

BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI - K. K. BIRLA GOA CAMPUS

First Semester 2022-23, Comprehensive Examination

Course Title: Security Analysis and Portfolio Management

Course No.: ECON F412, FIN F313

Examination Date: 31-12-2022 (FN)

Max Marks: 45

Section A: Fill in the Blanks (Up to 2 decimal places)

[10*0.5 = 5M]

- 1) The volatility of a stock price is 30% per annum. What is the standard deviation of the percentage price change in one trading day? _____
- 2) Consider the CAPM. The expected return on the market is 18%. The expected return on a stock with a beta of 1.2 is 20%. What is the risk-free rate? _____
- 3) Beta is the slope of SML (True/False) _____
- 4) In CAPM, is there any way to identify the investors who are more risk averse? (Yes/No) _____
- 5) _____ is on the horizontal axis of the Security Market Line?
- 6) _____ is the difference between the performance of an indexing scheme and the benchmark index
- 7) The beta, of a security is equal to the covariance between the security and market returns divided by the variance of the market's returns (True/False) _____
- 8) You believe that stock prices reflect all relevant information including historical stock prices and current public information about the firm, but not information that is only available to insiders. Which form of the EMH you believe? _____
- 9) You want to purchase IBM stock at Rs.80 from your broker using as little of your own money as possible. If the initial margin is 50% and you have Rs.2000 to invest, you will buy 25 shares (True/False) _____
- 10) _____ measures expected rate of return for bond held to maturity.

Section B: Fill in the Blanks (Up to 2 decimal places)

[11*1 = 11M]

- 11) Suppose that a callable bond with a call price of \$1,050 is selling today for \$980. If the yield curve shifts up by .5%, the bond price will fall to \$930. If it shifts down by .5%, the bond price will rise to \$1,010. What is the effective duration _____
- 12) A 9-year bond has a yield of 10% and a duration of 7.194 years. If the market yield changes by 50 basis points, what is the percentage change in the bond's price? _____
- 13) Suppose that two factors have been identified for the U.S. economy: the growth rate of industrial production, IP, and the inflation rate, IR. IP is expected to be 3%, and IR 5%. A stock with a beta of 1 on IP and .5 on IR currently is expected to provide a rate of return of 12%. If industrial production actually grows by 5%, while the inflation rate turns out to be 8%, what is your revised estimate of the expected rate of return on the stock? _____
- 14) The preferred stock of the Clarence Company has a par value of \$100 and a \$9 dividend rate. You require an 11 percent rate of return on this stock. What is the maximum price you would pay for it? _____
- 15) Suppose you want to buy 200 shares of worth \$70 each, but you have only \$5k only with you and plans to borrow the remaining with interest 3%. what will be the return on your investment when the stock price goes to the \$79? _____

16) Assuming the prevailing initial margin requirement is 40%, commissions are ignored, and Bata is selling at Rs. 35 per share, Shayam purchases 3571 shares using the maximum allowable margin. If the maintenance margin is 30%, to what price can Bata's share fall before Shayam will receive a margin call? _____

17) You are considering two assets with the following characteristics.

$$E(R_1) = 0:15 \quad E(\sigma_1) = 0:10 \quad w_1 = 0:5$$

$$E(R_2) = 0:20 \quad E(\sigma_2) = 0:20 \quad w_2 = 0:5$$

if $r_{1,2} = 0.40$, Compute the mean of two portfolios _____

18) Compute the standard deviation of the above two portfolios _____

19) Stock A has a beta of 1.20 and Stock B has a beta of 0.8. Suppose $r_f = 2\%$ and $R_M = 12\%$. According to the CAPM, what are the expected returns for each stock? _____

20) Suppose You invest \$250 in the investment and earn the return \$14 for the period of 5 months. Calculate the Annual HPY _____

21) Bond A is an 8% coupon bond, with a 20-year time to maturity selling at par value. Bond B is an 8% coupon bond, with a 20-year maturity time selling below par value. So, the duration of Bond __ must be shorter when compared to other.

Section C

Q1)

An analyst was trying to calculate the intrinsic value (IV) of ABC Co. stock to provide some investment recommendations (buy, sell) on the stock. ABC Co. just gave (at $t=0$) a dividend of ₹5.00 per share. EPS (Earnings per share) currently (at $t=0$) is ₹20 per share. The company plans to maintain the same (as $t=0$) dividend payout ratio every year for the next four years. The return on retained earnings is expected to be the same as the historical ROE of 20% per annum EAR for all years till perpetuity. After four years, the dividend payout ratio will be 50% every year until perpetuity, with the ROE remaining the same as before (causing the growth rate in dividends to change from 5th year onwards, i.e., 5-6 and so on). The stock of ABC co. was currently trading in the market at ₹80 per share (Market price) after the dividend is paid at $t=0$. (Note: If $IV > \text{Market Stock price}$, buy; if $IV < \text{Market Stock price}$, sell where IV is intrinsic value.). What is the intrinsic value (range in ₹ per share) of the stock today if the discount rate is 30%, and What should the investment recommendation be (buy, sell) for this stock today?

[3 Marks]

Q2) With the help of duration, fill the respective cells.

Yield Change (bp)	Initial Price	New Price		Percentage Change		Comment
		Based on Duration	Actual	Based on Duration	Actual	
10	113.6777		112.2027		-1.3	
-10	113.6777		115.1783		1.32	
200	113.6777		88.4426		-22.2	
-200	113.6777		149.252		31.29	

[3 Marks]

- Q3) a)** Suppose that a corporate bond with a coupon rate of 10% maturing March 1, 2012 is purchased with a settlement date of July 17, 2006. What would the price of this bond be if it is priced to yield 6.5%? **[1.5 Mark]**
- b)** Find the yield-to-maturity for a zero-coupon bond selling for \$274.78 with a maturity value of \$1,000, maturing in 15 years. **[1.5 Mark]**

Q4) You manage a risky portfolio with the expected rate of return of 22% and standard deviation of 25%. The T-Bill rate is 6%. Suppose your client decides to invest in your portfolio a proportion of 'y' of the total investment budget so that the overall portfolio will have an expected rate of return of 18%. Suppose your risky portfolio includes the 25% in stock A, 32% in stock B and 43% in stock C.

- A) What is the proportion of y? **[1.5 Mark]**
- B) What are your client's investment proportions in your three stocks and the T-bill? **[1.5 Mark]**
- C) What is the standard deviation of the rate of return on your client's portfolio? **[1 Mark]**

Q5) My pension plan will pay me 10,000 once a year for a 10-year period. The first payment will come in exactly 5 years. The pension fund wants to immunize its position.

- a) What is the duration of its obligation to me? The current interest rate is 10% per year. **[2.5 Marks]**
- b) If the plan uses 5-year and 20-year zero-coupon bonds to construct the immunized position, how much money ought to be placed in each bond? What will be the face value of the holdings in each zero? **[2.5 Marks]**

Q6) You will be paying \$10,000 a year in tuition expenses at the end of the next 2 years. Bonds currently yield 8%.

- a) What is the present value and duration of your obligation? **[2 Marks]**
- b) What maturity zero-coupon bond would immunize your obligation? **[1 Mark]**
- c) Suppose you buy a zero-coupon bond with value and duration equal to your obligation. Now suppose that rates immediately increase to 9%. What happens to your net position, that is, to the difference between the value of the bond and that of your tuition obligation? What if rates fall to 7%? **[1.5 Mark]**

Q7) Find the market equilibrium rate of return ($E(R_i)$) for assets X, Y, Z:

Asset	R1	Factor Loadings		Transformed Factor Expectations
		bi1	bi2	
X	11%	0.4	2	$\delta_1 = 20\%$
Y	25	1	1.5	$\delta_2 = 8\%$
Z	23	1.5	1	

[1.5 Mark]

Q8) Briefly answer the following

[5*1 = 5M]

- a) Define and discuss the weak-form EMH. Describe the two sets of tests used to examine the weak-form EMH.
- b) Explain how a given investor chooses an optimal portfolio. Will this choice always be a diversified portfolio, or could it be a single asset? Explain your answer.
- c) What are the similarities and differences between the CML and SML as models of the risk-return trade-off?
- d) How can multifactor models be used to help investors understand the relative risk exposures in their portfolios relative to a benchmark portfolio?
- e) Define Market order and Limit order with example.