Seminar 1
Solutions

A. Short Answer Questions

A1. Corporate goals and wealth (value) maximization

- Maximization of shareholders' wealth is the dominant goal of management in the Anglo-American world.
- In the rest of the world, this perspective still holds true (although to a lesser extent in some countries).
- In Anglo-American markets, this goal is realistic; in many other countries it is not.

Shareholder Wealth Maximization

- In a Shareholder Wealth Maximization model (SWM), a firm should strive to *maximize the return to shareholders*, as measured by the *sum of capital gains and dividends*, for a given level of risk.
- Alternatively, the firm should minimize the level of risk to shareholders for a given rate of return.

A2. The time value of money principle suggests that a certain amount of money today has different buying power than the same amount of money in the future. This notion exists both because there is an opportunity to earn interest on the money and because inflation will drive prices up, thus changing the "value" of the money. The time value of money is the central concept in finance theory.
The first step towards making capital allocating decisions is to develop the mathematical tools of the time value of money. The passage of time between the outflows and inflows in a typical investment situation results in different current values associated with cash flows that occur at different points in time.

B. Multiple Choice Questions

B1. C is correct. We need the future value of a lump sum amount at the end of year 5 which is $66,911.28.
B2. D is correct. We need the future value of an annuity at the end of 7 years which is $33,575.35.
B3. D is correct. We need the unknown interest rate used to value this perpetual cash flow which is 10%.
B4. C is correct. Since the cash flows are received at the beginning of each year we have an annuity due whose present value is $73,460.24.
B5. B is correct. The effective interest rate is given and we need to compute the stated interest rate using the effective interest rate relationship, which is 8.0%.

C. Problems

C1. The present value of each alternative is as follows.

Alternative 2: Since the $1,850 is paid at the end of every year this is an ordinary annuity. Because the cash flows are annual and interest is computed on a monthly basis we first need to compute the effective annual interest rate and then use this rate to obtain the present value of the annual annuity, which is $9,702.98.

Alternative 3: Here we need the monthly interest rate to get the present value of the monthly annuity as $9,885.22.

Alternative 4: Here we need to use the effective interest rate to get the future value of $21,000 at the end of 8 years as $9,467.24.

C2.

a. Amount borrowed = $160,000. Monthly payment = $1,342.71.

b. Interest paid in month 1 = $1,200. Principal repaid in month 1 = $142.71. Principal balance at the end of month 1 = $159,857.29.

See your tutorial notes for the loan's amortization schedule for the first 4 months.

i. The total amount owed at the end of month 4 = $159,422.69.

ii. The total interest paid in month 2 = $1,198.93.

iii. The total principal repaid in month 3 = $144.86.

c. The loan amount outstanding is equal to the present value of the remaining payments and is $132,382.36.

d. re = 9.38%.

C3.

a. r = 10%, t = 5 years
PV (100) = $100/(1+r)^t$ = 100/(1.1)^5 = 62.09
Answer = £62.09

b. r = 6%, t = 6 years
PV (100) = $100/(1+r)^t$ = 100/(1.06)^6 = 70.50
Answer = £70.50

c. r = 9%, t = 15 years
PV (100) = $100/(1+r)^t$ = 100/(1.09)^15 = 27.45
Answer = £27.45

C4. FV = £5000
t = 5
r = 8%
PV = $5000/(1+r)^t$ = 5000/(1.08)^5 = 3402.92

Answer = £3408.92

C5. r = 5%
t = 8
PV = 3000

Simple interest	= 5% x 3000	= 150 p.a.	
Cumulative simple interest	= 150 x t	= 150 x 8	= 1200
Accumulated sum (simple)	= 1200 + 3000 = £4200		

Compound interest
Accumulated sum (compound)= 3000 x (1+r)^^{t} = 3000 x (1+.05)^8 = £4432

C6. FV = PV x (1+r)^^{t}
FV/PV = (1+r)^^{t}
(FV/PV)^(1/t) = 1+r
(FV/PV)^(1/t) -1 = r

PV	Years	FV	FV/PV	(FV/PV)^(1/t)	**r**
£100	3	£109.27	1.0927	1.03	**3%**
£250	10	£447.71	1.79084	1.06	**6%**
£630.17	6	£1000	1.5869	1.08	**8%**

C7. 1+EAR = (1+ APR/t)^^{t}
(1 + EAR)^(1/t) = 1+APR/t
(1 + EAR)^(1/t) - 1 = APR/t
t x((1 + EAR)^(1/t) - 1) = APR
t = # of compounding periods in 1 year

Effective annual Interest rate	Compounding period	APR
16.075%	1 month	12 x ((1.16075)^(1/12) – 1)= 15%
10.38%	3 months	4 x ((1.1038)^(1/4) – 1) = 10%
8.16%	6 months	2 x ((1.0816)^(1/2) – 1) = 8%

C8. PV annuity = C(1/r - 1/r(1+r)^^{t})

a. PV = 1500 + PV annuity
APR = 6%, r = 6%/12 = 0.5%
PV annuity = 250 x (1/(.005) - 1/(.005 x (1+.005)^36)
= 250 x (200 – 167.13)
= 8217.5
Maximum purchase price = 8217.5 + 1500 = £9717.5

b. PV = 1500 + PV annuity

APR = 12%, r = 12%/12 =1%

PV annuity = 250 x (1/(.01) - 1/(.01 x (1+.01)^60)

= 250 x (100 – 55.045)

= 11238.75

Maximum purchase price = 11238.75 + 1500 = £12738.75