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# ACCA－Paper F9 <br> Financial Management <br> June 2015 <br> Final assessment 

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1 When commenting about the script performance，please ensure on individual questions and on overall assessment your comments cover areas of examination technique including：

| －Time management | －Handwriting | －Presentation and layout | －Use of English |
| :---: | :---: | :---: | :---: |
| －Points clearly and concisely made | －Relevance of answers to question | －Coverage and depth of answer | －Accuracy of calculations |
| －Calculations cross－referenced to workings | －All parts of the requirement attempted | －Length of answers equates to marks available | －Read the question carefully |

For each question，please provide suitable constructive comments

| Question <br> Number | General Comments | Exam Technique Comments |
| :--- | :--- | :--- |
|  |  |  |
|  |  |  |

## ACCA FINAL ASSESSMENT

## Financial Management

## June 2015

## Time allowed

Reading and planning： 15 minutes；
Writing：
3 hours
This paper is divided into two sections：
SECTION A－ALL TWENTY questions are compulsory and MUST be attempted

SECTION B－ALL FIVE questions are compulsory and MUST be attempted

ALL questions are compulsory and MUST be attempted
Formulae Sheet，Present Value and Annuity Tables are on pages 12， 13 and 14

Do NOT open this paper until instructed by the supervisor．
During reading and planning time only the question paper may be annotated．You must NOT write in your answer booklet until instructed by the supervisor．

This question paper must not be removed from the examination hall．

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## SECTION A

## ALL TWENTY questions are compulsory and MUST be attempted

Please use the space provided on the inside cover of the Candidate Answer Booklet to indicate your chosen answer to each multiple choice question．

Each question is worth two marks．

1 A company＇s capital structure is as follows：

|  | $\$ m$ |
| :--- | ---: |
| 20m ordinary shares（50c） | 10 |
| Reserves | 4 |
| $11 \%$ loan notes 20X4 | 7 |

The loan notes are redeemable at nominal value in 20X4．Current market prices for the company＇s securities are：50c ordinary shares，280c；11\％loan notes 20X4，100．The company is paying corporation tax at a rate of $30 \%$ ．The cost of the company＇s equity capital has been estimated at $12 \%$ pa．

What is the company＇s per annum weighted average cost of capital for investment appraisal purposes？

A $12.1 \%$
B 11．52\％
C $11.1 \%$
D 8．5\％

2 The management of XYZ Co has annual credit sales of \＄20 million and accounts receivable of $\$ 5$ million．Working capital is financed by an overdraft at $12 \%$ interest per year． Assume 365 days in a year．

What is the annual finance cost saving if the management reduces the collection period to 60 days？

A $\$ 203,760$
B $\$ 394,521$
C $\$ 78,904$
D $\$ 68,384$

3 The following information has been calculated for D Co：

| Trade receivables collection period | 50 days |
| :--- | :--- |
| Raw material inventory turnover period | 21 days |
| Work in progress inventory turnover period | 14 days |
| Trade payables payment period | 45 days |
| Finished goods inventory turnover period | 28 days |

What is the length of the working capital cycle？
A 68 days
B 158 days
C 130 days
D 116 days

4 Which of the following are stakeholder groups for a listed company？
1 Employees
2 Ordinary shareholders
3 The board of directors
4 Trade creditors
A Groups 2， 3 and 4 only
B Groups 1， 2 and 3 only
C Groups 1，2， 3 and 4
D None of these particular groups

5 Arnold Co is contemplating purchasing for $\$ 300,000$ a machine，which will be used to produce 50,000 units of a product per annum for five years．These products will be sold for $\$ 10$ each and unit variable costs are expected to be $\$ 6$ ．Incremental fixed costs are expected to be $\$ 70,000$ per annum for production costs and $\$ \mathbf{2 5 , 0 0 0}$ per annum for selling and administration costs．Arnold Co has a required return of $10 \%$ per annum．

By how many units must the estimate of production and sales volume fall for the project to be regarded as not worthwhile？

| A | 2,875 |
| :--- | :--- |
| B | 6,465 |
| C | 8,115 |
| D | 12,315 |

6 When using the expected value criterion，it is assumed that the individual wants to
A Minimise risk irrespective of the level of return
B Minimise risk for a given level of return
C Maximise return irrespective of the level of risk
D Maximise return for a given level of risk

7 According to Modigliani and Miller the cost of equity will always fall with decreased gearing because

A The firm is less likely to go bankrupt
B Debt is allowable against tax
C The return to shareholders becomes less variable
D The tax shield on debt increases the value of the shareholders＇equity

8 What is the purpose of hedging？
A To protect a profit already made from having undertaken a risky position
B To reduce costs
C To reduce or eliminate exposure to risk
D To make a profit by accepting risk
9 Lytham Co is a UK company，trading in South－East Asia and remitting profits to the UK． The directors are considering methods that they can use to minimise their exposure to foreign exchange risk．

Which of the following will not protect them from exchange risk？
A Matching
B Forward contracts
C Invoicing in Asian local currencies
D Leading and lagging
10 The higher risk of a project can be recognised by decreasing
A The cost of the initial investment of the project
B The estimates of future cash inflows from the project
C The internal rate of return of the project
D The required rate of return of the project
11 An investor，who bases all his investment decisions on information he has gathered from public statements and comments on company plans and performance，is acting as if he believed that the maximum level of efficiency of the capital market is

A Strong
B Semi－strong
C Weak
D Zero

12 A company＇s $6 \%$ irredeemable preference shares of $\$ 1$ each have a market price of 65 c． The company is paying corporation tax of $30 \%$ ．

What is the cost of preference share capital？
A $9.2 \%$
B $6.5 \%$
C $6.0 \%$
D $3.6 \%$

13 Which of the following is not one of the three main types of decision facing the financial manager in a company？

A Dividend decision
B Investment decision
C Income decision
D Financing decision

14 Compared to ordinary secured loan notes，convertible loan notes are
A Likely to be more expensive to service because of their equity component
B Likely to be less expensive to service because of their equity component
C Likely to be more expensive to service because converting to equity requires the holders to make additional payments

D Likely to be less expensive to service because they must rank after ordinary secured loan notes

15 Which of the following is the correct statement of the conclusion of Modigliani and Miller on the relevance of dividend policy？

A All shareholders are indifferent between receiving dividend income and capital gains
B Increase in retentions result in a higher growth rate
C Discounting the dividends is not an appropriate way to value the firm＇s equity
D The value of the shareholders＇equity is determined solely by the firm＇s investment selection criteria

A company is going to take on a project using a mixture of debt and equity finance in an economy where the corporation tax rate is $\mathbf{3 0 \%}$ ．Assuming perfect markets，other than tax，which of the following statements is true about the finance used for the project？

A $\quad \beta_{\mathrm{e}}>\beta_{\mathrm{a}} ;$ WACC＜Cost of equity calculated using $\beta_{\mathrm{a}} ;$ WACC＜Cost of equity calculated using $\beta_{e}$

B $\quad \beta_{\mathrm{e}}<\beta_{\mathrm{a}} ;$ WACC $>$ Cost of equity calculated using $\beta_{\mathrm{a}} ;$ WACC $>$ Cost of equity calculated using $\beta_{e}$

C $\quad \beta_{\mathrm{e}}>\beta_{\mathrm{a}} ;$ WACC＜Cost of equity calculated using $\beta_{\mathrm{a}} ;$ WACC $>$ Cost of equity calculated using $\beta_{e}$

D $\quad \beta_{e}<\beta_{\mathrm{a}} ;$ WACC $>$ Cost of equity calculated using $\beta_{\mathrm{a}} ;$ WACC $<$ Cost of equity calculated using $\beta_{e}$

17 Which of the following is not a source of finance within the Islamic banking model？
A Murabaha
B Sukuk
C Kataba
D Mudaraba

18 A scrip issue with perfect information
A Increases the market price of the share
B Increases individual shareholder wealth
C Decreases the debt／equity ratio of the company
D Decreases earnings per share

19 A company has a＇money＇cost of capital of 19\％per annum．The inflation rate is currently estimated at $6 \%$ per annum．

What is the＇real＇cost of capital？
A $12.26 \%$
B $13.0 \%$
C $11.35 \%$
D 10．11\％

20 All of the following are variables that can be manipulated to affect fiscal policy except
A personal taxes
B government expenditure on goods and services
C government expenditure on unemployment benefits
D the rate of interest

## SECTION B

## ALL FIVE questions are compulsory and MUST be attempted

1 Explain the term＇agency relationships＇and discuss the conflicts that might exist in the relationships between：
（i）shareholders and managers
（ii）shareholders and creditors．
What steps might be taken to overcome these conflicts？
（Total： 10 marks）

2 The following is an extract from the Statement of Financial Position of Leisure International Co at 30 June 20X4：
\＄000
Ordinary shares of 50c each 5，200
Reserves 4，850
9\％preference shares of \＄1 each 4，500
$14 \%$ irredeemable loan notes 5，000
Total long－term funds
19，550

The ordinary shares are quoted at 80c ex－div．Assume that the market estimate of the next ordinary dividend is 4 c ，growing thereafter at $12 \%$ per annum indefinitely．The preference shares，which are irredeemable，are quoted at 72c and the loan notes are quoted at par． Corporation tax is $35 \%$ ．

## Required：

（a）Use the relevant data above to estimate the company＇s weighted average cost of capital（WACC），i．e．the return required by the providers of the three types of capital，using the respective market values as weighting factors．
（10 marks）
（b）Explain how the capital asset pricing model would be used as an alternative method of estimating the cost of equity，indicating what information would be required and how it would be obtained．
（5 marks）

3 Weather Co has recently taken over many smaller companies，which it now runs as separate divisions．One division，Thunder，has just developed a new product called Lightning and is now considering whether to put it into production．The following information is available：
（i）Costs incurred in the development of Lightning amount to $\$ 480,000$ ．
（ii）Production of Lightning will require the purchase of new machinery at a cost of $\$ 2,400,000$ ，payable on the first day of the new financial year．This machinery is specific to the production of Lightning and will be obsolete and valueless when production ceases．The machinery has a production life of four years and a production capacity of 30,000 units per annum．
（iii）Production costs of Lightning（at year 1 prices）are estimated as follows：

$$
\$
$$

Direct material 8
Direct labour 12
Variable overheads 12
In addition，incremental fixed production costs（at year 1 prices），including straight－ line depreciation on plant and machinery，will amount to $\$ 800,000$ per annum．
（iv）The selling price of Lightning will be $\$ 80$ per unit（at year 1 prices）．Demand is expected to be 25,000 units per annum for the next four years．
（v）The consumer price index is expected to be at $5 \%$ per annum for the next four years and the selling price of Lightning is expected to increase at the same rate．Annual inflation rates for production costs are expected to be as follows：

|  | $\%$ |
| :--- | ---: |
| Direct materials | 4 |
| Direct labour | 10 |
| Variable overheads | 4 |
| Fixed costs | 5 |

（vi）The company＇s cost of capital in money terms is expected to be $15 \%$ ．
（vii）Corporation tax is $30 \%$ and is payable one year in arrears．Tax－allowable depreciation of 25 per cent on a reducing balance is available on capital expenditure．
（viii）This investment will also require an investment in working capital of $\$ 500,000$ payable at the start of the project．This is not expected to change during the life of the investment．

Unless otherwise specified，all costs and revenues should be assumed to arise at the end of each year．

The financial manager has recommended that a discounted cash flow method of project appraisal be used，but some members of the board are reluctant to do this．

## Required：

（a）Calculate the net present value for the proposed investment and comment on your result．
（12 marks）
（b）One of the directors has suggested using payback to assess the investments． Explain to him the advantages and disadvantages of using payback as a method of investment appraisal．
（Total： 15 marks）

4 The current managing director John Grant formed Grant and Co 12 years ago．He is now thinking about retirement and would like to release part of his investment in the company． Some of the other board members are also reaching retirement age and they would like to convert at least part of their shareholdings into cash．The company also needs to raise approximately $\$ 1$ million to finance a major new investment opportunity，which the board believes could contribute further to the long－term success of the company．The board is now considering floatation on the Alternative Investment Market（AIM）as a way of achieving the twin objectives of raising additional finance and releasing part of the board＇s equity investment．The intention is that the directors will sell $25 \%$ of their existing shareholding and issue new shares to raise the $\$ 1$ million of new finance required．The plans are still very much at a preliminary stage．

The following summarised financial data applies to Grant and Co：

|  | $20 \times 4$ | $20 \times 5$ |
| :--- | ---: | ---: |
|  | $\$ 000$ | $\$ 000$ |
| Profit after tax | 427 | 538 |
| Non－current assets： |  |  |
| Land and buildings | 1,450 | 1,350 |
| Plant and equipment（net） | 2,300 | 2,200 |
|  |  |  |
| Current assets： | 1,025 | 1,400 |
| Inventory | 2,325 | 2,575 |
| Total net assets | 750 | 750 |
| Ordinary shares（25 cents） |  |  |

## Additional information

（i）The average price earnings ratio of AIM listed companies in the same industry as Grant is 8.33 ，and average earnings per share is 20 cents．
（ii）The value of freehold land and buildings（never revalued）has fallen by $25 \%$ since purchased due to a recession．
（iii）The replacement cost of plant and equipment is $\$ 1,500,000$ but its current realisable value is $\$ 1,125,000$ ．
（iv）$\$ 180,000$ of inventory is obsolete and could only be sold for $\$ 10,000$ as scrap．

## Required：

Estimate the value of a share in Grant and Co using：
（i）a suitable PE ratio
（ii）an asset based value．
Comment on the reliability of your estimates．
（Total： 10 marks）

5 Trin Co is a UK－based company that has recently invested heavily in new plant and machinery．Some of the machinery was sourced from the US and，as a result，the company must pay $\$ 204,000$ to a US supplier in four months＇time．

The current spot rate between the US\＄and the $£$ is 1.523 ．The finance manager has gathered the following information：
Four month forward rate（\＄per $£$ ） 1.524
One year sterling interest rate（\％）： 5.9
One year dollar interest rate（\％）： 6.45

## Required：

（a）Discuss the differences between transaction risk，translation risk and economic risk．
（3 marks）
（b）（i）Given the interest rate differentials shown，indicate how the dollar might be expected to move relative to sterling over the next year．
（ii）Explain briefly whether or not forecasts of future exchange rates using current interest rate differentials are likely to be accurate．

## FORMULAE SHEET

## Economic order quantity

$$
=\sqrt{\frac{2 \mathrm{C}_{0} \mathrm{D}}{\mathrm{C}_{\mathrm{H}}}}
$$

## Miller－Orr Model

$$
\begin{gathered}
\text { Return point }=\text { Lower limit }+\left(\frac{1}{3} \times \text { spread }\right) \\
\text { Spread }=3\left(\frac{\frac{3}{4} \times \text { Transaction cost } \times \text { Variance of cashflow }}{\text { Interest rate }}\right)^{\frac{1}{4}}
\end{gathered}
$$

## The Capital Asset Pricing Model

$$
E(r)_{j}=R_{f}+\beta_{j}\left(E\left(r_{m}\right)-R_{f}\right)
$$

## The asset beta formula

$$
\beta_{a}=\left(\frac{V_{e}}{\left(V_{e}+V_{d}(1-T)\right)} \beta_{e}\right)+\left(\frac{V_{d}(1-T)}{\left(V_{e}+V_{d}(1-T)\right)} \beta_{d}\right)
$$

## The Growth Model

$$
P_{o}=\frac{D o(1+g)}{\left(r_{e}-g\right)}
$$

## Gordon＇s growth approximation

$$
\mathrm{g}=\mathrm{br} \mathrm{e}_{\mathrm{e}}
$$

The weighted average cost of capital

$$
\text { WACC }=\left(\frac{V_{e}}{V_{e}+V_{d}}\right) k_{e}+\left(\frac{V_{d}}{V_{e}+V_{d}}\right) k_{d}(1-T)
$$

The Fisher formula

$$
(1+i)=(1+r)(1+h)
$$

Purchasing power parity and interest rate parity

$$
S_{1}=S_{0} \times \frac{\left(1+h_{c}\right)}{\left(1+h_{b}\right)} \quad F_{o}=S_{0} \times \frac{\left(1+i_{c}\right)}{\left(1+i_{b}\right)}
$$



## PRESENT VALUE TABLE

Present value of 1 i．e．$(1+r)^{-n}$
Where $\quad r=$ discount rate

$\quad n=$ number of periods until payment
Periods
Discount rates（ $r$ ）

| （n） | $1 \%$ | $2 \%$ | $3 \%$ | $4 \%$ | $5 \%$ | $6 \%$ | $7 \%$ | $8 \%$ | $9 \%$ | $10 \%$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |


| $\mathbf{1}$ | 0.990 | 0.980 | 0.971 | 0.962 | 0.952 | 0.943 | 0.935 | 0.926 | 0.917 | 0.909 | $\mathbf{1}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathbf{2}$ | 0.980 | 0.961 | 0.943 | 0.925 | 0.907 | 0.890 | 0.873 | 0.857 | 0.842 | 0.826 | $\mathbf{2}$ |
| $\mathbf{3}$ | 0.971 | 0.942 | 0.915 | 0.889 | 0.864 | 0.840 | 0.816 | 0.794 | 0.772 | 0.751 | $\mathbf{3}$ |
| $\mathbf{4}$ | 0.961 | 0.924 | 0.888 | 0.855 | 0.823 | 0.792 | 0.763 | 0.735 | 0.708 | 0.683 | $\mathbf{4}$ |
| $\mathbf{5}$ | 0.951 | 0.906 | 0.863 | 0.822 | 0.784 | 0.747 | 0.713 | 0.681 | 0.650 | 0.621 | $\mathbf{5}$ |
|  |  |  |  |  |  |  |  |  |  |  |  |
| $\mathbf{6}$ | 0.942 | 0.888 | 0.837 | 0.790 | 0.746 | 0.705 | 0.666 | 0.630 | 0.596 | 0.564 | $\mathbf{6}$ |
| $\mathbf{7}$ | 0.933 | 0.871 | 0.813 | 0.760 | 0.711 | 0.665 | 0.623 | 0.583 | 0.547 | 0.513 | $\mathbf{7}$ |
| $\mathbf{8}$ | 0.923 | 0.853 | 0.789 | 0.731 | 0.677 | 0.627 | 0.582 | 0.540 | 0.502 | 0.467 | $\mathbf{8}$ |
| $\mathbf{9}$ | 0.914 | 0.837 | 0.766 | 0.703 | 0.645 | 0.592 | 0.544 | 0.500 | 0.460 | 0.424 | $\mathbf{9}$ |
| $\mathbf{1 0}$ | 0.905 | 0.820 | 0.744 | 0.676 | 0.614 | 0.558 | 0.508 | 0.463 | 0.422 | 0.386 | $\mathbf{1 0}$ |
|  |  |  |  |  |  |  |  |  |  |  |  |
| $\mathbf{1 1}$ | 0.896 | 0.804 | 0.722 | 0.650 | 0.585 | 0.527 | 0.475 | 0.429 | 0.388 | 0.350 | $\mathbf{1 1}$ |
| $\mathbf{1 2}$ | 0.887 | 0.788 | 0.701 | 0.625 | 0.557 | 0.497 | 0.444 | 0.397 | 0.356 | 0.319 | $\mathbf{1 2}$ |
| $\mathbf{1 3}$ | 0.879 | 0.773 | 0.681 | 0.601 | 0.530 | 0.469 | 0.415 | 0.368 | 0.326 | 0.290 | $\mathbf{1 3}$ |
| $\mathbf{1 4}$ | 0.870 | 0.758 | 0.661 | 0.577 | 0.505 | 0.442 | 0.388 | 0.340 | 0.299 | 0.263 | $\mathbf{1 4}$ |
| $\mathbf{1 5}$ | 0.861 | 0.743 | 0.642 | 0.555 | 0.481 | 0.417 | 0.362 | 0.315 | 0.275 | 0.239 | $\mathbf{1 5}$ |
|  |  |  |  |  |  |  |  |  |  |  |  |
| （n） | $\mathbf{1 1 \%}$ | $\mathbf{1 2 \%}$ | $\mathbf{1 3 \%}$ | $\mathbf{1 4 \%}$ | $\mathbf{1 5 \%}$ | $\mathbf{1 6 \%}$ | $\mathbf{1 7 \%}$ | $\mathbf{1 8 \%}$ | $\mathbf{1 9 \%}$ | $\mathbf{2 0 \%}$ |  |


| $\mathbf{1}$ | 0.901 | 0.893 | 0.885 | 0.877 | 0.870 | 0.862 | 0.855 | 0.847 | 0.840 | 0.833 | $\mathbf{1}$ |
| ---: | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $\mathbf{2}$ | 0.812 | 0.797 | 0.783 | 0.769 | 0.756 | 0.743 | 0.731 | 0.718 | 0.706 | 0.694 | $\mathbf{2}$ |
| $\mathbf{3}$ | 0.731 | 0.712 | 0.693 | 0.675 | 0.658 | 0.641 | 0.624 | 0.609 | 0.593 | 0.579 | $\mathbf{3}$ |
| $\mathbf{4}$ | 0.659 | 0.636 | 0.613 | 0.592 | 0.572 | 0.552 | 0.534 | 0.516 | 0.499 | 0.482 | $\mathbf{4}$ |
| $\mathbf{5}$ | 0.593 | 0.567 | 0.543 | 0.519 | 0.497 | 0.476 | 0.456 | 0.437 | 0.419 | 0.402 | $\mathbf{5}$ |
|  |  |  |  |  |  |  |  |  |  |  |  |
| $\mathbf{6}$ | 0.535 | 0.507 | 0.480 | 0.456 | 0.432 | 0.410 | 0.390 | 0.370 | 0.352 | 0.335 | $\mathbf{6}$ |
| $\mathbf{7}$ | 0.482 | 0.452 | 0.425 | 0.400 | 0.376 | 0.354 | 0.333 | 0.314 | 0.296 | 0.279 | $\mathbf{7}$ |
| $\mathbf{8}$ | 0.434 | 0.404 | 0.376 | 0.351 | 0.327 | 0.305 | 0.285 | 0.266 | 0.249 | 0.233 | $\mathbf{8}$ |
| $\mathbf{9}$ | 0.391 | 0.361 | 0.333 | 0.308 | 0.284 | 0.263 | 0.243 | 0.225 | 0.209 | 0.194 | $\mathbf{9}$ |
| $\mathbf{1 0}$ | 0.352 | 0.322 | 0.295 | 0.270 | 0.247 | 0.227 | 0.208 | 0.191 | 0.176 | 0.162 | $\mathbf{1 0}$ |
|  |  |  |  |  |  |  |  |  |  |  |  |
| $\mathbf{1 1}$ | 0.317 | 0.287 | 0.261 | 0.237 | 0.215 | 0.195 | 0.178 | 0.162 | 0.148 | 0.135 | $\mathbf{1 1}$ |
| $\mathbf{1 2}$ | 0.286 | 0.257 | 0.231 | 0.208 | 0.187 | 0.168 | 0.152 | 0.137 | 0.124 | 0.112 | $\mathbf{1 2}$ |
| $\mathbf{1 3}$ | 0.258 | 0.229 | 0.204 | 0.182 | 0.163 | 0.145 | 0.130 | 0.116 | 0.104 | 0.093 | $\mathbf{1 3}$ |
| $\mathbf{1 4}$ | 0.232 | 0.205 | 0.181 | 0.160 | 0.141 | 0.125 | 0.111 | 0.099 | 0.088 | 0.078 | $\mathbf{1 4}$ |
| $\mathbf{1 5}$ | 0.209 | 0.183 | 0.160 | 0.140 | 0.123 | 0.108 | 0.095 | 0.084 | 0.074 | 0.065 | $\mathbf{1 5}$ |

## ANNUITY TABLE

Present value of an annuity of 1 i．e．$\frac{1-(1+r)^{-n}}{r}$

$$
\begin{aligned}
\text { Where } & r=\text { discount rate } \\
& n=\text { number of periods }
\end{aligned}
$$

Periods Discount rates（r）

| （n） | $1 \%$ | $2 \%$ | $3 \%$ | $4 \%$ | $5 \%$ | $6 \%$ | $7 \%$ | $8 \%$ | $9 \%$ | $10 \%$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |


| $\mathbf{1}$ | 0.990 | 0.980 | 0.971 | 0.962 | 0.952 | 0.943 | 0.935 | 0.926 | 0.917 | 0.909 | $\mathbf{1}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathbf{2}$ | 1.970 | 1.942 | 1.913 | 1.886 | 1.859 | 1.833 | 1.808 | 1.783 | 1.759 | 1.736 | $\mathbf{2}$ |
| $\mathbf{3}$ | 2.941 | 2.884 | 2.829 | 2.775 | 2.723 | 2.673 | 2.624 | 2.577 | 2.531 | 2.487 | $\mathbf{3}$ |
| $\mathbf{4}$ | 3.902 | 3.808 | 3.717 | 3.630 | 3.546 | 3.465 | 3.387 | 3.312 | 3.240 | 3.170 | $\mathbf{4}$ |
| $\mathbf{5}$ | 4.853 | 4.713 | 4.580 | 4.452 | 4.329 | 4.212 | 4.100 | 3.993 | 3.890 | 3.791 | $\mathbf{5}$ |
|  |  |  |  |  |  |  |  |  |  |  |  |
| $\mathbf{6}$ | 5.795 | 5.601 | 5.417 | 5.242 | 5.076 | 4.917 | 4.767 | 4.623 | 4.486 | 4.355 | $\mathbf{6}$ |
| $\mathbf{7}$ | 6.728 | 6.472 | 6.230 | 6.002 | 5.786 | 5.582 | 5.389 | 5.206 | 5.033 | 4.868 | $\mathbf{7}$ |
| $\mathbf{8}$ | 7.652 | 7.325 | 7.020 | 6.733 | 6.463 | 6.210 | 5.971 | 5.747 | 5.535 | 5.335 | $\mathbf{8}$ |
| $\mathbf{9}$ | 8.566 | 8.162 | 7.786 | 7.435 | 7.108 | 6.802 | 6.515 | 6.247 | 5.995 | 5.759 | $\mathbf{9}$ |
| $\mathbf{1 0}$ | 9.471 | 8.983 | 8.530 | 8.111 | 7.722 | 7.360 | 7.024 | 6.710 | 6.418 | 6.145 | $\mathbf{1 0}$ |
|  |  |  |  |  |  |  |  |  |  |  |  |
| $\mathbf{1 1}$ | 10.37 | 9.787 | 9.253 | 8.760 | 8.306 | 7.887 | 7.499 | 7.139 | 6.805 | 6.495 | $\mathbf{1 1}$ |
| $\mathbf{1 2}$ | 11.26 | 10.58 | 9.954 | 9.385 | 8.863 | 8.384 | 7.943 | 7.536 | 7.161 | 6.814 | $\mathbf{1 2}$ |
| $\mathbf{1 3}$ | 12.13 | 11.35 | 10.63 | 9.986 | 9.394 | 8.853 | 8.358 | 7.904 | 7.487 | 7.103 | $\mathbf{1 3}$ |
| $\mathbf{1 4}$ | 13.00 | 12.11 | 11.30 | 10.56 | 9.899 | 9.295 | 8.745 | 8.244 | 7.786 | 7.367 | $\mathbf{1 4}$ |
| $\mathbf{1 5}$ | 13.87 | 12.85 | 11.94 | 11.12 | 10.38 | 9.712 | 9.108 | 8.559 | 8.061 | 7.606 | $\mathbf{1 5}$ |
|  |  |  |  |  |  |  |  |  |  |  |  |
| （n） | $\mathbf{1 1 \%}$ | $\mathbf{1 2 \%}$ | $\mathbf{1 3 \%}$ | $\mathbf{1 4 \%}$ | $\mathbf{1 5 \%}$ | $\mathbf{1 6 \%}$ | $\mathbf{1 7 \%}$ | $\mathbf{1 8 \%}$ | $\mathbf{1 9 \%}$ | $\mathbf{2 0 \%}$ |  |


| $\mathbf{1}$ | 0.901 | 0.893 | 0.885 | 0.877 | 0.870 | 0.862 | 0.855 | 0.847 | 0.840 | 0.833 | $\mathbf{1}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathbf{2}$ | 1.713 | 1.690 | 1.668 | 1.647 | 1.626 | 1.605 | 1.585 | 1.566 | 1.547 | 1.528 | $\mathbf{2}$ |
| $\mathbf{3}$ | 2.444 | 2.402 | 2.361 | 2.322 | 2.283 | 2.246 | 2.210 | 2.174 | 2.140 | 2.106 | $\mathbf{3}$ |
| $\mathbf{4}$ | 3.102 | 3.037 | 2.974 | 2.914 | 2.855 | 2.798 | 2.743 | 2.690 | 2.639 | 2.589 | $\mathbf{4}$ |
| $\mathbf{5}$ | 3.696 | 3.605 | 3.517 | 3.433 | 3.352 | 3.274 | 3.199 | 3.127 | 3.058 | 2.991 | $\mathbf{5}$ |
|  |  |  |  |  |  |  |  |  |  |  |  |
| $\mathbf{6}$ | 4.231 | 4.111 | 3.998 | 3.889 | 3.784 | 3.685 | 3.589 | 3.498 | 3.410 | 3.326 | $\mathbf{6}$ |
| $\mathbf{7}$ | 4.712 | 4.564 | 4.423 | 4.288 | 4.160 | 4.039 | 3.922 | 3.812 | 3.706 | 3.605 | $\mathbf{7}$ |
| $\mathbf{8}$ | 5.146 | 4.968 | 4.799 | 4.639 | 4.487 | 4.344 | 4.207 | 4.078 | 3.954 | 3.837 | $\mathbf{8}$ |
| $\mathbf{9}$ | 5.537 | 5.328 | 5.132 | 4.946 | 4.772 | 4.607 | 4.451 | 4.303 | 4.163 | 4.031 | $\mathbf{9}$ |
| $\mathbf{1 0}$ | 5.889 | 5.650 | 5.426 | 5.216 | 5.019 | 4.833 | 4.659 | 4.494 | 4.339 | 4.192 | $\mathbf{1 0}$ |
|  |  |  |  |  |  |  |  |  |  |  |  |
| $\mathbf{1 1}$ | 6.207 | 5.938 | 5.687 | 5.453 | 5.234 | 5.029 | 4.836 | 4.656 | 4.486 | 4.327 | $\mathbf{1 1}$ |
| $\mathbf{1 2}$ | 6.492 | 6.194 | 5.918 | 5.660 | 5.421 | 5.197 | 4.988 | 4.793 | 4.611 | 4.439 | $\mathbf{1 2}$ |
| $\mathbf{1 3}$ | 6.750 | 6.424 | 6.122 | 5.842 | 5.583 | 5.342 | 5.118 | 4.910 | 4.715 | 4.533 | $\mathbf{1 3}$ |
| $\mathbf{1 4}$ | 6.982 | 6.628 | 6.302 | 6.002 | 5.724 | 5.468 | 5.229 | 5.008 | 4.802 | 4.611 | $\mathbf{1 4}$ |
| $\mathbf{1 5}$ | 7.191 | 6.811 | 6.462 | 6.142 | 5.847 | 5.575 | 5.324 | 5.092 | 4.876 | 4.675 | $\mathbf{1 5}$ |

