Questions:

1. An increasing annuity is payable annually in advance for 5 years.  The first payment is 1500. Calculate the present value of the annuity if:

(a) payments increase by 55 each year

(b) payments increase by 5.5% each year.

You should assume an effective annual rate of interest of 5%.

1. A decreasing annuity is payable annually in advance for 15 years.  The first payment is 10000. Calculate the present value of the annuity if:

(a) payments decrease by 20 each year

(b) payments decrease by 75 each year.

You should assume an effective annual rate of interest of 4%.

1. A decreasing annuity is payable annually in advance for 8 years.  The first payment is 12000. Calculate the present value of the annuity if:

(a) payments increase by 10% each year

(b) payments increase by 5% each year.

You should assume an effective annual rate of interest of 3%.

1. A decreasing annuity is payable annually in advance for 10 years.  The first payment is 9500. Calculate the present value of the annuity if:

(a) payments increase by 20 each year

(b) payments increase by 5% each year.

You should assume an effective annual rate of interest of 4%.

1. Hollie is just about to start a 3‐year course at university and has received a gift of Rs.20,000 from a rich relative.  She invests this money in an account that pays interest at the rate of 3% pa effective.  The account allows a maximum of 4 withdrawals per year. Hollie expects to make withdrawals at the end of each quarter while she is at university (including a withdrawal on completion of her course).  She expects her first withdrawal to be Rs.1,000, and that withdrawals will increase by Rs.100 each quarter.
2. Using the above assumptions, calculate the balance of Hollie’s account at the end of her course.
3. Calculate the amount of the quarterly increase that would make Hollie’s balance fall to zero immediately after her final withdrawal.
4. Anne has been lent Rs. 90000 for her bakery. She invests this money in an account that pays interest at the rate of 4% pa effective. Anne devises a strategy to pay rent for her bakery at the end of every 6 months by making withdrawals from her account twice in a year. She expects her first withdrawal to be Rs.7500, and that withdrawals will increase by Rs.500 every 6 months.
5. Using the above assumptions, calculate the balance of Anne’s account at the end of 5 years.
6. Calculate the amount of the half-yearly increase that would make Anne’s balance fall to zero immediately after her final withdrawal.
7. A 15‐year annuity provides annual payments with the first payment in 4 years’ time.  The amount of the first payment is £5,000. The payment amount changes over time in the following way:

• Following the initial payment of £5,000, payments increase at a rate of 3% pa compound.

• There are 6 compound increases of 3% in total.

• There are no increases for 3 years thereafter.

• The remaining payments decrease at a rate of 2% pa compound.

In the calculations sheet, set up a table of cashflows and calculate the present value of this annuity using a rate of interest of 7% pa effective.

1. A 20‐year annuity provides annual payments with the first payment in 5 years’ time.  The amount of the first payment is £2500. The payment amount changes over time in the following way:

• Following the initial payment of £2500, payments increase at a rate of 2.5% pa compound for 5 years.

• The next 5 years see a payment decrease at a rate of 4% pa compound.

• The next 5 years the payments start to increase again at a rate of 2.5% pa compound.

• The next 5 years the payments start to decrease again at a rate of 4% pa compound.

In the calculations sheet, set up a table of cashflows and calculate the present value of this annuity using a rate of interest of 5% pa effective.