17\%$$

$$\text{Effective interest rate of Bank C} = 5.2\%$$

The effective interest rate of Bank A is the lowest. Bank A should be chosen.

33. **A**

$$\text{Net present value} = \$450,000 \times (1 + 5\% \div 12)^{24} / (1 + 2.5\%)^2 - \$450,000 = \$23,265$$

34. **A**

$$\text{Minimum amount} = \$4,000,000 \div (1 + 4\%)^3 = \$3,555,985$$