Chapter 4

# 複利和年金

## 問答題

1. 單利的計算基礎僅為每期的原始本金金額；複利計算的基礎則為期初的本金金額加上先前各期累積的利息，若期間在兩期以上，則本金所產生的利息會加入本金繼續再衍生新的利息，亦即利上加利。

   因此，在利率條件相同的情況下，複利計算的結果，金額會較單利計算結果為大。

2. 終值為某筆或多筆投資金額，經由複利計算後，在未來特定日所累積變成的金額。現值則是未來某筆或多筆金額，經由複利計算後，在今日折現後的金額。

3. 相等間隔時間連續支付 (或收取) 相等金額，且每期計息之利率也相同，即所謂的年金。由於各期金額的收付可於期初或期末為之，因此年金又區分為二類，於期末收付者，稱為普通年金；於期初收付者，稱為到期年金。

4. 所謂遞延年金，係指於若干期後才發生收付的年金。例如遞延 3 年之五年普通年金，意味前三年並無金額收付的發生，而第一期的收付是發生於第四年底，且連續 5 年。

5. 債券的面額、票面利率、債券的發行的日期、付息日期、到期日與發行時之市場利率。

## 選擇題

| | | |
|---|---|---|
| 1. (C) | 2. (D) | 3. (D) |
| 4. (D) | 5. (B) | 6. (B) |
| 7. (C) | 8. (B) | 9. (C) |
| 10. (B) | 11. (A) | 12. (C) |
| 13. (B) | 14. (C) | 15. (A) |
| 16. (D) | 17. (C) | 18. (C) |
| 19. (C) | | |

## 練習題

**1.** (1) \$100,000 + \$100,000 × 4% × 6 = \$124,000

(2) \$100,000 × $(1 + 0.04)^6$ = \$100,000 × 1.26532 = \$126,532

**2.** (1) \$60,000 × (Future Value of 1, 4 periods, 12%)
= \$60,000 × 1.57352 = \$94,411

(2) \$60,000 × (Future Value of 1, 8 periods, 6%)
= \$60,000 × 1.59385 = \$95,631

(3) \$60,000 × (Future Value of 1, 16 periods, 3%)
= \$60,000 × 1.60471 = \$96,283

**3.** \$1,300,000 × (Present Value of 1, 7 periods, 8%)
= \$1,300,000 × 0.58349 = \$758,537

**4.** (1) \$130,000 × (Future Value of 1, 6 periods, 12%)
= \$130,000 × 1.97382 = \$256,597

(2) \$45,000 × (Present Value of 1, 2 periods, 10%)
= \$45,000 × 0.82645 = \$37,190

(3) \$30,000 × (Future Value of 1, 6 periods, 2%)
= \$30,000 × 1.12616 = \$33,785

(4) \$250,000 × (Present Value of 1, 5 periods, 15%)
= \$250,000 × 0.49718 = \$124,295

**5.** \$10,000 × (Future Value of an Ordinary Annuity, 6 periods, 5%)
= \$10,000 × 6.80191 = \$68,020

**6.** \$14,000,000 ÷ (Future Value of an Ordinary Annuity, 11 periods, 8%)
= \$14,000,000 ÷ 16.64549 = \$841,069

**7.** \$1,000,000 ÷ (Future Value of an Annuity Due, 6 periods, 4%)
= \$1,000,000 ÷ 6.89829 = \$144,963

**8.** \$108,871 × (Future Value of an Annuity Due, Ｎ periods, 10%) = \$840,000
(Future Value of an Annuity Due, Ｎ periods, 10%) = 7.71555
(Future Value of an Ordinary Annuity, Ｎ periods, 10%)×1.1=7.71555
故(Future Value of an Ordinary Annuity, Ｎ periods, 10%)=7.01414
When N＝5→6.105100(**不足**)；When N＝6→7.715610
**故花花要存 6 年方可購買價值 \$840,000 的東西，即** N = 6 (**年**)

**9.** $500,000 × 4% × (Present Value of an Ordinary Annuity, 8 periods, 3%) + $500,000 × (Present Value of 1, 8 periods, 3%)
= $20,000 × 7.01969 + $500,000 × 0.78941 = $535,099

**10.** $125,000 × (Present Value of an Ordinary Annuity, 5 periods, 12%)
$125,000 × 3.60478 = $450,597

**11.** 店面甲：$50,000,000

店面乙：

租金現值：$7,000,000 × (Present Value of an Annuity Due, 20 periods, 15%)
= $7,000,000 × 7.19823 = $50,387,610

店面丙：

租金現值 = $860,000 × (Present Value of an Ordinary Annuity, 20 periods, 15%)
= $860,000 × 6.25933 = $5,383,024
店面丙之淨現值 = $55,000,000 − $5,383,024 = $49,616,976

由於店面丙之現值最低，故哲普公司應選擇店面丙。

**12.** $56,000 × (Present Value of an Annuity Due, 36 periods, 2%)
= $56,000 × 25.99862 = $1,455,923

**13.** $7,000 × (Present Value of an Annuity Due, 6 periods, 2.5%)
= $7,000 × 5.64583 = $39,521
分期付款現值 $39,521 大於現購價 $39,000，故直接購買較划算。

**14.** $340,000 × (Present Value of an Annuity Due, 7 periods, 8%)
= $340,000 × 5.62288 = $1,911,779

$1,911,779 × (Present Value of an 1, 5 periods, 8%)
= $1,911,779 × 0.68058 = $1,301,119

$1,301,119 ÷ (Future Value of an Ordinary Annuity, 8 periods, 8%)
= $1,301,119 ÷ 10.63663 = $122,324

**15.** $70,000 × (Present Value of an Annuity Due, 10 periods, 4%) × (Present Value of 1, 2 periods, 8%)
= $70,000 × 8.43533 × 0.85734 = $506,236

現購價 = $150,000 + $506,236 = $656,236