TREASURY, RISK AND FINANCE PROFESSIONALS

ACT

Examination Paper, Solutions and Examiner's Report

Paper: Certificate in Risk Management

October 2011

SECTION A – Answer TWO COMPULSORY questions

QUESTION 1

Assume today is 1 October 2011.

WIRED Plc has two divisions. The Components Division manufactures computer components and the Consultancy Division undertakes IT consultancy. The Directors of WIRED intend to dispose of the Components Division for an estimated £10 million in approximately three months time. They then intend to reinvest these proceeds in a factory for the Components Division with payment due nine months from now.

As Treasurer of WIRED, you are considering how best to manage the interest risk arising on the investment of the disposal proceeds until such time as they are needed to pay for the factory.

Hedging instruments being considered are the best match of:

A FRA
B at-the-money OTC interest rate option
C out-of-the-money OTC interest rate option

Assume that WIRED can invest at LIBOR minus 1.00% and that six month LIBOR is currently 2.00%.

Market rates as at 1 October 2011 for hedging instruments available to WIRED:

FRAs	
	Price
3v6 FRA	1.85 – 1.95
3v9 FRA	2.05 – 2.15
6v9 FRA	2.25 – 2.35

OTC Interest rate options (182 days) for the period 1 January to 1 July 2012		
Strike price	**Put premium % per annum**	**Call premium % per annum**
1.50%	0.025	0.625
2.00%	0.195	0.295
2.50%	0.540	0.140

Required:

(a) **Compare and contrast the features and risks arising from the use of:**

(i) **FRAs versus interest rate options.**
(ii) **OTC contracts versus exchange traded instruments.**

(7 marks)

(b) **What is the term used to describe the difference between an option's current price and its intrinsic value? Explain how and why this value differs for a call option according to how deeply out of the money it is.**

(3 marks)

(c) **For each of the hedging instruments A, B and C:**

(i) **Construct an effective hedge of WIRED's interest rate exposure, stating the hedge terms obtained in each case.**

(3 marks)

(ii) **Calculate the cash flows arising at the expiry of the hedge, on the hedge instrument alone, for future (outturn) 6 month LIBOR of 1.50%, 2.00% and 2.50%.** ***(Use exact days.)***

(6 marks)

(d) **(i)** **Calculate the all-in rate obtained on the hedged deposit using each of hedging instruments A, B and C and illustrate your results by drawing a graph using the graph paper provided. Use a range of future (outturn) 6 month LIBOR of between 1.00% and 3.00%.**

(5 marks)

(ii) **Discuss what factors WIRED might take into account when deciding which hedging instrument to use.**

(6 marks)

(Total 30 marks)

QUESTION 2

For the purposes of this question, assume it is currently late 2011.

The Treasurer of Company TILLY quotes the latest relevant producer price index (PPI) figure, which indicates inflationary pressure, to support their view that interest rates are likely to change in the near future.

TILLY has:

- £100 million floating rate debt at 6-month LIBOR plus 200 bp maturing on 1 January 2014
- £20 million fixed rate debt at 6% maturing on 1 January 2020

The Treasurer of TILLY proposes to swap half the company's floating rate debt into fixed rate debt for a two year period from 1 January 2012. A bank has offered a two-year swap rate of 5.6% against 6-month LIBOR.

6-month forward rates are as follows:

Start date	**%**
1 January 2012	5.0
1 July 2012	5.3
1 January 2013	5.6
1 July 2013	5.8
1 January 2014	6.0

Required:

(a) Explain:

(i) The theoretical link between inflation and interest rates.
(ii) How a central bank can influence market interest rates.

(4 marks)

(b) (i) Calculate the expected average borrowing rate achieved on the total debt of £120 million both before and after entering into the swap contract.

(5 marks)

(ii) Explain your result in (b) (i) above and state at what average LIBOR rates TILLY would benefit from the swap.

(2 marks)

(c) Explain to the Directors of TILLY the types of risk that might arise from fixing interest rates on long term borrowings.

(5 marks)

(Total 16 marks)

SECTION B – Answer THREE out of four questions

QUESTION 3

Assume today is 1 October 2011.

Company SET entered into a cross currency swap with bank S as follows:

Commencement:	1 October 2010
Term:	4 years
Principal:	GBP 20 million at an exchange rate of GBP/USD 1.6000
Receive:	GBP at 3% annually
Pay:	USD at 5% annually

Under the swap agreement's credit support annex, any change in the value of the swap contract is payable in full on each annual anniversary of the swap.

The swap can be assumed to have zero value on 1 October 2010.

On 1 October 2011, spot and forward rates for 12 month LIBOR were as follows:

Period	**GBP**	**USD**
1 October 2011 – 1 October 2012	3.5%	5.0%
1 October 2012 – 1 October 2013	3.8%	5.2%
1 October 2013 – 1 October 2014	4.0%	5.3%

Assume that today's GBP/USD spot rate remains unchanged at 1.6000 throughout the period of the swap.

Required:

(a) Describe the different dealing methods that companies can use to access the FX markets.

(2 marks)

(b) (i) Explain the different types of counterparty risk arising on cross currency swaps.

(4 marks)

(ii) Explain how counterparty risk arising on cross currency swaps may be managed under an ISDA agreement.

(3 marks)

(c) Calculate:

(i) The GBP value of the swap on 1 October 2011.

(7 marks)

(ii) The settlement due under the swap's credit support annex on 1 October 2011.

(2 marks)

(Total 18 marks)

QUESTION 4

GORDON plc is a multinational manufacturing group. The following is an extract from its latest financial statements:

Liquidity risk

The Group is exposed to liquidity risk as part of its normal financing and trading cycles at times when peak borrowings are required. Borrowings normally peak in March and November following dividend and bond coupon payments. The Group's policies are to ensure that sufficient liquidity is available to meet obligations when they fall due and to maintain sufficient flexibility in order to fund investment and acquisition objectives. Liquidity needs are assessed through short and long term forecasts. Committed bank facilities total £709 million, of which £350 million expire in Jan 2012. There were no drawings on these facilities at 30 June 2011 although £13 million was utilised for Letters of Credit. Committed facilities are provided through 12 banks

Maturity analysis of borrowings, derivatives and other financial liabilities

	Within 1 year £m	One to two years £m	Two to five years £m	More than five years £m	Total £m
30 June 2011					
Borrowings	**(72)**	**(9)**	**(207)**	**(348)**	**(636)**
Contractual interest payments and finance lease charges	**(39)**	**(39)**	**(78)**	**(114)**	**(270)**
Government refundable advances	**-**	**-**	**(3)**	**(53)**	**(56)**
Deferred and contingent consideration	**(6)**	**(6)**	**(24)**	**-**	**(36)**
Derivative financial instruments liabilities - receipts	**182**	**91**	**211**	**145**	**629**
Derivative financial instruments liabilities - payments	**(196)**	**(98)**	**(232)**	**(160)**	**(686)**
30 June 2010					
Borrowings	(97)	(39)	(334)	(352)	(822)
Contractual interest payments and finance lease charges	(50)	(49)	(107)	(144)	(350)
Derivative financial instruments liabilities - receipts	319	111	220	211	861
Derivative financial instruments liabilities - payments	(373)	(133)	(269)	(260)	(1,035)

There is no significant difference in the contractual undiscounted value of other financial liabilities from the amounts stated in the balance sheet and balance sheet notes.

Required:

(a) Describe the reporting requirements for liquidity risk listed in IFRS7.
(4 marks)

(b) (i) Identify and describe five different sources of liquidity risk that GORDON faced on 30 June 2011.
(5 marks)

(ii) For two sources of liquidity risk identified in (b)(i), explain how these risks could be assessed, evaluated and managed.
(9 marks)

(Total 18 marks)

QUESTION 5

VIOLET plc has a defined benefit pension scheme. The Trustees of the pension scheme have recently met to consider their investment strategy for the next financial year. A list of proposed investments has been provided by their advisers with full details of each item, including company beta data.

The equity market capitalisation of VIOLET is approximately GBP 500 million.

The pension scheme comprises:

	GBP million	
Equities	500	
Bonds	200	
Liabilities	(800)	when discounted at 4% over 15 years
Deficit	(100)	

Additional information relating to the pension scheme:

- Movements in equity values can be assumed to be independent of changes in the value of bonds and liabilities.
- Both bonds and liabilities can be assumed to approximate to constant annual cash flows at the end of each of the next 15 years; and therefore to have the same sensitivity to interest rate movements.

In preparation for the next meeting of the Trustees of the pension scheme, Mr Z, a new Trustee has asked you, as a fellow Trustee of the scheme, for an explanation of:

1. Company beta values – what they are and what relevance they might have for the investment decision.

2. The possible future problems and issues that might arise for both the pension scheme and for VIOLET of a large pension deficit at the end of the year.

Required:

(a) Compile a two-way sensitivity table to show the combined impact on the deficit of:

- **discount rate for liabilities of 3%, 4% and 5%; and**
- **change in equity values of -10%, 0% and +10%**

Briefly interpret your results.

(11 marks)

(b) Write a note to Mr Z to address each of his two concerns. No further calculations are required.

(7 marks)

(Total 18 marks)

QUESTION 6

Assume today is 1 October 2011.

WILLIAM plc, a company based in the UK, has just been approached by a South African company to supply a large item of equipment priced in South African Rand (ZAR). WILLIAM would also be responsible for setting up and testing the equipment and some of these costs would be incurred in ZAR. All other costs can be assumed to be denominated in GBP. As Treasurer, you have been asked to join a risk committee to evaluate and manage the risks arising from the contract, with particular focus on currency risk.

Project details:

- A single receipt of ZAR 5 million is due on 1 June 2012.
- WILLIAM's costs consist of GBP 200,000 and ZAR 1 million (also payable on 1 June 2012).

Market rates as at 1 Oct 2011:

GBP/ZAR spot	10.3500-10.3610
8 month forward	583/555

Market rates as at 1 Jan 2012:

GBP/ZAR spot	9.6900 – 9.7010
5 month forward	343/320
7 month forward	498/471

The Marketing Director has suggested that the company should accept and retain the currency risk arising on this contract.

Required:

(a) Discuss the appropriateness of the risk response suggested by the Marketing Director and what alternative risk responses could be considered.

(6 marks)

(b) If the currency exposure on the equipment supply contract is hedged on 1 October 2011 using an appropriate forward contract, calculate:

- **the forward rate on the forward contract**
- **the hedged profit on the equipment supply contract**

(4 marks)

(c) If, on 1 January 2012, WILLIAM learns that the project is delayed and payment is now expected two months later than had been originally anticipated:

(i) State the contract terms and hedge result obtained by unwinding the current forward contract and entering into a replacement contract.

(4 marks)

(ii) Discuss the limitations of the approach in (c)(i) above and what other approaches could be used to extend the hedge.

(4 marks)

(Total 18 marks)

Formulae

Population Variance

$$\text{Variance Var[X]} = \sigma^2 = \frac{\text{Sum of squared differences of observations from the mean}}{\text{Number in population}}$$

Estimated population varian

ce based on a sample

$$\text{Variance Var[X]} = \sigma^2 = \frac{\text{Sum of squared differences of observations from the mean}}{(\text{Number in sample} - 1)}$$

Present value of an annuity

$$PV = \frac{CF}{r} x \left(1 - \frac{1}{(1+r)^n}\right) \text{ or } AF = (1 - DF) \div r$$

Estimated internal rate of return

$$\text{Estimated IRR\%} = a\% + \frac{A}{(A-B)}(b\% - a\%)$$

Lognormal Value at Risk calculation for use with market rates

EQUATION Ia: $\text{Expected Maximum Rate} = e^{Z\sigma\sqrt{T}} \times S_0$

EQUATION Ib: $\text{Expected Minimum Rate} = e^{-Z\sigma\sqrt{T}} \times S_0$

EQUATION IIa: $$Z = \frac{+Ln\left(\frac{\text{Expected Maximum Rate}}{S_0}\right)}{\sigma\sqrt{T}}$$

EQUATION IIb: $$Z = \frac{-Ln\left(\frac{\text{Expected Minimum Rate}}{S_0}\right)}{\sigma\sqrt{T}}$$

Duration

Duration (also known as Macaulay Duration) = $\frac{\text{Sum(t x PV)}}{\text{Sum(PV)}}$

Modified duration

Modified duration = $\frac{\text{Duration}}{(1+r)}$

Convexity

Convexity = $\frac{\text{Sum(t x (t + 1) x PV)}}{\text{Sum(PV)}}$

Modified convexity

$$\text{Modified convexity} = \frac{\text{Convexity}}{(1+r)^2}$$

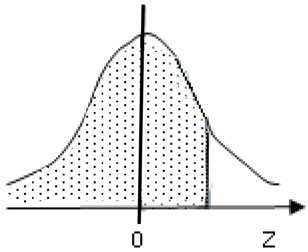
Price sensitivity

% change in value ≈ - modified duration x (change in r) + $^1/_2$ modified convexity x (change in r)^2

The Normal Table - one-tailed distribution

This table is based on the cumulative distribution function Z for the Standard Normal Random Variable for a one-tailed distribution with Z = 0 as the mean.

The table shows the respective probabilities of any outcome up to a given Z value.
The table can be used with interpolation.



Note:

- Z = 2.00 represents a confidence level of 97.7%
- At 95% confidence level, Z = 1.65
- At 99% confidence level, Z = 2.33

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	0.500	0.504	0.508	0.512	0.516	0.520	0.524	0.528	0.532	0.536
0.1	0.540	0.544	0.548	0.552	0.556	0.560	0.564	0.567	0.571	0.575
0.2	0.579	0.583	0.587	0.591	0.595	0.599	0.603	0.606	0.610	0.614
0.3	0.618	0.622	0.626	0.629	0.633	0.637	0.641	0.644	0.648	0.652
0.4	0.655	0.659	0.663	0.666	0.670	0.674	0.677	0.681	0.684	0.688
0.5	0.691	0.695	0.698	0.702	0.705	0.709	0.712	0.716	0.719	0.722
0.6	0.726	0.729	0.732	0.736	0.739	0.742	0.745	0.749	0.752	0.755
0.7	0.758	0.761	0.764	0.767	0.770	0.773	0.776	0.779	0.782	0.785
0.8	0.788	0.791	0.794	0.797	0.800	0.802	0.805	0.808	0.811	0.813
0.9	0.816	0.819	0.821	0.824	0.826	0.829	0.831	0.834	0.836	0.839
1.0	0.841	0.844	0.846	0.848	0.851	0.853	0.855	0.858	0.860	0.862
1.1	0.864	0.867	0.869	0.871	0.873	0.875	0.877	0.879	0.881	0.883
1.2	0.885	0.887	0.889	0.891	0.893	0.894	0.896	0.898	0.900	0.901
1.3	0.903	0.905	0.907	0.908	0.910	0.911	0.913	0.915	0.916	0.918
1.4	0.919	0.921	0.922	0.924	0.925	0.926	0.928	0.929	0.931	0.932
1.5	0.933	0.934	0.936	0.937	0.938	0.939	0.941	0.942	0.943	0.944
1.6	0.945	0.946	0.947	0.948	0.949	0.951	0.952	0.953	0.954	0.954
1.7	0.955	0.956	0.957	0.958	0.959	0.960	0.961	0.962	0.962	0.963
1.8	0.964	0.965	0.966	0.966	0.967	0.968	0.969	0.969	0.970	0.971
1.9	0.971	0.972	0.973	0.973	0.974	0.974	0.975	0.976	0.976	0.977
2.0	0.977	0.978	0.978	0.979	0.979	0.980	0.980	0.981	0.981	0.982
2.1	0.982	0.983	0.983	0.983	0.984	0.984	0.985	0.985	0.985	0.986
2.2	0.986	0.986	0.987	0.987	0.987	0.988	0.988	0.988	0.989	0.989
2.3	0.989	0.990	0.990	0.990	0.990	0.991	0.991	0.991	0.991	0.992
2.4	0.992	0.992	0.992	0.992	0.993	0.993	0.993	0.993	0.993	0.994
2.5	0.994	0.994	0.994	0.994	0.994	0.995	0.995	0.995	0.995	0.995
2.6	0.995	0.995	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996
2.7	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997
2.8	0.997	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998
2.9	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.999	0.999	0.999
3.0	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999
3.1	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999
3.2	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999
3.3	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
3.4	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Suggested Solutions for October 2011

QUESTION 1

(a)(i)

FRAs versus interest rate options:

Counterparty	A FRA is an OTC instrument. An interest rate option might be either an OTC or an exchange traded instrument. OTC instruments, as bilateral contracts, carry counterparty risk. Exchange traded instruments are underwritten collectively by the market.
Nature of the hedge	FRAs fix the interest rate, options give a minimum interest rate and allow the holder to take advantage of any increase in rates above the agreed strike rate.
Cash flow pattern	Only options require the payment of a premium up front
Settlement	Both settle against a reference rate (such as LIBOR) and are a settlement of differences in rates. Where used as a hedging instrument, settlement is therefore independent of the underlying hedged position.

(a)(ii)

OTC contracts v exchange traded instruments:

Counterparty risk	OTC contracts are taken out with a named counterparty and the counterparty risk is against that counterparty. The risk for exchange traded instruments is with the exchange, which in turn is collectively guaranteed by all its members, and is therefore significantly lower.
Margin payments	Margin payments are required daily for exchange traded fixing instruments, reflecting the change in value of the instrument. Settlement is made by a single payment on maturity for OTC contracts.
Ability to unwind	Exchange traded instruments can be sold to / bought back from the exchange and so can be more easily unwound. Unwinding OTC contracts is a matter of negotiation with the relevant counterparty and it is usually cheaper to arrange an equal and opposite contract to cancel out the effect of an unwanted OTC contract rather than dispose of the contract itself.
Customisation	Exchange traded instruments come in standard contract sizes and for standard contract values whereas OTC

	contracts can be set up to exactly match a company's individual requirements.
Price	Exchange traded instruments provide greater price transparency and are cheaper in terms of price. However, the cost of the additional administrative effort involved can outweigh the cost savings for small volumes of deals.

(b)

Time value is the term used to describe the difference between an option's current price and its 'intrinsic value' (the difference between the benchmark rate and the strike rate). Time value is greatest when the underlying price is at or near to the strike price.

If a call option is deeply out of the money, there will only be a small possibility that the underlying price will exceed the strike price on the exercise date and so the time value is comparatively small. In periods of high volatility of interest rates, the time value is generally higher, even for options that are deeply out of the money.

However, if an option is just 'out-of-the-money', there is a good chance that the option will move 'into-the-money' and so the time value will be greater than for options that are deeply 'out-of-the-money'.

(c)(i)

Instrument A
Sell a £10 million 3v9 FRA at a fixed rate of 2.05%.
This instrument fixes a reference interest rate of 2.05%.
[We are told that the company can invest at the reference rate of LIBOR less 1% and so the actual interest rate achieved using hedging Instrument A will be 1.05% (= 2.05% - 1%).]

Instrument B
Buy a £10 million 6 month put option at a strike price of 2.00% and a premium of 0.195%.
This instrument guarantees a minimum reference interest rate of 1.805% after deducting the premium of 0.195%.

Instrument C
Buy a £10 million 6 month put option at a strike price of 1.50% and a premium of 0.025%. Here, the minimum all-in reference interest rate guaranteed is 1.475% after deducting the premium of 0.025%.

(c)(ii)

Days in the period 1 January to 1 July: 31 + 29 + 31 + 30 + 31 + 30 = 182 days

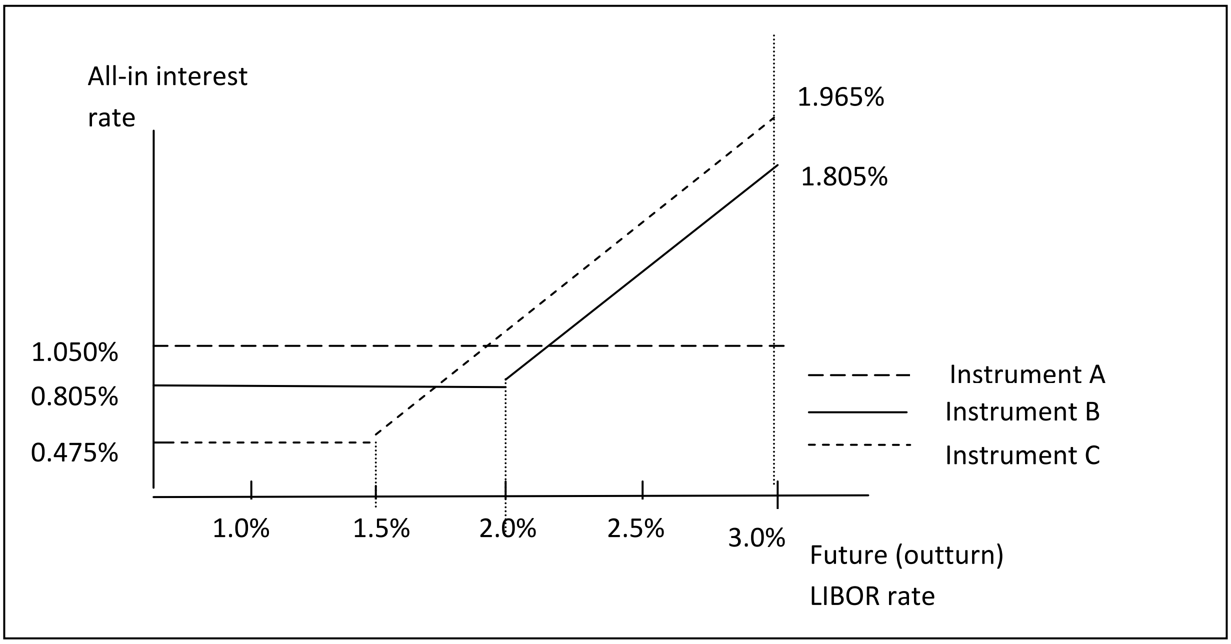
Examiner's note: Strictly, as shown here, the day count should include a 29 day period in February as 2012 is a leap year, and LIBOR is based on an act/365 basis. However, the information that 2012 was a leap year was not given in the question. Full marks were therefore awarded to candidates who based their calculations on either a 181 or 182 day period.

Instrument A (FRA)
Compensation payments on 1 January 2012:
Outturn rate 1.50%:
£10m x (0.0205 – 0.0150)x$^{182}/_{365}$/(1 + 0.015 x$^{182}/_{365}$) = £27,221.06 received
Outturn rate 2.00%:
£10m x (0.0205 – 0.0200) x$^{182}/_{365}$/(1 + 0.020 x$^{182}/_{365}$) = £2,468,53 received
Outturn rate 2.50%:
£10m x (0.0205 – 0.0250) x$^{182}/_{365}$/(1 + 0.025 x$^{182}/_{365}$) = - £22,162.09, that is, £22,162.09 paid

Instrument B (option at strike price of 2.00%)
Payment on expiry on 1 January 2012:
Outturn rate 1.50%:
£10 m x (0.0200 – 0.0150) x$^{182}/_{365}$/(1 + 0.0150 x$^{182}/_{365}$) = £24,746.42 received
Outturn rate 2.00%: none – option not exercised
Outturn rate 2.50%: none – option not exercised

Instrument C (option at strike price of 1.50%)
Payment on expiry on 1 January 2012:
Outturn rate 1.50%: none – option not exercised
Outturn rate 2.00%: none – option not exercised
Outturn rate 2.50%: none – option not exercised

(d)(i)



Workings: *1.050% = 2.05% - 1% (the 1% is the spread)*
0.805% = 2.00% - 1% - 0.195% and 1.805% = 3% - 1% - 0.195%
0.475% = 1.50% - 1% - 0.025% and 1.975% = 3% - 1% - 0.025%

(d)(ii)

The choice of instrument involves a trade-off between risk and reward and this, in turn, depends on the risk appetite of the company and its financial position.

Some important factors that WIRED should consider include:

- Risk appetite: if WIRED is risk averse, it would choose the FRA because this gives a certain result.
- Board policy on what instruments are permitted.
- View on interest rates and flexibility of hedging strategy permitted by Treasury: if the Treasurer believes that interest rates are likely to rise over the next three month period to a greater extent than has been priced by the market, an out-of-the-money option contract may be attractive. This provides some 'worst case' protection whilst minimising the cost of this protection. If the company thought interest rates were likely to be more volatile than the market believed, then an at-the-money option would be attractive.

- How certain the company is about when and if the funds from the planned disposal will be received – an option contract gives more flexibility in the face of uncertainty.

QUESTION 2

(a)(i)

Fisher hypothesised that there was a one to one relationship between nominal interest rates and expected inflation rates.

When measured over a long time period (of several years), empirical evidence reveals a high correlation between historic inflation and nominal interest rates, which supports Fisher's hypothesis, at least over the long term. However, because expected inflation cannot reliably be measured it is impossible to test Fisher's hypothesis directly, and the link between inflation expectations and nominal interest rates in the short term remains unclear.

(a)(ii)

A central bank can influence market interest rates by raising or lowering the official short term interest rate or by quantitative easing (QE).

The official interest rate is the interest rate that banks have to pay on short term borrowings from the central bank to fund temporary cash shortfalls. This rate is an important determinant of the rate at which banks in a country will lend to their customers, which in turn influence a wide variety of other short term rates, such as LIBOR rates.

QE involves the central bank using newly created 'electronic money' to buy assets from the banks. When longer term assets are purchased, this drives up the price of such assets (hence protecting the value of bank's reserves), and drives down long term asset yields, and hence long term interest rates.

Additional material beyond what was required in the exam but that might be of interest to future students:

By swapping assets for cash, QE is also designed to encourage banks to lend - so long as they do not place the cash back on deposit with the central bank. QE may generate inflation, or delay price corrections in mispriced financial assets. QE may also become 'printing money'/'monetizing Government debt', through which Government debt issued to fund current expenditure is then acquired by the central bank in the secondary markets.

(b)(i)

Average LIBOR rate for the 2 year period remaining on the floating rate borrowing is:
(5.0% + 5.3% + 5.6% + 5.8%) / 4 = 5.425%
Average borrowing rate before the hedge:
100/120 x (5.425% + 2%) + 20/120 x 6% = 7.1875%
Average borrowing rate after the hedge is taken into account:
50/120 x (5.425% + 2%) + 50/120 x (5.6% + 2%) + 20/120 x 6% = 7.26%

(b)(ii)

TILLY would benefit from the swap if the average LIBOR rate for the subsequent 2 year period were greater than 5.6%. In this case average LIBOR is expected to be 5.425%, below 5.6%, and so if the market's predictions are correct, TILLY will not benefit financially from the swap.

(c)

The risks involved in fixing interest rates on long term borrowings include:

- The opportunity cost of higher interest payments if market interest rates subsequently fall, leading to higher debt servicing costs than if the borrowings had remained at floating rates.
- Higher average cost of debt in periods where there is a 'normal' shaped yield curve, i.e. where interest rates are higher for longer maturities.
- Competitive disadvantage due to higher debt servicing costs than competitors. For example, if, unlike TILLY, major competitors have floating rate borrowings and are able to pass on interest savings to customers by reducing prices, TILLY risks a competitive disadvantage.
- Higher market value of debt liabilities prior to maturity if interest rates subsequently fall.
- Counterparty risk if the bank counterparty is unable to complete its side of the swap.
- There is also a risk of actually increasing the exposure of TILLY'S bottom line to interest rate movements. It is important to look at TILLY's business as whole. For instance, if TILLY's profits are currently highly positively correlated with interest rates, variable rate debt will reduce bottom line volatility.
- Fixing interest rates using a swap, as proposed, may also create liquidity risk if the bank requires a credit support annex as part of the swap and interest rates were to fall, requiring TILLY to make payments under the annex.

QUESTION 3

(a)

Corporates gain access to the FX markets via banks with which they have a foreign exchange facility.

They access the markets by:

- telephone to the bank's corporate dealing desks, particularly for the largest deals where the best rates should be sought
- proprietary or web-based systems for day to day needs in all but the smallest companies

(b) (i)

Settlement risk is the risk that the counterparty fails to complete its side of the swap transaction on any settlement date. This represents an exposure to GROSS flows.

Replacement risk is the risk that the swap needs to be replaced before maturity due to failure of the counterparty and would be replaced at a less favourable swap rate. This represents an exposure to NET flows.

(b) (ii)

These risks can be greatly reduced by the use of ISDA agreements if it is possible to include a credit support annex. Under a credit support annex, payments are made to match any reduction in the value of a swap contract and hence reduce both replacement and settlement risk arising under the swap. Note that only same currency cash flows can be netted off under an ISDA agreement, so there is no protection from netting in the case of cross currency swap contracts.

(c)(i)

Period	1	2	3		
Receive				USD	GBP
GBP	600,000	600,000	20,600,000		
Fwd %	3.50%	3.80%	4.00%		
Annual DF	0.9662	0.9308	0.8950		
	(=1.035^{-1})	(=1.035^{-1} x 1.038^{-1})	(=1.035^{-1}x 1.038^{-1} 1.040^{-1})		
PV	579,710	558,488	18,437,251		19,575,449
Pay					
USD	1,600,000	1,600,000	33,600,000		
Fwd %	5.00%	5.20%	5.30%		
Annual DF	0.9524	0.9053	0.8597		
	(=1.050^{-1})	(=1.050^{-1} x 1.052^{-1})	(=1.050^{-1} x 1.052^{-1} 1.053^{-1})		
PV	1,523,810	1,448,488	28,887,228	31,859,526	19,912,203
Value of the swap				Loss of:	GBP 336,754

(c) (ii)

Assuming the swap commenced life on 1 October 2010 with a zero value, the settlement amount due under the credit support annex on 1 October 2011 would be GBP 336,754 payable by SET to the bank.

QUESTION 4

(a)

Under general provisions applicable to all risks, IFRS 7 requires:

- A narrative description of the exposure to liquidity risk and how it arises
- The objectives, policies and processes for managing liquidity risk, including methods used to measure the risk
- Disclosure of any changes in the above from the previous period

IFRS 7 specifies the following additional disclosure requirements for liquidity risk:

- Maturity analysis for financial liabilities and also for financial assets if necessary to enable users of the financial statements to evaluate the nature and extent of liquidity risk
- Methods used to manage the liquidity risk inherent in the above

(b) (i)

Sources of liquidity risk that GORDON might face include:

- Risks arising from changes in forecast future operational cash flows include:
    - Difficulty in accurately predicting future cash flows due to fluctuating cash flows, including annual and product related peaks and troughs of trading cycles
    - Risk of customers delaying or defaulting on payments
    - Unexpected capital expenditure or losses
    - Inaccuracy in cash forecasts used to plan headroom requirements
    - Inadequate headroom to meet large unexpected payments

- Risks arising from the strategic cash needs of the business include:
    - Changes to the business plan (resulting in inappropriate funding in place).
    - Unexpected acquisition opportunity.

- Risks relating to the availability and accessibility of short term funds, include:
    - Cash not moving round the group effectively / trapped cash
    - Risk of cash being tied up in working capital – credit terms and inventory

- Risks relating to the availability of long term funding include:
    - Conditions in the financial markets:
        - The risk of market disruption and lack of credit in the market.
        - Cash requirements/counterparty risk arising from large value of derivatives.
    - Credit worthiness of the business:
        - Risk of deterioration of credit rating affecting ability to borrow.
        - Risk of breach of covenants on bank borrowings (under the £709 committed bank facilities), resulting in the need to repay / refinance debt unexpectedly.
        - Ability to refinance long term borrowings or facilities on maturity.

(b) (ii)

The answer to (b)(ii) should follow on from any two of the sources of risk identified in (b)(i).

Whatever risks are chosen, the assessment, evaluation and management of liquidity risks will be very similar, and should consider factors such as those listed below, with appropriate application to the actual sources of liquidity risk identified in (b)(i):

Assessing:

- Regular review of the risk register
- Familiarity with the business and the evolving business model
- Historical analysis of peaks and troughs
- An impact / probability assessment
- Prioritising risks for further in-depth analysis

Evaluating:

- Cash forecasting (including ‘expected’ and ‘worst’ outcomes)
- Adequacy of current funding plan to meet forecast cash needs.
- Sensitivity analysis (to include economic down turn)
- Scenario analysis (to include hostile competitor action)

Managing:

- Adequate short term facilities or a cash pool (headroom)
- Advance warning of planned changes in trading patterns from the sales team
- Adequate committed bank facilities
- Refinancing of current committed bank facilities well in advance
- Appropriate policies and controls over investment and borrowing, including counterparty limits
- Managing the firm’s credit rating, as far as possible, to ensure facilities can be renewed at an acceptable cost

QUESTION 5

(a)

Work with net liabilities of 600 = 800-200

Annuity factor: AF(15, 4%) = 11.1184
So, equivalent Annual Cost of liabilities with a value of 600 is, EAC = 600/11.1184 = 53.965

So the value of net liabilities at a discount rate of 5.0% is:
AF (15, 5%) x 53.965 = 10.3797 x 53.965 = 560.135, a decrease of GBP 40 million

And the value of net liabilities at a discount rate of 3.0% is:
AF (15, 3%) x 53.965 = 11.9379 x 53.965 = 644.227, an increase of GBP 44 million

Impact on the pension deficit:

	Discount rate 3%	Discount rate 4%	Discount rate 5%
Equity value change	GBP million	GBP million	GBP million
-10%	100 + 44 + 50 = 194	100 + 50 = 150	100 - 40 + 50 = 110
0%	100 + 44 = 144	100 (no change)	100 - 40 = 60
+10%	100 + 44 - 50 = 94	100 – 50 = 50	100 - 40 – 50 = 10

Interpretation of results
As expected, the pension deficit increases with both a fall in the discount rate and a fall in equity values. The impact of a 1% change in the discount rate is approximately the same as that of a 10% change in equity values. Sensitivity to either change is highly significant in this case. The deficit is expected to approximately double in size if the discount rate and equity values fall by 1% and 10% respectively.

(b)

Beta values

- Beta measures the systematic risk of an asset, as compared to the 'average' in the market. That is, the beta indicates the likely movements in the value of the company shares in relation to general equity movements. Beta is used as a measure of the riskiness of the investment in a particular company's equity
- The beta of a risk-free investment is 0. The beta of an investment that has the same systematic risk as the market as a whole is 1. Beta is greater than 1 if the investment has a higher systematic risk than the market

- It is sometimes tempting for pension schemes which have large pension deficits to seek to eliminate that deficit by investing in higher risk assets with high betas. Historical analysis has shown this to occur in practice. However, this is a very risky tactic as it could make the situation even more serious if the deficit were to increase further as a result of losses from risky investments.

Implications of a large pension deficit for sponsor company:
- Pressure to increase contributions, diverting cash from dividends, loan repayments and possible investment opportunities
- Deterioration in financial ratios, making it both more difficult and expensive to raise finance
- Risk of credit rating downgrade
- Accounting risk - impact on reported profit and net assets for the sponsor company
- Risk of loss of control (sponsor's covenant kicks in)
- Regulatory risk – intervention by the pensions regulator

QUESTION 6

(a)

The Marketing Director is suggesting 'accept and retain'. This may be a high risk strategy. The contract is described as involving a 'large item of equipment'. The sterling value of the rand exposure (see below) is just under £400,000, but it is unlikely that the whole of this sum would be lost through FX movements. Whether any possible FX losses are a material sum to the UK company would need to be judged in the context of that company: what would be the impact on the balance sheet and reported profits for the company? However, it is unlikely that shareholders would expect the company to deliberately retain currency exposures of this nature, so even a small FX loss could have a disproportionate impact on the confidence of the market in the firm's management.

Other possible risk responses include:

- Avoid – the exchange risk arising in this case could be avoided by refusing to agree to sell equipment to this company.

- Accept and reduce – perhaps by sourcing some of the components or even building the equipment in South Africa to reduce the net exposure to the Rand – unlikely to be practical options – or perhaps by reducing the period of time between accepting the order and being paid (e.g. reduce the credit period or ask for funds up front). All these should be explored further. Suitable policies requiring the risk to be transferred if certain limits are breached could also be seen as a combined 'accept and reduce' and 'accept and transfer' approach.

- Accept and transfer – e.g. by entering into forward contracts. This would appear to be the most appropriate risk response in this case since this is a known, fixed, foreign exchange risk that can be eliminated in this way. Alternatively, an option contract could have been used. However, the premium cost is likely to be prohibitive and is, effectively, payment for a one way 'bet' on rates moving in WILLIAM's favour. Risk might also be transferred, wholly or partially, on to the customer by invoicing in GBP, or through a currency variation clause.

(b)

Construct a hedge using a forward contract assuming that both the ZAR receipt and payment will occur on 1 June 2012.
That is, fix the forward rate at GBP/ZAR 10.3055 = 10.3610 – 0.0555
Giving a profit on the contract of GBP 188,142 = ZAR 4 million/10.3055 – 200,000

(c) (i)

Unwind contract: On 1 June buy ZAR 4 m at a rate of GBP/ZAR 9.6557 so pay GBP 414,263.
Replacement contract: On 1 Oct sell ZAR 4m at a rate of GBP/ZAR 9.6539 so receive GBP 414,340.
(where 9.6557 = 9.6900 – 0.0343 and 9.6539 = 9.7010 – 0.0471)

Overall hedge result:
1 June loss of GBP 26,121 (= GBP 414,263 – GBP 388,142).
1 October sell ZAR 4 million for GBP 414,340.
So net GBP receipt (ignoring interest paid on GBP between 1 June and 1 August) is GBP 388,219.

(c) (ii)

The disadvantage of this approach is the spot spread lost by entering into one forward contract on the buy side, and another on the sell side on 1 January. This can be avoided by:

- Either entering into a forward / forward FX swap for the 5 to 7 month period (this is the best option).
- Or waiting until 1 June and then rolling the forward contract using an FX swap. Note that this approach would expose WILLIAM to unknown future market pricing of two month forward pips on 1 June.

A further possible approach would be to borrow ZAR on 1 June to meet the requirement of the forward contract and use the eventual ZAR receipts to repay this borrowing. However, this would incur a credit spread. In addition, the ZAR borrowing would be subject to two month market interest rates as at 1 June, which are not known on 1 January.

Examiner's Report

Certificate in Risk Management October 2011

General

The paper followed the standard format of a compulsory section A comprising two questions, followed by the choice of three out of four question in section B.

The general level of performance was lower than in recent diets. A number of candidates had difficulty with some of the basic numerical computations required, including the application of first principles to the calculation of an all-in average hedged borrowing rate (in Question 2) and calculating the present value of future cash flows when working out the value of a cross currency swap (in Question 3). However, it was encouraging to see an increase in knowledge of more recent additions to the syllabus such as liquidity risk and pension risk.

Details by individual question follow.

SECTION A – TWO compulsory questions

QUESTION 1

This question required the application and evaluation of the use of either an FRA or two different option contracts to hedge the interest rate on a forecast future temporary surplus cash position arising on the planned disposal of a division of the company.

The pass rate for this question was similar to that for the paper as a whole.

Part (a) was generally well answered.

Part (b) was not so well answered, with many candidates failing to focus on the requirement set. Note that this question concerns extent to which an option is out of the money might influence the time value element of the option price rather than how the time value of an option contract can be expected to change over time (which was the subject of an exam question in an earlier diet).

Common errors in the calculations in parts (c) and (d) included:

- Incorrect choice of contract.
- Omitting to state whether a particular contract would be bought or sold.
- Omitting to discount the settlement value for the FRA or, more commonly, the option contract.
- Inability to determine when an option contract would be exercised.
- Omitting to deduct the 1.00% margin against LIBOR at which the company can deposit funds when calculating the all-in interest rate obtained for the hedged deposit.
- Failure to sketch a graph of the resultant hedged position.

QUESTION 2

This question began by considering the link between inflation and interest rates and how the central bank can influence market interest rates. It also looked at the interest risk arising on borrowings and how the interest profile could be altered using an interest rate swap contract.

A surprising number of candidates chose to explain purchasing power party theory or interest rate parity theory rather than the link between inflation and interest rates as described in Fisher theory. However, there was generally good coverage of recent central bank intervention in respect of quantitative easing and changes to the repo rate.

Common errors in the part (b) calculations included:

- Use of the period one LIBOR rate rather than an average rate.
- Application of the swap over 5 periods rather than the remaining life of 4 periods.
- Incorrect application of the 200 bp (eg adding the full 200 bp to each six month period).
- Omitting to add the 200 bp to the fixed swap rate when calculating the actual borrowing rate achieved.
- Calculating a simple average interest rate without taking into account the amount borrowed at each interest rate.

Note the answer to part (b)(ii) was simply the swap rate of 5.6%. No additional calculations (or complex arithmetic equations proffered on occasion) were required here.

SECTION B – Choice of THREE out of four optional questions

QUESTION 3

Question 3 was the first of the optional questions. It concerned a cross currency swap contract and tested candidates' understanding of counterparty risk, swap valuation and credit support annexes.

Most candidates were able to demonstrate a good understanding of the counterparty risk arising on swap contracts. However, it should be noted that ISDA agreements generally only allow for the netting of exposures in the same currency. So this would only be useful in reducing counterparty risk if the company has derivatives in the same currencies but opposite exposures with this bank. Credit support annexes can help reduce counterparty risk as a result of collateral posted as values change (although effectively this only transforms counterparty risk into liquidity risk rather than eliminated risk altogether).

Common errors in the swap valuation included:

- Inappropriate use of the 'fixed rate' formula to value the swap.
- Incorrect calculation of zero rates.
- Principal cash flows ignored (note that they do not net out due to the different discount rates in each currency).
- Omitting to convert the USD value into GBP when calculating the profit or loss on the swap.
- Omitting to specify whether the swap value calculated is a profit or a loss.

QUESTION 4

This question focussed on liquidity risk. It began by testing knowledge of the IFRS disclosure requirements in respect of liquidity risk. This was followed by the requirement to identify different types of liquidity risk in a given scenario and to explain how two of these could best be assessed, evaluated and managed. This was the least popular of the optional questions and also had the lowest marks in the optional section.

There were several instances of full marks in part (a) where candidates had learnt this material.

Part (b)(i) was generally well answered. There were a few cases where marks were lost because fewer than five sources of liquidity risk were listed or where there was repetition.

In part (b)(ii) there was sometimes a tendency to give theoretical answers rather than apply the theory to the scenario presented.

QUESTION 5

Question 5 required the compilation of a two-way sensitivity table to demonstrate the sensitivity of a pension deficit value to changes in the discount rate and/or equity values. It also required an explanation of betas and the implication of a large pension deficit for the sponsor company. This was the most popular of the optional questions and also had the highest pass rate (over 75%).

The table format and equity values were generally correct. Some candidates performed sensitivity calculations on the bonds and liabilities separately rather than first netting them off. This was not a problem and produced the same result if both bonds and liabilities were adjusted for different interest rates, but did require some unnecessary calculations. Common errors in the sensitivity calculations for the net liabilities were:

- Multiplying, rather than dividing, by the annuity factor to obtain the annual liability payment and vice versa when converting back to the liability value after changing the discount rate.
- Dividing by the discount rate directly (implying that the liabilities are paid in perpetuity) rather than by the 15 year annuity factor.
- Adjusting the value of the liabilities for different discount rates but not the value of the bonds.

Candidates were generally able to describe the meaning of a company beta but were less confident about how a beta value might affect a pension fund investment decision.

To gain full marks, a more expansive answer was required on the impact of a pension deficit on the sponsor company than simply stating that the company would be required to make up any deficit.

QUESTION 6

Question 6 tested understanding of the range of possible risk responses, including the application of a forward contract hedge, in the context of a company that has accepted a sales contract priced in foreign currency. This question was the 2nd most popular choice of optional question and had a relatively high pass rate (above 60%).

Part (a) contained two sub-requirements – firstly to discuss the appropriateness of the suggested risk response and, secondly, to discuss alternative risk responses. Several candidates focussed on just one of these and ignored the other. The mark allocation was evenly split between the two issues.

In part (b), the forward rate was generally calculated correctly. However, many candidates stopped at that point rather than continuing with the calculation of the hedged profit on the sale.

Part (c) required a slightly more complex calculation in order to unwind and replace the original contract. There was often some confusion about which spot rate and forward points to use in each case.