NANYANG TECHNOLOGICAL UNIVERSITY

SPECIAL TERM I EXAMINATION 2015-2016

BU8201 – Business Finance

June 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.

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 has a required return of 10%, while Stock Y has a required return of 12%. Which of the following statements is most correct?

   (A) Stock Y must have a higher dividend yield than Stock X.
   (B) If Stock Y and Stock X have the same dividend yield, then Stock Y must have a lower expected capital gains yield than Stock X.
   (C) If Stock X and Stock Y have the same current dividend and the same expected dividend growth rate, then Stock Y must sell for a higher price.
   (D) All of the statements above are correct.

Note: Question No. 1 continues on page 2

Question 1 (continued)

(E) None of the statements above is correct.

(2) If inflation is expected to decrease and investors are becoming more risk averse, how will the Security Market Line (SML) be affected?

(A) SML is likely to shift upwards and its slope is likely to be less steep.
(B) SML is likely to shift downwards and its slope is likely to be less steep.
(C) SML is likely to shift upwards and its slope is likely to be more steep.
(D) SML is likely to shift downwards and its slope is likely to be more steep.
(E) SML is likely to remain unchanged if the decrease in inflation offsets the increase in risk-aversion.

(3) Which of following statements is most correct?

(A) Two bonds having the same risk should yield the same nominal YTM for bond investors.
(B) A zero-coupon bond will not have a market price above its par value.
(C) A discount bond is always a better investment compared to a premium bond.
(D) All else equal, a callable bond will have lower coupon rate compared to a non-callable bond.
(E) All else equal, a bond with sinking fund will have higher coupon rate compared to a bond with no sinking fund provision.

(4) Which of the following statements is most correct?

(A) Projects with positive IRR should be accepted since they offer positive returns.
(B) A project with multiple IRRs should be accepted so long as all of the IRRs exceed the cost of capital.
(C) A project with multiple IRRs should be accepted as long as one of the IRRs exceeds the cost of capital.
(D) Only statements A and B are correct.
(E) None of the above statements is correct.

(5) Which one of the following statements is most correct?

(A) It is not possible to have negative beta for a stock, because such a stock will have negative required return.
(B) A stock's returns which are negatively correlated to the returns of most other stocks will have negative beta.
(C) A stock's returns can be negatively correlated to the returns of the market, and yet have positive beta.

Note: Question No. 1 continues on page 3

Question 1 (continued)

(D) It is better to choose a low-beta stock compared to a high-beta stock, because the former is less risky.
(E) Beta of a stock is determined only by the standard deviation of the stock's returns relative to that of the market.

(6) A company is planning to issue bonds with 8%, semiannual coupon, with par value of $1,000. The bonds will mature in 15 years and will be issued at par. Given this, which of the following statements is most correct?

(A) The bonds will become premium bonds if the market interest rate for the bonds increases.
(B) The bonds will pay ten coupon payments of $80 each.
(C) The bonds will sell at a premium if the market rate is 6%.
(D) One year later, each bond will be worth $1,040 if market interest rate for the bonds remains unchanged.
(E) The final payment for every bond on maturity date will be $1,080.

(7) Which of the following statements regarding CAPM is most correct?

(A) It is only applicable if all investors hold diversified portfolios.
(B) The higher the beta of a stock, the higher is the expected return.
(C) Stocks' actual returns are linearly related to their respective betas.
(D) A stock's beta is usually computed by regressing its past returns against the returns of the market.
(E) The beta of the market portfolio may change if economic conditions change.

(8) Which one of the following statements is most correct?

(A) The NPV method is considered the most superior method in capital budgeting and this is true under all situations.
(B) A project has normal cash flow with investment at Year 0. If the IRR of the project exceeds the cost of capital (the appropriate discount rate for the project), it does not necessary imply that the project's NPV would be positive.
(C) For two independent projects, we should examine the crossover rate before making decision to accept or reject the projects.
(D) When the IRR of a project is equal to the cost of capital, then the project's MIRR would be the same as its IRR.
(E) In practice, the payback method is not useful since it ignores time value of money.

Note: Question No. 1 continues on page 4

Question 1 (continued)

(9) Which one of the following statements regarding cash flows estimation in capital budgeting is most correct?

(A) If the project is expected to make losses in certain years, then no corporate tax effects should be considered in those years.
(B) Interest costs should be treated as cash outflows if the company plans to borrow funds to finance the project.
(C) There should be no tax on salvage if the fixed assets are sold at their book values at the end of the project.
(D) Externalities must be considered, but only if it reduces the cash flows of the project.
(E) If the project utilizes unused valuable assets (such as building and equipment) that are already owned by the company, then no cash outflows relating to those assets need to be estimated.

(10) Which one of the following statements is most **INCORRECT**?

(A) Dividend policy would generally affect stock price even though there are many listed companies who do not pay dividends and yet have valuable stock price.
(B) Share repurchases would generally have tax advantages to shareholders who sell shares in the process.
(C) If shareholders forego dividends, they will be able to enjoy higher capital gains for the stock.
(D) Even when a company makes a significant loss in a year, it can still decide to pay dividend in that year.
(E) Companies must balance between paying too little or too much dividend. The objective is to adopt a dividend policy that maximizes shareholders' wealth.

(TOTAL: 30 marks)

Section B

Question 2

(a) You take up a 20-year housing loan of $500,000 from a bank with nominal loan interest rate of 5% per annum. For the end-of-month installments, the bank has agreed to your request to pay only $3,000 per month in the first 10 years, and $4,000 per month in the subsequent 10 years. Any remaining principal at the end of 20 years will be then be repaid in one single payment. What will be the remaining principal immediately after you have paid the last installment at the end of 20 years?

(5 marks)

Note: Question No. 2 continues on page 5

Question 2 (continued)

(b) Due to cash flow constraints, a company has decided to pay dividend of $1 per share every 4 years (first payment will be made 4 years from now), instead of paying dividend of $0.25 every year. The proposed pattern of dividend payment is expected to continue perpetually. The stock has a beta of 1.5. Risk-free rate is 3% and the market return is 10%. What is the estimated value of this stock?

(5 marks)

(c) A firm issues two types of bonds: zero-bond bonds and 6% semiannual coupon bonds. Both bonds have maturity of 10 years. The zero-coupon bonds have par value of $2,000, whereas the semiannual coupon bonds have par value of $1,000. If the semiannual coupon bonds are each issued at $900, what should be issue price for each of the zero-coupon bonds?

(5 marks)

(d) A 10-year project has an investment cost at Year 0, and cash inflows of $2 million per year for the first 5 years, and cash inflows of $3 million per year for the subsequent 5 years. The appropriate discount rate for the project is 12%, and the project's MIRR is 18%. What is the investment cost of this project?

(5 marks)

(TOTAL: 20 marks)

Question 3

James is 25 years old today, 1 January, and he is embarking on a savings-and-investment plan for his retirement. Every year, he will first deposit $200 at the end of every month in his bank account, and at the end of the year, he will transfer all the money in the savings account, including interest earned, to an investment account (in order to fulfill the minimum annual investment sum required for the investment account). The bank account will earn a nominal interest rate of 3%, compounded monthly, and the investment account is expected to earn 8% annual return, compounded monthly.

(a) How much will James have in his bank account at the end of the first year?

(6 marks)

(b) If James plans to retire when he turns 65 years old, how much will he have in his investment account for retirement?

(7 marks)

Note: Question No. 3 continues on page 6

Question 3 (continued)

(c) If James wishes to be able to make monthly withdraw of $8,000 from his investment account for 20 years in his retirement, with the first withdrawal being made on the day he turns 65 years old, instead of depositing $200 every month, how much must the monthly deposit be under his savings-and investment plan?

(12 marks)

(TOTAL: 25 marks)

Question 4

Detergent manufacturer Garren Corporation has just spent $100,000 on a market study for its new cleaning product, Graze. The company is now considering investing $5 million in fixed assets in a 5-year project to launch Graze in the market. The assets will be depreciated equally over 4 years. An investment of $100,000 in net operating working capital is required at the start of the project, but is expected to be fully recovered when the project ends. Annual sales of Graze is expected to be $3 million per year. Annual operating cost (excluding depreciation cost) is expected to be 50% of sales. Salvage value of the invested assets at the end of the project is expected to be $150,000. According to Garren's assessment, Graze is likely to reduce the after-tax cash flow of the company's other detergent products by $40,000 per year for the next 5 years. Garren's marginal cost of equity is 16% and marginal cost of debt before tax is 8%, and its target capital structure is 40% equity and 60% debt. The applicable tax rate is 30%.

(a) What is the initial cash flow (at t = 0) for the project?

(5 marks)

(b) What are the annual after-tax operating cash flows for the 5-year project?

(8 marks)

(c) What is the terminal cash flow for the project?

(6 marks)

(d) Should the company accept this new project (show appropriate calculations)?

(6 marks)

(TOTAL: 25 marks)

- END OF PAPER -

Appendix 1

Selected Formulas

Chapter 3

Stockholders' equity = Total assets – Total liabilities

Net operating working capital
= Current assets – (Current liabilities – Notes payable)

Operating income (or EBIT) = Sales revenue – Operating costs

FCF = [EBIT(1-T) + Depreciation] – (Capital expenditures + ΔNet 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

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

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

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

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

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

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

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

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

Note: Appendix 1 continues on page 9

Appendix 1 (continued)

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

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

Chapter 7

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

Chapter 8

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

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

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

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

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

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

Chapter 9

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

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

$$\begin{aligned}\text{Value of stock } (\hat{P}_0) &= \text{PVof expected future dividends} \\ &= \frac{D_1}{(1+r_s)^1} + \frac{D_2}{(1+r_s)^2} + \cdots + \frac{D_\infty}{(1+r_s)^\infty} \\ &= \sum_{t=1}^{\infty} \frac{D_t}{(1+r_s)^t}\end{aligned}$$

Note: Appendix 1 continues on page 10

Appendix 1 (continued)

Chapter 10

Constant growth stock: $\hat{P}_0 = \frac{D_0(1+g)^1}{(1+r_s)^1} + \frac{D_0(1+g)^2}{(1+r_s)^2} + \cdots + \frac{D_0(1+g)^\infty}{(1+r_s)^\infty}$

$= \frac{D_0(1+g)}{r_s - g} = \frac{D_1}{r_s - g}$

Expected rate of return = Expected dividend yield + Expected growth rate, or capital gains yield

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

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

Return on common equity (ROE) = Net Income/Common Equity

Payout ratio = Dividends/ Net Income

Retention ratio = 1 – Payout ratio

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

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

Nonconstant growth stock : $\hat{P}_0 = \frac{D_1}{(1+r_s)^1} + \frac{D_2}{(1+r_s)^2} + \cdots + \frac{D_N}{(1+r_s)^N} + \frac{D_{N+1}}{(1+r_s)^{N+1}} + \cdots + \frac{D_\infty}{(1+r_s)^\infty}$

$= \frac{D_1}{(1+r_s)^1} + \frac{D_2}{(1+r_s)^2} + \cdots + \frac{D_N}{(1+r_s)^N} + \frac{\hat{P}_N}{(1+r_s)^N}$

= PV of nonconstant dividends + PV of horizon value, $\hat{P}_N$

Price/Earnings (P/E) = Price per share/ Earnings per share

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

Chapter 11

WACC = $w_d r_d(1 - T) + w_p r_p + w_c r_s$

After-tax cost of debt = $r_d(1 - T)$

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

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

$$IRR: CF_0 + \frac{CF_1}{(1+IRR)^1} + \frac{CF_2}{(1+IRR)^2} + \cdots + \frac{CF_N}{(1+IRR)^N} = 0$$

$$\sum_{t=0}^{N} \frac{CF_t}{(1+IRR)^t} = 0$$

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

Chapter 13

Operating cash flows = EBIT (1-T) + Depreciation & Amortization

Tax paid on salvaged assets = (Tax rate)(Salvage value – Book value)

Chapter 15

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

- 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.