

# 國立臺北科技大學 103 學年度碩士班招生考試

系所組別：3130 土木工程系土木與防災碩士班丙組

## 第三節 工程經濟 試題

第一頁 共三頁

### 注意事項：

1. 本試題共 10 題，配分共 100 分。
2. 請標明大題、子題編號作答，不必抄題。
3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

1. 美國聯邦準備理事會 (F E D) 日前宣布縮減 Q E (量化寬鬆) 政策的規模，從 2014 年一月開始，購債金額從每月八百五十億美元縮減一百億美元到七百五十億美元，宣告美國在二〇〇八年金融海嘯後的刺激經濟方案退場，請討論亞洲各國央行面對此新形勢，應如何備戰因應？又是否會波及台灣的房價？ (10%)
2. 請利用供給需求曲線說明 (1) 需求拉動之通貨膨脹。 (5%)  
(2) 成本推動之通貨膨脹。 (5%)
3. 1976 年前美國總統卡特為減少石油之用量，決定對豪華大型車增稅，並貼補小型車，是否正確？ (10%)
4. 假定 A 公司有一項新設備(X) 50,000 美元，以直線折舊法計算折舊，折舊費為 5,000 美元，該公司折舊前及稅前淨利為 20,000 美元，稅率為 34%。又若 A 公司有另一項新設備(Y) 50,000 美元，以加速折舊法計算折舊，折舊費為 20,000 美元，該公司折舊前及稅前淨利為 20,000 美元，稅率為 34%。A 公司該如何選擇(X) OR (Y) (10%)
5. 站在財務管理的觀理來看，淨現值法是一種最理想的資本預算評估方法，不過，在實務上仍然有很多公司使用回收期間法或內部報酬法來評估投資專案，試說明其中的原因。 (10%)
6. 解釋名詞  
a. 機會成本 (3%);  
b. 沉沒成本 (3%);  
c. GDP (4%)

7. An individual is borrowing \$150,000 at 8% interest compounded annually. The loan is to be repaid in equal annual payments over 30 years. However, just after the eighth payment is made, the lender allows the borrower to triple the annual payment. The borrower agrees to this increased payment. If the lender is still charging 8% per year, compounded annually, on the unpaid balance of the loan, what is the balance still owed just after the twelfth payment is made?  
(10%)
8. Mike borrowed \$60,000 from a bank at an interest rate of 12%, compounded monthly. This loan will be repaid in 36 equal monthly installments over 3 years. Immediately after his 10<sup>th</sup> payment, Mike desires to pay the remainder of the loan in a single payment. Compute this lump sum amount?  
(10%)
9. 令姊五年後將開始大學求學生涯，而通知令尊其後四年每年花費\$16,000。令尊於五年前已經開始籌畫此事，每年儲蓄\$2,000，而今後打算持續進行儲蓄五年。請問，令尊今後五年儲蓄應增加儲蓄多少？才能滿足令姊之求學生涯所需，年利率為 10%。  
(10%)
10. B 君向銀行貸款 800,000 元，年利率為 8% ，五年後還清，試問每年應還多少？  
(10%)

注意：背面尚有參考資料

附錄 A \$1 的本利和  $FV_{IF} = PV(1+i)^n$

| 期數 | 百分比   |       |       |       |        |        |        |        |        |        |        |
|----|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|
|    | 1%    | 2%    | 3%    | 4%    | 5%     | 6%     | 7%     | 8%     | 9%     | 10%    | 11%    |
| 1  | 1.010 | 1.020 | 1.030 | 1.040 | 1.050  | 1.060  | 1.070  | 1.080  | 1.090  | 1.100  | 1.110  |
| 2  | 1.020 | 1.040 | 1.061 | 1.082 | 1.103  | 1.124  | 1.145  | 1.166  | 1.188  | 1.210  | 1.232  |
| 3  | 1.030 | 1.061 | 1.093 | 1.125 | 1.158  | 1.191  | 1.225  | 1.260  | 1.295  | 1.331  | 1.368  |
| 4  | 1.041 | 1.082 | 1.126 | 1.170 | 1.216  | 1.262  | 1.311  | 1.360  | 1.412  | 1.464  | 1.518  |
| 5  | 1.051 | 1.104 | 1.159 | 1.217 | 1.276  | 1.338  | 1.403  | 1.469  | 1.539  | 1.611  | 1.685  |
| 6  | 1.062 | 1.126 | 1.194 | 1.265 | 1.340  | 1.419  | 1.501  | 1.587  | 1.677  | 1.772  | 1.870  |
| 7  | 1.072 | 1.149 | 1.230 | 1.316 | 1.407  | 1.504  | 1.606  | 1.714  | 1.828  | 1.949  | 2.076  |
| 8  | 1.083 | 1.172 | 1.267 | 1.369 | 1.477  | 1.594  | 1.718  | 1.851  | 1.993  | 2.144  | 2.305  |
| 9  | 1.094 | 1.195 | 1.305 | 1.423 | 1.551  | 1.689  | 1.838  | 1.999  | 2.172  | 2.358  | 2.558  |
| 10 | 1.105 | 1.219 | 1.344 | 1.480 | 1.629  | 1.791  | 1.967  | 2.159  | 2.367  | 2.594  | 2.839  |
| 11 | 1.116 | 1.243 | 1.384 | 1.539 | 1.710  | 1.898  | 2.105  | 2.332  | 2.580  | 2.853  | 3.152  |
| 12 | 1.127 | 1.268 | 1.426 | 1.601 | 1.796  | 2.012  | 2.252  | 2.518  | 2.813  | 3.138  | 3.498  |
| 13 | 1.138 | 1.294 | 1.469 | 1.665 | 1.886  | 2.133  | 2.410  | 2.720  | 3.066  | 3.452  | 3.883  |
| 14 | 1.149 | 1.319 | 1.513 | 1.732 | 1.980  | 2.261  | 2.579  | 2.937  | 3.342  | 3.797  | 4.310  |
| 15 | 1.161 | 1.346 | 1.558 | 1.801 | 2.079  | 2.397  | 2.759  | 3.172  | 3.642  | 4.177  | 4.785  |
| 16 | 1.173 | 1.373 | 1.605 | 1.873 | 2.183  | 2.540  | 2.952  | 3.426  | 3.970  | 4.595  | 5.311  |
| 17 | 1.184 | 1.400 | 1.653 | 1.948 | 2.292  | 2.693  | 3.159  | 3.700  | 4.328  | 5.054  | 5.895  |
| 18 | 1.196 | 1.428 | 1.702 | 2.206 | 2.407  | 2.854  | 3.380  | 3.996  | 4.717  | 5.560  | 6.544  |
| 19 | 1.208 | 1.457 | 1.754 | 2.107 | 2.527  | 3.026  | 3.617  | 4.316  | 5.142  | 6.116  | 7.263  |
| 20 | 1.220 | 1.486 | 1.806 | 2.191 | 2.653  | 3.027  | 3.870  | 4.661  | 5.604  | 6.727  | 8.062  |
| 25 | 1.282 | 1.641 | 2.094 | 2.666 | 3.386  | 4.292  | 5.427  | 6.848  | 8.623  | 10.835 | 13.585 |
| 30 | 1.348 | 1.811 | 2.427 | 3.243 | 4.322  | 5.743  | 7.612  | 10.063 | 13.268 | 17.449 | 22.892 |
| 40 | 1.489 | 2.208 | 3.262 | 4.801 | 7.040  | 10.286 | 14.974 | 21.725 | 31.409 | 45.259 | 65.001 |
| 50 | 1.645 | 2.692 | 4.384 | 7.107 | 11.467 | 18.420 | 29.457 | 46.902 | 74.358 | 117.39 | 184.57 |

附錄 A \$1 的本利和 (續)

| 期數 | 百分比    |        |        |         |         |         |         |         |         |         |          |
|----|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|----------|
|    | 12%    | 13%    | 14%    | 15%     | 16%     | 17%     | 18%     | 19%     | 20%     | 25%     | 30%      |
| 1  | 1.120  | 1.130  | 1.140  | 1.150   | 1.160   | 1.170   | 1.180   | 1.190   | 1.200   | 1.250   | 1.300    |
| 2  | 1.254  | 1.277  | 1.300  | 1.323   | 1.346   | 1.369   | 1.392   | 1.416   | 1.440   | 1.563   | 1.690    |
| 3  | 1.405  | 1.443  | 1.482  | 1.521   | 1.561   | 1.602   | 1.643   | 1.685   | 1.728   | 1.953   | 2.197    |
| 4  | 1.574  | 1.630  | 1.689  | 1.749   | 1.811   | 1.874   | 1.939   | 2.005   | 2.074   | 2.441   | 2.856    |
| 5  | 1.762  | 1.842  | 1.925  | 2.011   | 2.100   | 2.192   | 2.288   | 2.386   | 2.488   | 3.052   | 3.713    |
| 6  | 1.974  | 2.082  | 2.195  | 2.313   | 2.436   | 2.565   | 2.700   | 2.840   | 2.986   | 3.815   | 4.827    |
| 7  | 2.211  | 2.353  | 2.502  | 2.660   | 2.826   | 3.001   | 3.185   | 3.379   | 3.583   | 4.768   | 6.276    |
| 8  | 2.476  | 2.658  | 2.853  | 3.059   | 3.278   | 3.511   | 3.759   | 4.021   | 4.300   | 5.960   | 8.157    |
| 9  | 2.773  | 3.004  | 3.252  | 3.518   | 3.803   | 4.108   | 4.435   | 4.785   | 5.160   | 7.451   | 10.604   |
| 10 | 3.106  | 3.395  | 3.707  | 4.046   | 4.411   | 4.807   | 5.234   | 5.696   | 6.192   | 9.313   | 13.786   |
| 11 | 3.479  | 3.836  | 4.226  | 4.652   | 5.117   | 5.624   | 6.176   | 6.777   | 7.430   | 11.642  | 17.922   |
| 12 | 3.896  | 4.335  | 4.818  | 5.350   | 5.936   | 6.580   | 7.288   | 8.064   | 8.916   | 14.552  | 23.298   |
| 13 | 4.363  | 4.898  | 5.492  | 6.153   | 6.886   | 7.699   | 8.599   | 9.596   | 10.699  | 18.190  | 30.288   |
| 14 | 4.887  | 5.535  | 6.261  | 7.076   | 7.988   | 9.007   | 10.147  | 11.420  | 12.839  | 22.737  | 39.374   |
| 15 | 5.474  | 6.254  | 7.138  | 8.137   | 9.266   | 10.539  | 11.974  | 13.590  | 15.407  | 28.422  | 51.186   |
| 16 | 6.130  | 7.067  | 8.137  | 9.358   | 10.748  | 12.330  | 14.129  | 16.172  | 18.488  | 35.527  | 66.542   |
| 17 | 6.866  | 7.986  | 9.276  | 10.761  | 12.468  | 14.426  | 16.672  | 19.244  | 22.186  | 44.409  | 86.504   |
| 18 | 7.690  | 9.024  | 10.575 | 12.375  | 14.463  | 16.879  | 19.673  | 22.091  | 26.623  | 55.511  | 112.46   |
| 19 | 8.613  | 10.197 | 12.056 | 14.232  | 16.777  | 19.748  | 23.214  | 27.252  | 31.948  | 69.389  | 146.19   |
| 20 | 9.646  | 11.523 | 13.743 | 16.367  | 19.461  | 23.106  | 27.393  | 32.429  | 38.338  | 86.736  | 190.05   |
| 25 | 17.000 | 21.231 | 26.462 | 32.919  | 40.874  | 50.658  | 62.669  | 77.388  | 95.396  | 264.70  | 705.64   |
| 30 | 29.960 | 39.116 | 50.950 | 66.212  | 85.850  | 111.07  | 143.37  | 184.68  | 237.38  | 807.79  | 2,620.0  |
| 40 | 93.051 | 132.78 | 188.88 | 267.86  | 378.72  | 533.87  | 750.38  | 1,051.7 | 1,469.8 | 7,523.2 | 36,119.  |
| 50 | 289.00 | 450.74 | 700.23 | 1,083.7 | 1,670.7 | 2,566.2 | 3,927.4 | 5,988.9 | 9,100.4 | 70,065. | 497,929. |

附錄 B \$1 的現值  $PV_{IF} = FV \left[ \frac{1}{(1+i)^n} \right]$

| 期數 | 百分比   |       |       |       |       |       |       |       |       |       |       |       |
|----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|    | 1%    | 2%    | 3%    | 4%    | 5%    | 6%    | 7%    | 8%    | 9%    | 10%   | 11%   | 12%   |
| 1  | 0.990 | 0.980 | 0.971 | 0.962 | 0.952 | 0.943 | 0.935 | 0.926 | 0.917 | 0.909 | 0.901 | 0.893 |
| 2  | 0.980 | 0.961 | 0.943 | 0.925 | 0.907 | 0.890 | 0.873 | 0.857 | 0.842 | 0.826 | 0.812 | 0.797 |
| 3  | 0.971 | 0.942 | 0.915 | 0.889 | 0.864 | 0.840 | 0.816 | 0.794 | 0.772 | 0.751 | 0.731 | 0.712 |
| 4  | 0.961 | 0.924 | 0.885 | 0.855 | 0.823 | 0.792 | 0.763 | 0.735 | 0.708 | 0.683 | 0.659 | 0.636 |
| 5  | 0.951 | 0.906 | 0.863 | 0.822 | 0.784 | 0.747 | 0.713 | 0.681 | 0.650 | 0.621 | 0.593 | 0.567 |
| 6  | 0.942 | 0.888 | 0.837 | 0.790 | 0.746 | 0.705 | 0.666 | 0.630 | 0.596 | 0.564 | 0.535 | 0.507 |
| 7  | 0.933 | 0.871 | 0.813 | 0.760 | 0.711 | 0.665 | 0.623 | 0.583 | 0.547 | 0.513 | 0.482 | 0.452 |
| 8  | 0.923 | 0.853 | 0.789 | 0.731 | 0.677 | 0.627 | 0.582 | 0.540 | 0.502 | 0.467 | 0.434 | 0.404 |
| 9  | 0.914 | 0.837 | 0.766 | 0.703 | 0.645 | 0.592 | 0.544 | 0.500 | 0.460 | 0.424 | 0.391 | 0.361 |
| 10 | 0.905 | 0.820 | 0.744 | 0.676 | 0.614 | 0.558 | 0.508 | 0.463 | 0.422 | 0.386 | 0.352 | 0.322 |
| 11 | 0.896 | 0.804 | 0.722 | 0.650 | 0.585 | 0.527 | 0.475 | 0.429 | 0.388 | 0.350 | 0.317 | 0.287 |
| 12 | 0.887 | 0.788 | 0.701 | 0.625 | 0.557 | 0.497 | 0.444 | 0.397 | 0.356 | 0.319 | 0.286 | 0.257 |
| 13 | 0.879 | 0.773 | 0.681 | 0.601 | 0.530 | 0.469 | 0.415 | 0.368 | 0.326 | 0.290 | 0.258 | 0.229 |
| 14 | 0.870 | 0.758 | 0.661 | 0.577 | 0.505 | 0.442 | 0.388 | 0.340 | 0.299 | 0.263 | 0.232 | 0.205 |
| 15 | 0.861 | 0.743 | 0.642 | 0.555 | 0.481 | 0.417 | 0.362 | 0.315 | 0.275 | 0.239 | 0.209 | 0.183 |
| 16 | 0.853 | 0.728 | 0.623 | 0.534 | 0.458 | 0.394 | 0.339 | 0.292 | 0.252 | 0.218 | 0.188 | 0.163 |
| 17 | 0.844 | 0.714 | 0.605 | 0.513 | 0.436 | 0.371 | 0.317 | 0.270 | 0.231 | 0.198 | 0.170 | 0.146 |
| 18 | 0.836 | 0.700 | 0.587 | 0.494 | 0.416 | 0.350 | 0.296 | 0.250 | 0.212 | 0.180 | 0.153 | 0.130 |
| 19 | 0.828 | 0.686 | 0.570 | 0.475 | 0.396 | 0.331 | 0.277 | 0.232 | 0.194 | 0.164 | 0.138 | 0.116 |
| 20 | 0.820 | 0.673 | 0.554 | 0.456 | 0.377 | 0.312 | 0.258 | 0.215 | 0.178 | 0.149 | 0.124 | 0.104 |
| 25 | 0.780 | 0.610 | 0.478 | 0.375 | 0.295 | 0.233 | 0.184 | 0.146 | 0.116 | 0.092 | 0.074 | 0.059 |
| 30 | 0.742 | 0.552 | 0.412 | 0.308 | 0.231 | 0.174 | 0.131 | 0.099 | 0.075 | 0.057 | 0.044 | 0.033 |
| 40 | 0.672 | 0.453 | 0.307 | 0.208 | 0.142 | 0.097 | 0.067 | 0.046 | 0.032 | 0.022 | 0.015 | 0.011 |
| 50 | 0.608 | 0.372 | 0.228 | 0.141 | 0.087 | 0.054 | 0.034 | 0.021 | 0.013 | 0.009 | 0.005 | 0.003 |

附錄 B \$1 的現值 (續)

| 期數 | 百分比   |       |       |       |       |       |       |       |       |       |       |       |       |
|----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|    | 13%   | 14%   | 15%   | 16%   | 17%   | 18%   | 19%   | 20%   | 25%   | 30%   | 35%   | 40%   | 50%   |
| 1  | 0.885 | 0.877 | 0.870 | 0.862 | 0.855 | 0.847 | 0.840 | 0.833 | 0.800 | 0.769 | 0.741 | 0.714 | 0.667 |
| 2  | 0.783 | 0.769 | 0.756 | 0.743 | 0.731 | 0.718 | 0.706 | 0.694 | 0.640 | 0.592 | 0.549 | 0.510 | 0.444 |
| 3  | 0.693 | 0.675 | 0.658 | 0.641 | 0.624 | 0.609 | 0.593 | 0.579 | 0.512 | 0.455 | 0.406 | 0.364 | 0.296 |
| 4  | 0.613 | 0.592 | 0.572 | 0.552 | 0.534 | 0.515 | 0.499 | 0.482 | 0.410 | 0.350 | 0.301 | 0.260 | 0.198 |
| 5  | 0.543 | 0.519 | 0.497 | 0.476 | 0.456 | 0.437 | 0.419 | 0.402 | 0.328 | 0.269 | 0.223 | 0.186 | 0.132 |
| 6  | 0.480 | 0.456 | 0.432 | 0.410 | 0.390 | 0.370 | 0.352 | 0.335 | 0.262 | 0.207 | 0.165 | 0.133 | 0.088 |
| 7  | 0.425 | 0.400 | 0.376 | 0.354 | 0.333 | 0.314 | 0.296 | 0.279 | 0.210 | 0.159 | 0.122 | 0.095 | 0.059 |
| 8  | 0.376 | 0.351 | 0.327 | 0.305 | 0.285 | 0.266 | 0.249 | 0.233 | 0.168 | 0.123 | 0.091 | 0.068 | 0.039 |
| 9  | 0.333 | 0.300 | 0.284 | 0.263 | 0.243 | 0.225 | 0.209 | 0.194 | 0.134 | 0.094 | 0.067 | 0.048 | 0.026 |
| 10 | 0.295 | 0.270 | 0.247 | 0.227 | 0.208 | 0.191 | 0.176 | 0.162 | 0.107 | 0.073 | 0.050 | 0.035 | 0.017 |
| 11 | 0.261 | 0.237 | 0.215 | 0.195 | 0.178 | 0.162 | 0.148 | 0.135 | 0.086 | 0.056 | 0.037 | 0.025 | 0.012 |
| 12 | 0.231 | 0.208 | 0.187 | 0.168 | 0.152 | 0.137 | 0.124 | 0.112 | 0.069 | 0.043 | 0.027 | 0.018 | 0.008 |
| 13 | 0.204 | 0.182 | 0.163 | 0.145 | 0.130 | 0.116 | 0.104 | 0.093 | 0.055 | 0.033 | 0.020 | 0.013 | 0.005 |
| 14 | 0.181 | 0.160 | 0.141 | 0.125 | 0.111 | 0.099 | 0.088 | 0.078 | 0.044 | 0.025 | 0.015 | 0.009 | 0.003 |
| 15 | 0.160 | 0.140 | 0.123 | 0.108 | 0.095 | 0.084 | 0.074 | 0.065 | 0.035 | 0.020 | 0.011 | 0.006 | 0.002 |
| 16 | 0.141 | 0.123 | 0.107 | 0.093 | 0.081 | 0.071 | 0.062 | 0.054 | 0.028 | 0.015 | 0.008 | 0.005 | 0.002 |
| 17 | 0.125 | 0.108 | 0.093 | 0.080 | 0.069 | 0.060 | 0.052 | 0.045 | 0.023 | 0.012 | 0.006 | 0.003 | 0.001 |
| 18 | 0.111 | 0.095 | 0.081 | 0.069 | 0.059 | 0.051 | 0.044 | 0.038 | 0.018 | 0.009 | 0.005 | 0.002 | 0.001 |
| 19 | 0.098 | 0.083 | 0.070 | 0.060 | 0.051 | 0.043 | 0.037 | 0.031 | 0.014 | 0.007 | 0.003 | 0.002 | 0     |
| 20 | 0.087 | 0.073 | 0.061 | 0.051 | 0.043 | 0.037 | 0.031 | 0.026 | 0.012 | 0.005 | 0.002 | 0.001 | 0     |
| 25 | 0.047 | 0.038 | 0.030 | 0.024 | 0.020 | 0.016 | 0.013 | 0.010 | 0.004 | 0.001 | 0.001 | 0     | 0     |
| 30 | 0.026 | 0.020 | 0.015 | 0.012 | 0.009 | 0.007 | 0.005 | 0.004 | 0.001 | 0     | 0     | 0     | 0     |
| 40 | 0.008 | 0.005 | 0.004 | 0.003 | 0.002 | 0.001 | 0.001 | 0.001 | 0     | 0     | 0     | 0     | 0     |
| 50 | 0.002 | 0.001 | 0.001 | 0.001 | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |

Source: Maurice Joy, Introduction to Financial Management (Homewood, Ill.: Richard D. Irwin, 1997).

附錄 C 年金\$1之本利和  $FV_{IFA} = A \frac{[(1+i)^n - 1]}{i}$

| 期數 | 百分比    |        |        |        |        |        |        |        |        |         |         |
|----|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|
|    | 1%     | 2%     | 3%     | 4%     | 5%     | 6%     | 7%     | 8%     | 9%     | 10%     | 11%     |
| 1  | 1.000  | 1.000  | 1.000  | 1.000  | 1.000  | 1.000  | 1.000  | 1.000  | 1.000  | 1.000   | 1.000   |
| 2  | 2.010  | 2.020  | 2.030  | 2.040  | 2.050  | 2.060  | 2.070  | 2.080  | 2.090  | 2.100   | 2.110   |
| 3  | 3.030  | 3.060  | 3.091  | 3.122  | 3.153  | 3.184  | 3.215  | 3.246  | 3.278  | 3.310   | 3.342   |
| 4  | 4.060  | 4.122  | 4.184  | 4.246  | 4.310  | 4.375  | 4.440  | 4.506  | 4.573  | 4.641   | 4.710   |
| 5  | 5.101  | 5.204  | 5.309  | 5.416  | 5.526  | 5.637  | 5.751  | 5.867  | 5.985  | 6.105   | 6.228   |
| 6  | 6.152  | 6.308  | 6.468  | 6.633  | 6.802  | 6.975  | 7.153  | 7.336  | 7.523  | 7.716   | 7.913   |
| 7  | 7.214  | 7.434  | 7.662  | 7.898  | 8.142  | 8.394  | 8.654  | 8.923  | 9.200  | 9.487   | 9.783   |
| 8  | 8.286  | 8.583  | 8.892  | 9.214  | 9.549  | 9.897  | 10.260 | 10.637 | 11.028 | 11.436  | 11.859  |
| 9  | 9.639  | 9.755  | 10.159 | 10.583 | 11.027 | 11.491 | 11.978 | 12.488 | 13.021 | 13.579  | 14.164  |
| 10 | 10.462 | 10.950 | 11.464 | 12.006 | 12.578 | 13.181 | 13.816 | 14.487 | 15.193 | 15.937  | 16.722  |
| 11 | 11.567 | 12.169 | 12.808 | 13.486 | 14.207 | 14.972 | 15.784 | 16.645 | 17.560 | 18.531  | 19.561  |
| 12 | 12.683 | 13.412 | 14.182 | 15.026 | 15.917 | 16.870 | 17.888 | 18.977 | 20.141 | 21.384  | 22.713  |
| 13 | 13.809 | 14.680 | 15.618 | 16.627 | 17.713 | 18.882 | 20.141 | 21.495 | 22.953 | 24.523  | 26.212  |
| 14 | 14.947 | 15.974 | 17.086 | 18.292 | 19.599 | 21.015 | 22.550 | 24.215 | 26.019 | 27.975  | 30.095  |
| 15 | 16.097 | 17.293 | 18.599 | 20.024 | 21.579 | 23.276 | 25.129 | 27.152 | 29.361 | 31.772  | 34.405  |
| 16 | 17.258 | 18.639 | 20.157 | 21.825 | 23.657 | 25.673 | 27.888 | 30.324 | 33.003 | 35.950  | 39.190  |
| 17 | 18.430 | 20.012 | 21.762 | 23.698 | 25.840 | 28.213 | 30.840 | 33.750 | 36.974 | 40.545  | 44.501  |
| 18 | 19.615 | 21.412 | 23.414 | 25.645 | 28.132 | 30.906 | 33.999 | 37.450 | 41.301 | 45.599  | 50.396  |
| 19 | 20.811 | 22.841 | 25.117 | 27.671 | 30.539 | 33.760 | 37.379 | 41.446 | 46.018 | 51.159  | 56.939  |
| 20 | 22.019 | 24.297 | 26.870 | 29.778 | 33.066 | 36.786 | 40.995 | 45.762 | 51.160 | 57.275  | 64.203  |
| 25 | 28.243 | 32.030 | 36.459 | 41.646 | 47.727 | 54.865 | 63.249 | 73.106 | 84.701 | 98.347  | 114.41  |
| 30 | 34.785 | 40.588 | 47.575 | 56.085 | 66.439 | 79.058 | 94.461 | 113.28 | 136.31 | 164.49  | 199.02  |
| 40 | 48.886 | 60.402 | 75.401 | 95.026 | 120.80 | 154.76 | 199.64 | 259.06 | 337.89 | 442.59  | 581.83  |
| 50 | 64.463 | 84.579 | 112.80 | 152.67 | 209.35 | 290.34 | 406.53 | 573.77 | 815.08 | 1,163.9 | 1,668.8 |

附錄 C 年金\$1之本利和 (續)

| 期數 | 百分比     |         |         |         |         |         |          |         |         |         |          |
|----|---------|---------|---------|---------|---------|---------|----------|---------|---------|---------|----------|
|    | 12%     | 13%     | 14%     | 15%     | 16%     | 17%     | 18%      | 19%     | 20%     | 25%     | 30%      |
| 1  | 1.000   | 1.000   | 1.000   | 1.000   | 1.000   | 1.000   | 1.000    | 1.000   | 1.000   | 1.000   | 1.000    |
| 2  | 2.120   | 2.130   | 2.140   | 2.150   | 2.160   | 2.170   | 2.180    | 2.190   | 2.200   | 2.250   | 2.300    |
| 3  | 3.374   | 3.407   | 3.440   | 3.473   | 3.506   | 3.539   | 3.572    | 3.606   | 3.640   | 3.813   | 3.990    |
| 4  | 4.779   | 4.850   | 4.921   | 4.993   | 5.066   | 5.141   | 5.215    | 5.291   | 5.368   | 5.766   | 6.187    |
| 5  | 6.353   | 6.480   | 6.610   | 6.742   | 6.877   | 7.014   | 7.154    | 7.297   | 7.442   | 8.207   | 9.043    |
| 6  | 8.115   | 8.323   | 8.536   | 8.754   | 8.977   | 9.207   | 9.442    | 9.683   | 9.930   | 11.259  | 12.756   |
| 7  | 10.089  | 10.405  | 10.730  | 11.067  | 11.414  | 11.772  | 12.142   | 12.523  | 12.916  | 15.073  | 17.583   |
| 8  | 12.300  | 12.757  | 13.233  | 13.727  | 14.240  | 14.773  | 15.327   | 15.902  | 16.499  | 19.842  | 23.858   |
| 9  | 14.776  | 15.416  | 16.085  | 16.786  | 17.519  | 18.285  | 19.086   | 19.923  | 20.799  | 25.802  | 32.015   |
| 10 | 17.549  | 18.420  | 19.337  | 20.304  | 21.321  | 22.393  | 23.521   | 24.701  | 25.959  | 33.253  | 42.619   |
| 11 | 20.655  | 21.814  | 23.045  | 24.349  | 25.733  | 27.200  | 28.755   | 30.404  | 32.150  | 42.566  | 56.405   |
| 12 | 24.133  | 25.650  | 27.271  | 29.002  | 30.850  | 32.824  | 34.931   | 37.180  | 39.581  | 54.208  | 74.327   |
| 13 | 28.029  | 29.985  | 32.089  | 34.352  | 36.786  | 39.404  | 42.219   | 45.244  | 48.497  | 68.760  | 97.625   |
| 14 | 32.393  | 34.883  | 37.581  | 40.505  | 43.672  | 47.103  | 50.818   | 54.841  | 59.196  | 86.949  | 127.91   |
| 15 | 37.280  | 40.417  | 43.842  | 47.580  | 51.660  | 56.110  | 60.965   | 66.261  | 72.035  | 109.69  | 167.29   |
| 16 | 42.753  | 46.672  | 50.980  | 55.717  | 60.925  | 66.649  | 72.939   | 79.850  | 87.442  | 138.11  | 218.47   |
| 17 | 48.884  | 53.739  | 59.118  | 65.075  | 71.673  | 78.979  | 87.068   | 96.022  | 105.93  | 173.64  | 285.01   |
| 18 | 55.750  | 61.725  | 68.394  | 75.836  | 84.141  | 93.406  | 103.74   | 115.27  | 128.12  | 218.05  | 371.52   |
| 19 | 63.440  | 70.749  | 78.969  | 88.212  | 98.603  | 110.29  | 123.41   | 138.17  | 154.74  | 273.56  | 483.97   |
| 20 | 72.052  | 80.947  | 91.025  | 102.44  | 115.38  | 130.03  | 146.63   | 165.42  | 186.69  | 342.95  | 630.17   |
| 25 | 133.33  | 155.62  | 181.87  | 212.79  | 249.21  | 292.11  | 342.60   | 402.04  | 471.98  | 1,054.8 | 2,348.80 |
| 30 | 241.33  | 293.20  | 356.79  | 434.75  | 530.31  | 647.44  | 790.95   | 966.7   | 1,181.9 | 3,227.2 | 8,730.0  |
| 40 | 767.09  | 1,013.7 | 1,342.0 | 1,779.1 | 2,360.8 | 3,134.5 | 4,163.21 | 5,529.8 | 7,343.9 | 30,089  | 120,393  |
| 50 | 2,400.0 | 3,459.5 | 4,994.5 | 7,217.7 | 10,436  | 15,090  | 21,813   | 31,515  | 45,497  | 280,256 | 165,976  |

附錄 D 年金\$1之現值  $PV_{IFA} \quad PV_A = A \left[ \frac{1 - \frac{1}{(1+i)^n}}{i} \right]$

| 期數 | 百分比    |        |        |        |        |        |        |        |        |       |       |       |
|----|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|-------|
|    | 1%     | 2%     | 3%     | 4%     | 5%     | 6%     | 7%     | 8%     | 9%     | 10%   | 11%   | 12%   |
| 1  | 0.990  | 0.980  | 0.971  | 0.962  | 0.952  | 0.943  | 0.935  | 0.926  | 0.917  | 0.909 | 0.901 | 0.893 |
| 2  | 1.970  | 1.942  | 1.913  | 1.886  | 1.859  | 1.833  | 1.808  | 1.783  | 1.759  | 1.736 | 1.713 | 1.690 |
| 3  | 2.941  | 2.884  | 2.829  | 2.775  | 2.723  | 2.673  | 2.624  | 2.577  | 2.531  | 2.487 | 2.444 | 2.402 |
| 4  | 3.902  | 3.808  | 3.717  | 3.630  | 3.546  | 3.465  | 3.387  | 3.312  | 3.240  | 3.170 | 3.102 | 3.037 |
| 5  | 4.853  | 4.713  | 4.580  | 4.452  | 4.329  | 4.212  | 4.100  | 3.993  | 3.890  | 3.791 | 3.696 | 3.605 |
| 6  | 5.795  | 5.601  | 5.417  | 5.242  | 5.076  | 4.917  | 4.767  | 4.623  | 4.486  | 4.355 | 4.231 | 4.111 |
| 7  | 6.728  | 6.472  | 6.230  | 6.002  | 5.786  | 5.582  | 5.389  | 5.206  | 5.033  | 4.868 | 4.712 | 4.564 |
| 8  | 7.652  | 7.325  | 7.020  | 6.733  | 6.463  | 6.210  | 5.971  | 5.747  | 5.535  | 5.335 | 5.146 | 4.968 |
| 9  | 8.566  | 8.162  | 7.786  | 7.435  | 7.108  | 6.802  | 6.515  | 6.247  | 5.995  | 5.759 | 5.537 | 5.328 |
| 10 | 9.471  | 8.983  | 8.530  | 8.111  | 7.722  | 7.360  | 7.024  | 6.710  | 6.418  | 6.145 | 5.889 | 5.650 |
| 11 | 10.368 | 9.787  | 9.253  | 8.760  | 8.306  | 7.887  | 7.499  | 7.139  | 6.805  | 6.495 | 6.207 | 5.938 |
| 12 | 11.255 | 10.575 | 9.954  | 9.385  | 8.863  | 8.384  | 7.943  | 7.536  | 7.161  | 6.814 | 6.492 | 6.194 |
| 13 | 12.134 | 11.348 | 10.635 | 9.966  | 9.394  | 8.853  | 8.358  | 7.904  | 7.487  | 7.103 | 6.750 | 6.424 |
| 14 | 13.004 | 12.106 | 11.296 | 10.563 | 9.899  | 9.295  | 8.745  | 8.244  | 7.786  | 7.367 | 6.982 | 6.628 |
| 15 | 13.865 | 12.849 | 11.939 | 11.118 | 10.380 | 9.712  | 9.108  | 8.559  | 8.061  | 7.606 | 7.191 | 6.811 |
| 16 | 14.718 | 13.578 | 12.561 | 11.652 | 10.838 | 10.106 | 9.447  | 8.851  | 8.313  | 7.824 | 7.379 | 6.974 |
| 17 | 15.562 | 14.292 | 13.166 | 12.166 | 11.274 | 10.477 | 9.763  | 9.122  | 8.544  | 8.022 | 7.549 | 7.102 |
| 18 | 16.398 | 14.992 | 13.754 | 12.659 | 11.690 | 10.828 | 10.059 | 9.372  | 8.756  | 8.201 | 7.702 | 7.250 |
| 19 | 17.226 | 15.678 | 14.324 | 13.134 | 12.085 | 11.158 | 10.336 | 9.604  | 8.950  | 8.365 | 7.839 | 7.366 |
| 20 | 18.046 | 16.351 | 14.877 | 13.590 | 12.462 | 11.470 | 10.594 | 9.818  | 9.129  | 8.514 | 7.963 | 7.469 |
| 25 | 22.023 | 19.523 | 17.413 | 15.622 | 14.094 | 12.783 | 11.654 | 10.675 | 9.823  | 9.077 | 8.422 | 7.843 |
| 30 | 25.808 | 22.396 | 19.600 | 17.792 | 15.372 | 13.765 | 12.409 | 11.258 | 10.274 | 9.427 | 8.694 | 8.055 |
| 40 | 32.835 | 27.355 | 23.115 | 19.793 | 17.159 | 15.046 | 13.332 | 11.925 | 10.757 | 9.779 | 8.951 | 8.244 |
| 50 | 39.196 | 31.424 | 25.730 | 21.482 | 18.256 | 15.762 | 13.801 | 12.233 | 10.962 | 9.915 | 9.042 | 8.304 |

附錄 D 年金\$1之現值 (續)

| 期數 | 百分比   |       |       |       |       |       |       |       |       |       |       |       |       |
|----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|    | 13%   | 14%   | 15%   | 16%   | 17%   | 18%   | 19%   | 20%   | 25%   | 30%   | 35%   | 40%   | 50%   |
| 1  | 0.885 | 0.877 | 0.870 | 0.862 | 0.855 | 0.847 | 0.840 | 0.833 | 0.800 | 0.769 | 0.741 | 0.714 | 0.667 |
| 2  | 1.668 | 1.647 | 1.626 | 1.605 | 1.585 | 1.566 | 1.547 | 1.528 | 1.440 | 1.361 | 1.289 | 1.224 | 1.111 |
| 3  | 2.361 | 2.322 | 2.283 | 2.246 | 2.210 | 2.174 | 2.140 | 2.106 | 1.952 | 1.816 | 1.696 | 1.589 | 1.407 |
| 4  | 2.974 | 2.914 | 2.855 | 2.798 | 2.743 | 2.690 | 2.639 | 2.589 | 2.362 | 2.166 | 1.997 | 1.849 | 1.605 |
| 5  | 3.517 | 3.433 | 3.352 | 3.274 | 3.199 | 3.127 | 3.058 | 2.991 | 2.689 | 2.436 | 2.220 | 2.035 | 1.737 |
| 6  | 3.998 | 3.889 | 3.784 | 3.685 | 3.589 | 3.498 | 3.410 | 3.326 | 2.951 | 2.643 | 2.385 | 2.168 | 1.824 |
| 7  | 4.423 | 4.288 | 4.160 | 4.039 | 3.922 | 3.812 | 3.706 | 3.605 | 3.161 | 2.802 | 2.508 | 2.263 | 1.883 |
| 8  | 4.799 | 4.639 | 4.487 | 4.344 | 4.207 | 4.078 | 3.954 | 3.837 | 3.329 | 2.925 | 2.598 | 2.331 | 1.922 |
| 9  | 5.132 | 4.946 | 4.772 | 4.607 | 4.451 | 4.303 | 4.163 | 4.031 | 3.463 | 3.019 | 2.655 | 2.379 | 1.948 |
| 10 | 5.426 | 5.216 | 5.019 | 4.833 | 4.659 | 4.494 | 4.339 | 4.192 | 3.571 | 3.092 | 2.715 | 2.414 | 1.965 |
| 11 | 5.687 | 5.453 | 5.234 | 5.029 | 4.836 | 4.656 | 4.486 | 4.327 | 3.656 | 3.147 | 2.752 | 2.438 | 1.977 |
| 12 | 5.918 | 5.660 | 5.421 | 5.197 | 4.988 | 4.793 | 4.611 | 4.439 | 3.725 | 3.190 | 2.779 | 2.456 | 1.985 |
| 13 | 6.122 | 5.842 | 5.583 | 5.342 | 5.118 | 4.910 | 4.715 | 4.533 | 3.780 | 3.223 | 2.799 | 2.469 | 1.990 |
| 14 | 6.302 | 6.002 | 5.724 | 5.468 | 5.229 | 5.008 | 4.802 | 4.611 | 3.824 | 3.249 | 2.814 | 2.478 | 1.993 |
| 15 | 6.462 | 6.142 | 5.847 | 5.575 | 5.324 | 5.092 | 4.876 | 4.675 | 3.859 | 3.268 | 2.825 | 2.484 | 1.995 |
| 16 | 6.604 | 6.265 | 5.954 | 5.668 | 5.405 | 5.162 | 4.938 | 4.730 | 3.887 | 3.283 | 2.834 | 2.489 | 1.997 |
| 17 | 6.729 | 6.373 | 6.047 | 5.749 | 5.475 | 5.222 | 4.988 | 4.775 | 3.910 | 3.295 | 2.840 | 2.492 | 1.998 |
| 18 | 6.840 | 6.467 | 6.128 | 5.818 | 5.534 | 5.273 | 5.033 | 4.812 | 3.928 | 3.304 | 2.844 | 2.494 | 1.999 |
| 19 | 6.938 | 6.550 | 6.198 | 5.877 | 5.584 | 5.316 | 5.070 | 4.843 | 3.942 | 3.311 | 2.848 | 2.496 | 1.999 |
| 20 | 7.025 | 6.623 | 6.259 | 5.929 | 5.628 | 5.353 | 5.101 | 4.870 | 3.954 | 3.316 | 2.850 | 2.497 | 1.999 |
| 25 | 7.330 | 6.873 | 6.464 | 6.097 | 5.766 | 5.467 | 5.195 | 4.948 | 3.985 | 3.329 | 2.856 | 2.499 | 2.000 |
| 30 | 7.496 | 7.003 | 6.566 | 6.177 | 5.829 | 5.517 | 5.235 | 4.979 | 3.995 | 3.332 | 2.857 | 2.500 | 2.000 |
| 40 | 7.634 | 7.105 | 6.642 | 6.233 | 5.871 | 5.548 | 5.258 | 4.997 | 3.999 | 3.333 | 2.857 | 2.500 | 2.000 |
| 50 | 7.675 | 7.133 | 6.661 | 6.246 | 5.880 | 5.554 | 5.262 | 4.999 | 4.000 | 3.333 | 2.857 | 2.500 | 2.000 |