SCHOOL OF FINANCE AND APPLIED STATISTICS

FINANCIAL MATHEMATICS
(STAT 2032 / STAT 6046)

TUTORIAL EXERCISES WEEK 8

Question 1
A fund was valued at:

$5.2m	on 1 January 1999
$5.35m	on 1 April 1999
$5.6m	on 1 July 1999
$5.6m	on 1 October 1999
$5.6m	on 31 December 1999

The only cash flow during 1999 was an injection of $100,000 on 30 June. Calculate
   (a) the money-weighted rate of return
   (b) the time-weighted rate of return

Past Exam Question – 2005 Final Exam Q2(a)
You invest $10,000 in a savings account earning 4.5% p.a. Six months later you invest a further $8,000. Eight months after the initial investment, the interest rate on the savings account changes to 2.5% p.a. Calculate (to 2 decimal places), over the 12 month period after the initial investment, the:

i)   Time Weighted Rate of Return (1 mark)

ii)   Money Weighted Rate of Return (4 marks)

Question 2
A 25 year bond has a face value of $10,000 and is redeemable at $12,000. The bond pays coupons of 8.0% half-yearly. Find the price of the bond if the yield is 6% p.a. effective.

Question 3
A $3,000 bond with annual coupons is selling at an annual effective yield equal to twice the annual coupon rate. The present value of the coupons is equal to the present value of the redemption amount, where redemption is at par. What is the selling price?

Question 4

Smith purchased a 20-year, 8% per annum coupon, $1,000 bond redeemable at par with half-yearly coupons for a purchase price that gave a nominal annual yield to maturity, convertible half-yearly, of 10%. After the 20th coupon (10 years), Smith sells the bond. At what price did he sell the bond if his actual nominal annual yield over the holding period was 10% convertible half-yearly?

Question 5

Two $1,000 bonds redeemable at par at the end of the same period are bought to yield a nominal rate of 6% convertible half-yearly. One bond costs $912.93 and has a coupon rate of 5% pa payable half-yearly. The other bond has a coupon rate of 4% pa payable half-yearly. Find the price of the second bond.

Question 6

An investor purchases a $10,000 bond redeemable at par on 31 December 2018, with 12% p.a. coupons payable half-yearly. Calculate the purchase price of the bond if it was purchased on 30 April 2005 at an effective annual yield of 7.5%.

Question 7

Find the purchase price at 30 June 2005 of a $50,000 nominal bond redeemable at par on 31 December 2010 with a yield of 7.0% p.a. effective (ie. net or gross); under the following conditions:

   a) You are not subject to any tax.
   b) You are subject to tax on income only of 43.5%.
   c) You are subject to tax on income of 43.5% and capital gains of 30%.

Coupons are paid half-yearly at 10% p.a.

Question 8

Find the purchase price at 6 May 2005 of a $10,000 nominal bond redeemable at $15,000 on 31 December 2017 with a net yield of 8.0% p.a. effective. Coupons are paid half-yearly at 5% p.a. You are subject to tax on coupons and capital gains of 33%.

Question 9

A ten-year $100,000 bond redeemable at par is issued with 6% p.a. coupons payable half-yearly. Income tax is payable at a rate of 15%, with tax payments due 4 months after each coupon is received. Find the purchase price of the bond at a net redemption yield of 9% p.a. effective.

Past Exam Question – 2005 Final Exam Q2(b)

Using a net effective quarterly yield of 1.5%, calculate the purchase price of a $100 face value bond, redeemable at $120 in 7 years. Coupons are payable on a half yearly basis at 9% per annum. Tax on coupons and capital gains is at 33%. (4 marks)