

BU8201

NANYANG TECHNOLOGICAL UNIVERSITY

SPECIAL TERM II EXAMINATION 2015-2016

BU8201 – Business Finance

July 2016

Time Allowed: 2 hours

INSTRUCTIONS

- 1 This paper contains **FOUR(4)** questions and comprises **SIX(6)** pages and **ONE(1)** Appendix 1 of **FIVE(5)** pages.
 - 2 Answer **ALL** questions.
 - 3 The number of marks allocated is shown at the end of each question.
 - 4 Write all your answers to the multiple-choice questions in Question 1 of **Section A** on the same page in your answer book.
 - 5 Begin your answer to each question in **Section B** on a separate page of the answer book.
 - 6 Answers to the questions in **Section B** will be graded for content and appropriate presentation.
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Section A

Question 1

This question consists of TEN(10) multiple-choice questions. Choose only one correct answer from the given choices (A), (B), (C), (D) and (E). Write all answers of this question on the same page in your answer book. Each multiple-choice question carries three(3) marks.

1. Stock X and Stock Y both have an expected return of 10% (the two stocks are not in equilibrium), and both are paying dividend of \$1 per share in the coming year. Which of the following statements is most correct?
 - (A) Both stocks must have the same dividend growth rate.
 - (B) Both stocks must have the same beta.
 - (C) Both stocks must have the same dividend yield.
 - (D) Both stocks must have the same capital gains yield.
 - (E) None of the statements above is correct.

Note: Question No. 1 continues on page 2

Question 1 (continued)

- (2) Which of the following statements is most correct?
- (A) Issuing callable bonds is more risky to the company compared to issuing non-callable bonds.
 - (B) All else equal, investing in bonds with sinking fund is more risky compared to investing in bonds without sinking fund.
 - (C) All else equal, a callable bond will have higher coupon rate compared to a non-callable bond.
 - (D) All else equal, bonds with sinking fund are likely to have higher coupon rate than bonds without sinking fund.
 - (E) Callable bonds and bonds with sinking fund have the same risks, as they both allow the company to buy back the bonds if it chooses to.
- (3) Which of the following statements is most correct?
- (A) Corporate Valuation Model is only suitable for companies that do not pay dividends, and cannot be used for companies that pay dividends.
 - (B) Constant dividend growth model is not suitable if the cost of equity is less than the perpetual dividend growth rate.
 - (C) Stock analysts applying the same valuation method on the same stock will usually arrive at the same or similar stock value.
 - (D) The cost of equity is used as the discount rate in both the Dividend Discount Model and the Corporate Valuation Model.
 - (E) Dividend Discount Model and Corporate Valuation Model would usually arrive at the same or similar stock value.
- (4) Which of the following statements is most correct?
- (A) A project with higher IRR would produce a higher NPV compared to a project with lower IRR.
 - (B) For independent projects with normal cash flows, the IRR method will always arrive at the same accept/reject decision as the NPV method.
 - (C) A project's IRR should be compared to the WACC of the company to arrive at the accept/reject decision, regardless of the risk of the project compared to that of the company.
 - (D) The MIRR of a project will always be lower than the IRR of the project.
 - (E) None of the above statements is correct.
- (5) Which one of the following statements is most correct?
- (A) It is not possible for a stock's required return to be lower than the risk-free rate.
 - (B) It is common for a stock's actual or realized return to be different from its expected return and its required return.

Note: Question No. 1 continues on page 3

Question 1 (continued)

- (C) A stock with zero beta is preferred compared to a stock with a negative beta, because the former is less risky.
 - (D) If two stocks have the same beta, then their returns will also have the same correlation with the returns of the market.
 - (E) A stock with beta of 0.8 will move by the same quantum as another stock with beta of -0.8, and hence they have the same market risk.
- (6) A 20-year bond was issued 5 years ago at par value of \$1,000. The bond has semiannual coupon of 6%, and its current market price is \$920. Given this, which of the following statements is most correct?
- (A) The YTM for this bond is higher than 6%.
 - (B) The bond value will reach \$1,000 in 15 years if there is no default.
 - (C) If interest rate for this bond remains unchanged at its current level, the bond price will appreciate every year till maturity.
 - (D) Only (A) and (B) are correct.
 - (E) (A), (B) and (C) are correct.
- (7) If Stock A has a beta of 2 and Stock B has a beta of -2, which of the following is most correct?
- (A) If Stock's A required return is 12%, the Stock B's required return will be -12%.
 - (B) The standard deviation of Stock A's returns will be the same as that of Stock B.
 - (C) The market price of Stock A and Stock B in any year will always move in opposite direction.
 - (D) The price of both stocks will fluctuate by the same dollar amount, except that they fluctuate in opposite direction.
 - (E) None of the above statements is correct.
- (8) Which one of the following statements is most correct?
- (A) The NPV and MIRR methods will always lead to the same choice when analyzing two mutually exclusive projects.
 - (B) MIRR is better than IRR because it is easier to compute and its assumed reinvestment rate is more realistic.
 - (C) The NPV method is always better and more convenient than the IRR method when used to analyze independent or mutually exclusive projects.
 - (D) If a project's IRR is less than the WACC, its MIRR will be higher than its IRR.
 - (E) The discounted payback period could be shorter than the payback period under some circumstances, even if the discount rate remains positive.

Note: Question No. 1 continues on page 4

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Question 1 (continued)

- (9) Which one of the following should **NOT** be included in the capital budgeting analysis for a new product?
- (A) The sale of the new product will cause some customers to switch from one of the company's existing products.
 - (B) The project will have to occupy the space that the company is currently generating rental income.
 - (C) The company has spent \$200,000 on collection of market data relating to the demand of the new product.
 - (D) A competing product produced by a competitor that may affect the sales of the new product.
 - (E) The new product will stimulate sales of some of the company's other products.
- (10) Which of the following statements is most **INCORRECT**?
- (A) Stock repurchases can be used by a company to distribute cash to its shareholders, and also as a means to change its capital structure.
 - (B) Stock repurchases can be used to distribute large one-time cash generated by the company in a particular year (such as sale of a business division) without having to increase its regular dividend.
 - (C) Stock repurchases do not force shareholders to sell their shares but allow them to decide whether or not to receive the distribution.
 - (D) Stock repurchases would generally cause shareholders to pay more tax than distribution through cash dividends, because shareholders tend to achieve higher gains in stock repurchases.
 - (E) Stock repurchases will cause the equity and the number of shares of the company to be reduced.

(TOTAL: 30 marks)

Section B

Question 2

- (a) You take up a 25-year \$600,000 housing loan from a bank with nominal loan interest rate of 6% per annum. For the monthly payments, the bank has agreed to your request to pay only interest portion of the loan for the first 5 years, and monthly amortized payment will then be made for the remaining 20 years of the loan. How much total dollar interest would you have paid for the entire loan period?

(5 marks)

Note: Question No. 2 continues on page 5

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Question 2 (continued)

- (b) A company achieved a free cash flow of \$10 million last year. For the next 3 years, the company expects the free cash flow to double every year, before growing at a perpetual rate of 5% annually. The company's cost of equity is 14% and its weighted average cost of capital is 10%. The company has issued a total of 20 million common shares. It has total debt with market value of \$500 million, and has no preferred stock. Based on the above information, what is the estimated intrinsic value of this stock?
(5 marks)
- (c) A firm has outstanding callable bonds with current market price of \$1,020. If the company wishes, the bonds can be called at the end of Year 6 at a call price of \$1,080. The bonds have 6% annual coupon rate and coupons are paid semiannually. They also have par value of \$1,000 and still have 10 years to maturity if they are not called. Determine (with appropriate calculations) whether the company is likely to call the bonds, if market interest rates continue to remain unchanged.
(5 marks)
- (d) A 6-year project has an investment cost at Year 0, and cash inflows of \$1.5 million per year for the next 6 years. The appropriate discount rate for the project is 10%. The project's discounted payback is 2.8 years. Compute the MIRR of this project.
(5 marks)

(TOTAL: 20 marks)

Question 3

You plan to invest \$1,000 at the end of every month in an investment account, which is expected to generate an annual return of 8%, compounded monthly. At the end of the first year, however, you plan to withdraw \$3,000 from the investment account to spend on year-end holiday trip. For subsequent years, although your monthly deposits would remain at \$1,000, your annual year-end withdrawal amount will increase by 10% every year to account for higher overseas vacation costs.

- (a) How much will you have in your investment account at the end of the first year (after the year-end withdrawal)?
(6 marks)
- (b) How much will you have in your investment account at the end of 5 years?
(9 marks)

Note: Question No. 3 continues on page 6

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Question 3 (continued)

- (c) To have enough money to make the down payment for an apartment, you want to have a balance of \$100,000 in your investment account by the end of 5 years (after making the final year-end withdrawal for that year). To achieve this, instead of investing \$1,000 at the end of every month in the investment account, how much must your monthly investment be?

(10 marks)

(TOTAL: 25 marks)

Question 4

Reziz Corporation is considering investing in one of the two production systems to manufacture its new product. The following are the details of the two systems:

System A

Investment cost: \$2,000,000

Useful life: 5 years

Annual maintenance cost: \$100,000

Depreciation: Equal annual depreciation over 5 years

Salvage value: \$50,000

System B

Investment cost: \$2,800,000

Useful life: 8 years

Annual maintenance cost: \$40,000

Depreciation: Equal annual depreciation over 8 years

Salvage value: \$120,000

Reziz's equity beta is 1.3. The market return is 13% and the risk-free rate is 4%. Its semiannual-coupon bonds with annual coupon rate of 10.6% are trading at \$1,120 (with par value of \$1,000). The bonds have 8 years to maturity. The company's target capital structure is 50% equity and 50% debt. The applicable tax rate is 35%.

- (a) What is the weighted average cost of capital of Reziz Corporation?
(5 marks)
- (b) If the production systems are not intended to be repeated at the end of their useful lives, which production system should Reziz choose?
(10 marks)
- (c) If Reziz intends to repeat indefinitely the chosen system at the end its useful life, which production system should it choose?
(10 marks)

(TOTAL: 25 marks)

- END OF PAPER -

Appendix 1

Selected Formulas

Chapter 3

$$\text{Stockholders' equity} = \text{Total assets} - \text{Total liabilities}$$

$$\begin{aligned} \text{Net operating working capital} \\ = \text{Current assets} - (\text{Current liabilities} - \text{Notes payable}) \end{aligned}$$

$$\text{Operating income (or EBIT)} = \text{Sales revenue} - \text{Operating costs}$$

$$\text{FCF} = [\text{EBIT}(1-T) + \text{Depreciation}] - (\text{Capital expenditures} + \Delta \text{Net operating working capital})$$

Chapter 4

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

$$\text{Quick, or acid test ratio} = \frac{\text{Current assets} - \text{Inventories}}{\text{Current liabilities}}$$

$$\text{Inventory turnover ratio} = \frac{\text{Sales}}{\text{Inventories}}$$

$$\text{Days sales outstanding (DSO)} = \frac{\text{Receivables}}{\text{Average sales per day}} = \frac{\text{Receivables}}{\text{Annual sales}/365}$$

$$\text{Fixed assets turnover ratio} = \frac{\text{Sales}}{\text{Net fixed assets}}$$

$$\text{Total assets turnover ratio} = \frac{\text{Sales}}{\text{Total assets}}$$

$$\text{Debt ratio} = \frac{\text{Total debt}}{\text{Total assets}}$$

$$\text{Times-interest-earned (TIE) ratio} = \frac{\text{EBIT}}{\text{Interest charges}}$$

$$\text{Operating margin} = \frac{\text{Operating income (EBIT)}}{\text{Sales}}$$

$$\text{Profit margin} = \frac{\text{Net income}}{\text{Sales}}$$

$$\text{Return on total assets (ROA)} = \frac{\text{Net income}}{\text{Total assets}}$$

Note: Appendix 1 continues on page 8

Appendix 1 (continued)

$$\text{Basic Earning Power (BEP)} = \frac{\text{EBIT}}{\text{Total assets}}$$

$$\text{Return on common equity (ROE)} = \frac{\text{Net income}}{\text{Common equity}}$$

$$\text{Price/Earnings (P/E) ratio} = \frac{\text{Price per share}}{\text{Earnings per share}}$$

$$\text{Book value per share} = \frac{\text{Common equity}}{\text{Shares outstanding}}$$

$$\text{Market/Book ratio (M/B)} = \frac{\text{Market price per share}}{\text{Book value per share}}$$

$$\begin{aligned} \text{ROE} &= \text{Profit margin} \times \text{Total assets turnover} \times \text{Equity multiplier} \\ &= \frac{\text{Net income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Total assets}} \times \frac{\text{Total assets}}{\text{Total common equity}} \end{aligned}$$

Chapter 5

$$\text{Future value} = FV_N = PV(1 + I)^N$$

$$\text{Present value} = PV = \frac{FV_N}{(1 + I)^N}$$

$$FVA_N = PMT(1+I)^{N-1} + PMT(1+I)^{N-2} + PMT(1+I)^{N-3} + \dots + PMT(1+I)^0 = PMT \left[\frac{(1+I)^N - 1}{I} \right]$$

$$FVA_{\text{due}} = FVA_{\text{ordinary}} (1 + I)$$

$$PVA_N = \frac{PMT}{(1+I)^1} + \frac{PMT}{(1+I)^2} + \dots + \frac{PMT}{(1+I)^N} = PMT \left[\frac{1 - \frac{1}{(1+I)^N}}{I} \right]$$

$$PVA_{\text{due}} = PVA_{\text{ordinary}} (1 + I)$$

$$\text{PV of a perpetuity} = \frac{PMT}{I}$$

$$PV = \frac{CF_1}{(1+I)^1} + \frac{CF_2}{(1+I)^2} + \dots + \frac{CF_N}{(1+I)^N} = \sum_{t=1}^N \frac{CF_t}{(1+I)^t}$$

Note: Appendix 1 continues on page 9

Appendix 1 (continued)

$$\text{Periodic rate } (I_{\text{PER}}) = \frac{\text{Stated annual rate}}{\text{Number of payments per year}} = \frac{I}{M}$$

$$\text{Effective annual rate (EFF\%)} = \left(1 + \frac{I_{\text{NOM}}}{M}\right)^M - 1.0$$

Chapter 7

$$\begin{aligned} \text{Quoted interest rate (r)} &= r^* + \text{IP} + \text{DRP} + \text{LP} + \text{MRP} \\ &= r_{\text{RF}} + \text{DRP} + \text{LP} + \text{MRP} \end{aligned}$$

Chapter 8

$$\text{Expected rate of return } (\hat{r}) = P_1 r_1 + P_2 r_2 + \dots + P_N r_N = \sum_{i=1}^N P_i r_i$$

$$\text{Standard deviation } = \sigma = \sqrt{\sum_{i=1}^N (r_i - \hat{r})^2 P_i}$$

$$\text{Coefficient of variation } = \text{CV} = \frac{\sigma}{\hat{r}}$$

$$\hat{r}_p = w_1 \hat{r}_1 + w_2 \hat{r}_2 + \dots + w_N \hat{r}_N = \sum_{i=1}^N w_i \hat{r}_i$$

$$b_p = w_1 b_1 + w_2 b_2 + \dots + w_N b_N = \sum_{i=1}^N w_i b_i$$

$$r_i = r_{\text{RF}} + (r_M - r_{\text{RF}}) b_i$$

Chapter 9

$$\begin{aligned} \text{Bond's value } (V_B) &= \frac{\text{INT}}{(1+r_d)^1} + \frac{\text{INT}}{(1+r_d)^2} + \dots + \frac{\text{INT}}{(1+r_d)^N} + \frac{M}{(1+r_d)^N} \\ &= \sum_{t=1}^N \frac{\text{INT}}{(1+r_d)^t} + \frac{M}{(1+r_d)^N} \end{aligned}$$

$$\text{Price of semiannual-coupon bond } (V_B) = \sum_{t=1}^{2N} \frac{\text{INT}/2}{(1+r_d/2)^t} + \frac{M}{(1+r_d/2)^{2N}}$$

Value of stock $(\hat{P}_0) = \text{PV of expected future dividends}$

$$\begin{aligned} &= \frac{D_1}{(1+r_s)^1} + \frac{D_2}{(1+r_s)^2} + \dots + \frac{D_\infty}{(1+r_s)^\infty} \\ &= \sum_{t=1}^{\infty} \frac{D_t}{(1+r_s)^t} \end{aligned}$$

Note: Appendix 1 continues on page 10

Appendix 1 (continued)

Chapter 10

$$\begin{aligned}\text{Constant growth stock: } \hat{P}_0 &= \frac{D_0(1+g)^1}{(1+r_s)^1} + \frac{D_0(1+g)^2}{(1+r_s)^2} + \dots + \frac{D_0(1+g)^\infty}{(1+r_s)^\infty} \\ &= \frac{D_0(1+g)}{r_s - g} = \frac{D_1}{r_s - g}\end{aligned}$$

$$\begin{array}{lcl}\text{Expected rate} & = & \text{Expected} \\ \text{of return} & & \text{dividend yield} \quad + \quad \text{Expected growth rate, or} \\ & & \text{capital gains yield}\end{array}$$

$$\hat{r}_s = \frac{D_1}{P_0} + g$$

$$\text{Growth rate} = (1 - \text{Payout ratio})\text{ROE}$$

$$\text{Return on common equity (ROE)} = \text{Net Income/Common Equity}$$

$$\text{Payout ratio} = \text{Dividends/ Net Income}$$

$$\text{Retention ratio} = 1 - \text{Payout ratio}$$

$$\text{Zero growth stock: } \hat{P}_0 = \frac{D}{r_s}$$

$$\text{Horizon value} = \hat{P}_N = \frac{D_{N+1}}{r_s - g}$$

$$\begin{aligned}\text{Nonconstant growth stock: } \hat{P}_0 &= \frac{D_1}{(1+r_s)^1} + \frac{D_2}{(1+r_s)^2} + \dots + \frac{D_N}{(1+r_s)^N} + \frac{D_{N+1}}{(1+r_s)^{N+1}} + \dots + \frac{D_\infty}{(1+r_s)^\infty} \\ &= \frac{D_1}{(1+r_s)^1} + \frac{D_2}{(1+r_s)^2} + \dots + \frac{D_N}{(1+r_s)^N} + \frac{\hat{P}_N}{(1+r_s)^N} \\ &= \text{PV of nonconstant dividends} + \text{PV of horizon value, } \hat{P}_N\end{aligned}$$

$$\text{Price/Earnings (P/E)} = \text{Price per share/ Earnings per share}$$

$$V_p = \frac{D_p}{r_p} \quad \hat{r}_p = \frac{D_p}{V_p}$$

Chapter 11

$$\text{WACC} = w_d r_d(1 - T) + w_p r_p + w_c r_s$$

$$\text{After-tax cost of debt} = r_d(1 - T)$$

$$\text{Component cost of preferred stock} = r_p = \frac{D_p}{P_p}$$

Note: Appendix 1 continues on page 11

Appendix 1 (continued)

$$r_s = r_{RF} + (r_M - r_{RF})b_i$$

$$r_s = \hat{r}_s = \frac{D_1}{P_0} + \text{Expected } g$$

$$\text{Cost of equity from new stock} = r_e = \frac{D_1}{P_0(1-F)} + g$$

Chapter 12

$$NPV = CF_0 + \frac{CF_1}{(1+r)^1} + \frac{CF_2}{(1+r)^2} + \dots + \frac{CF_N}{(1+r)^N} = \sum_{t=0}^N \frac{CF_t}{(1+r)^t}$$

$$\begin{aligned} \text{IRR: } CF_0 + \frac{CF_1}{(1+IRR)^1} + \frac{CF_2}{(1+IRR)^2} + \dots + \frac{CF_N}{(1+IRR)^N} &= 0 \\ \sum_{t=0}^N \frac{CF_t}{(1+IRR)^t} &= 0 \end{aligned}$$

$$\text{MIRR: } \sum_{t=0}^N \frac{COF_t}{(1+r)^t} = \frac{\sum_{t=0}^N COF_t (1+r)^{N-t}}{(1+MIRR)^N} \quad \text{PV costs} = \frac{TV}{(1+MIRR)^N}$$

Chapter 13

$$\text{Operating cash flows} = \text{EBIT} (1-T) + \text{Depreciation \& Amortization}$$

$$\text{Tax paid on salvaged assets} = (\text{Tax rate})(\text{Salvage value} - \text{Book value})$$

Chapter 15

$$b_L = b_U [1 + (1-T)(D/E)]$$

- END OF APPENDIX 1 -

BU8201 BUSINESS FINANCE

Please read the following instructions carefully:

- 1. Please do not turn over the question paper until you are told to do so. Disciplinary action may be taken against you if you do so.**
2. You are not allowed to leave the examination hall unless accompanied by an invigilator. You may raise your hand if you need to communicate with the invigilator.
3. Please write your Matriculation Number on the front of the answer book.
4. Please indicate clearly in the answer book (at the appropriate place) if you are continuing the answer to a question elsewhere in the book.