Q1. An Indian investor obtains USD when the USD is worth INR 80 (direct quote) and invests in a one-year money market security that provides a yield (in USD) of 5 percent. At the end of one year, the investor converts the USD proceeds from the investment back to INR at the prevailing spot rate of INR 84 per USD. You are required to compute effective yield for the investor which incorporates actual yield earned plus exchange rate effect. **[5 Marks]**

Solution:

=(1.05\*1.05)-1=10.25%

Q2. The forecasted returns of two stocks in different economic conditions are as follows: **[1+1+3= 5 Marks]**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Economic Condition | | | | |
|  | Super growth | High growth | Low growth | Stagnation | Recession |
| Probability | 0.30 | 0.25 | 0.20 | 0.15 | 0.1 |
| Return on stock A (%) | 30 | 25 | 20 | 10 | -25 |
| Return on stock B (%) | 20 | 15 | 10 | 5 | -10 |

Calculate the following:

1. What is the expected return and risk if you invest only in stock A?
2. What is the expected return and risk if you invest only in stock B?
3. What is the expected return and risk if you invest in a portfolio consisting of stock A and B in equal proportion?

|  |  |  |  |
| --- | --- | --- | --- |
| **Solution** |  | expected return | standard deviation |
| a | Invest in A | 18.25 | 15.83 |
| b | Invest in B | 11.50 | 8.82 |
| c | Invest in PF | 14.88 | 12.26 |

Q3. Answer the following questions: **[5\*2=10 Marks]**

(a) How much would you have to deposit today to have $10,000 in five years at 6% interest compounded semiannually?

(b) How much would you pay for an investment which will be worth $16,000 in three years? Assume interest is 5%?

(c) If your company borrows $300,000 at 8% interest (per annum) and agrees to repay the loan in 10 equal semiannual payments to include principal plus interest, how much would be the amount of equal semiannual payment?

(d) If you tripled your money in 10 years, what interest rate did you earn?

(e) If you put $5000 in the stock market, how many years would it take you to triple your money if the market is making 12% a year?

Solution:**.**

a. [$7440.94]

b. [$13821]

c. [$36987.28]

d. 11.6%

e. 9.7 years (Use log)

Q4. Consider two five-year bonds with a face value of $1,000 each: **[5\*2=10 Marks]**

Bond A: An 8% coupon bond with a yield to maturity (YTM) of 9%.

Bond B: An 11% coupon bond with a yield to maturity (YTM) of 10%.

Required:

(a) Calculate the Macaulay duration for both bonds and compare their interest rate sensitivity.

(b) Calculate the modified duration for both bonds and compare their interest rate sensitivity.

SOLUTION:

Bond A:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Year** | **Cash Flow** | **PV at 9%** | **Proportion wrt Bond Price** | **Proportion \*Year (t)** |
| 1 | 80 | 73.39 | 0.08 | 0.08 |
| 2 | 80 | 67.33 | 0.07 | 0.14 |
| 3 | 80 | 61.77 | 0.06 | 0.19 |
| 4 | 80 | 56.67 | 0.06 | 0.24 |
| 5 | 1080 | 701.93 | 0.73 | 3.65 |
|  | **CMP** | **961.10** | 1.00 | **4.30** |
|  |  |  | Modified Duration | 3.94 |

Bond B:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Year** | **Cash Flow** | **PV at 10%** | **Proportion wrt Bond Price** | **Proportion \*Year (t)** |
| 1 | 110 | 100.00 | 0.10 | 0.10 |
| 2 | 110 | 90.91 | 0.09 | 0.18 |
| 3 | 110 | 82.64 | 0.08 | 0.24 |
| 4 | 110 | 75.13 | 0.07 | 0.29 |
| 5 | 1110 | 689.22 | 0.66 | 3.32 |
|  | **CMP** | **1037.91** | 1.00 | **4.12** |
|  |  |  | Modified Duration | 3.75 |

**Bond A is more interest rate sensitive.**