Yong Peng manufactures the exclusive brand of woman's shoes, Jimmy Zhu, in Australia. These shoes are made with the world's finest cork, imported from Portugal. With the fall in the Australian dollar, Yong Peng is worried that the price she pays for her imported cork will rise. As a result, she negotiates a forward contract to buy 100 kilograms of work for AUD$P3 per kilogram in three months' time.

Note that the current market price of cork is AUD$3.15 per kilogram. The current simple interest rate for all loans (and investments) up to three months' duration is 4.2% p.a.

1. Draw a carefully labelled cash flow diagram that represents the cash flows of this forward contract.

Month 1		Current market Price		Profit
• $3* 100Kg = $300	→	• $3.15* 100 Kg = $315	→	• $15

2, Draw a carefully labelled cash flow diagram showing how Young Peng could construct a replicating portfolio to reproduce the cash flows associated with the above forward contract. Include a detailed written description of your forward contract under your diagram. You are not required to calculate the value of the forward contract in this question, only to describe the replicating portfolio.

Month 1

- $3* 100Kg = $300

→

Current market Price

- $3.15* 100 Kg = $315

→

Difference

- $15

Month 4

- 3* 100Kg = $300

→

Current market Price

- current market price* 100 Kg = Total value

→

Difference

- The difference amount

$$M = PV(Holding\ Costs) - PV(Holding\ Benefits)$$

The net cost will be

$$PV(F) = S + M$$

If $PV(F) > S + M$ then the contract is overvalued and it is undervalued if it is $PV(F) < S + M$.

3. What should the arbitrage free price P3 of this forward contract be? Why?

The Price can be calculated using following formula

$$NPV_{actual} = PS * (F_{actual}/100) * (100 * TV / TS)$$

If we apply that formula the contract price of the forward will be $3.18. As the buyer buys at $3 the arbitrage opportunity is not available. This is for hedging purpose only

5. Consider the following floating rate bond: it has a face value of $100. Each half year it pays coupon based on the current market returns over the half year that has just ended. That is, if the market returns 3% from 15 January to 15 July then the bond pays $3. The bond matures in 10 years' time, at which point the $100 face value is returned to the purchaser.

How much would you pay for this floating rate bond? Why?

$$c_i = (r_i + m_q) \cdot \frac{DIP}{DIY} \cdot 100$$

c_i = coupon amount for the i'th coupon period.
r_i = index level (as a percentage) as at the observation date for the i'th reset.
m_q = quoted margin (as a percentage) relative to the index level.
DIP = number of days in the period, based on the selected accrual method.
DIY = number of days in the year, based on the selected accrual method.

Ci = (3%+3%) (181/365)*100

The floating bond rate would be 0.02975 or 2.98%. The 3% amount will not be paid to the bond holders because of the risk it carries as the bond is floating rated.