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1. **(21 pts) – 7 pts for each**

Consider a consol bond that pays ***iC*** dollars at the ***i-th*** payment date. That is, the payment would be ***C*** dollars at the first payment date, ***2C*** dollars at the second payment date, and so on.

Suppose that the periodic discount rate is ***r***.

(a) Calculate the price of this consol bond.

(b) Calculate the Macaulay Duration of this consol bond.

(c) Let a firm take a short position in this consol bond and want to immunize the interest rate risk of this short position by taking another long position in a zero coupon bond. Try to calculate the proper face value and time to maturity of this zero coupon bond.

2. **(20 pts) – 4 pts for each**

(a) What is the "reinvestment risk"?

(b) Define the "internal rate of return" (IRR).

(c) Explain how to calculate **IRR** through the bisection method.

(d) Explain why **IRR** cannot measure the reinvestment risk.

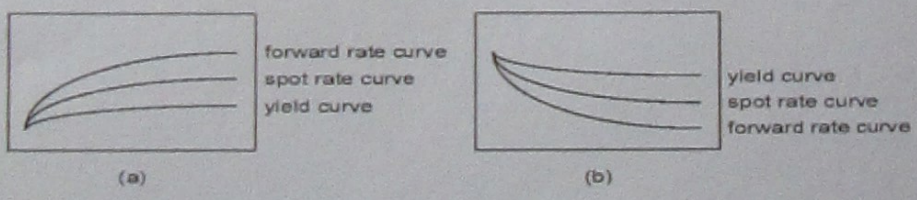
(e) Define "holding period return" and explain the relationship between the reinvestment risk and the holding period return.

3. **(25 pts)**

(a) What is the "bond yield rate"? **(2 pts)**

(b) What is the "zero rate"? **(2 pts)**

(c) Given market bond yield rates, explain how to calculate zero rates through the bootstrap method. **(5 pts)**



(d) As the graphs shown above, prove that the spot rate curve will be above (or below) the yield curve when the shape of the yield curve is normal (or inverted). **(5 pts)**

(e) Define "forward rate". **(2 pts)**

(f) Define "yield spread". **(2 pts)**

(e) Define "static spread". **(2 pts)**

(f) Explain how to calculate the static spread of a corporate bond through the yield spread of that bond and the yield curve implied by the prices of risk free bonds. **(5 pts)**

4. **(14 pts)**

(a) What does the day count convention "30/360" and "actual/actual" mean? **(4 pts)**

(b) Define the "dirty price" **(2 pts)**

(c) Explain how to calculate the dirty price of a bond traded at a date that is not a coupon payment date. **(4 pts)**

(d) Define the "clean price" and the "accrued interest". **(4 pts)**

5. **(20 pts) – 2 pts for each**

Explain the terms below:

(a) Liquidity Preference Theory

(b) tax asymmetry

(c) arbitrage

(d) equivalent rate per annum

(e) Quarterly compounding

(f) humped (yield) curve

(g) Newton-Raphson method

(h) Annuities

(i) dollar duration

(j) Unbiased Expectations Theory