FINM 37300 FINAL EXAM

Name (and CNet ID please): _____

- Calculators <u>are</u> allowed.
- Please <u>no</u> books or notes, <u>no</u> laptops or electronic devices that can store text.
- Please <u>turn your phone off</u> (and any electronics other than a calculator).

Please indicate your <u>answers</u> on the final exam sheets

- You do not need to show your work.
- Use a blue book if you want to write out any calculations, but do not return the blue book;
- We will not grade or consider any written calculations, only the final result.

1) A trader has the following position: selling CAD 25 million versus USD at 1.3400. If the current USDCAD rate is 1.2500, what is the mark-to-market value of the position in CAD terms?

   Original trade: -CAD 25,000,000 +USD 18,656,716 (divide by 1.3400 to determine USD amount)

   If sold at the current rate, +USD 18,656,716 * 1.2500 = +CAD 23,320,896

   So the trader has a loss: +CAD 23,320,896 - CAD 25,000,000 = <u>-CAD 1,679,104</u>

2) Assume USDJPY is 106.25 and EURUSD is 1.1250, what is the implied EURJPY cross rate?

   EUR 1 = 1.1250 of USD = 1.1250 * 106.25 of JPY = 119.53 of JPY

   So, the EURJPY cross rate is <u>119.53</u>

3) A trader has the following position: selling JPY 100 million versus EUR at 132.25. The current spot EURJPY rate is 135.75, and current spot USDJPY is 105.20. What is the market-to-market value of the trader's position, in USD?

   Original trade: -JPY 100,000,000 +EUR 756,144 (divide by 132.25 to determine EUR amount)

   It's easiest to use the current value in JPY since are given the USDJPY spot rate.

   Current value of +EUR 756,144 is +JPY 102,646,503 (multiply by 135.75 to determine JPY amount)

   So the value is +JPY 2,646,503, which equals <u>+USD 25,157</u> (divide by 105.20 to determine USD amount)

4) Assume the following rates, which include both bid and offer: USDSEK 8.1050 / 8.1060. If a customer (i.e., market taker) buys SEK 25 million versus USD, what will the USD amount be?

   Buying SEK means selling USD. A market taker would sell on the bid (i.e., sell on the lower rate), which is 8.1050

   So the USD amount would be 25,000,000 / 8.1050 = <u>3,084,516</u>

5) Find the all-in 4-month forward rate for USDNOK, ignoring bid/ask and assuming the following:

USDNOK spot   8.0500
USD deposit rate   0.50%
NOK deposit rate   1.20%
122 days between spot and the forward date. USD and NOK deposit rates follow ACT/360.

Forward = 8.0500 * (1 + 1.20% * 122/360) / (1 + 0.50% * 122/360) = 8.0691

6) Calculate the CHF interest rates implied by the following rates ("implied yield"), ignoring bid/offer.

USDCHF spot   0.9590
USDCHF forward   0.9537
USD deposit rate   0.70%
182 days between spot and the forward date. USD and CHF deposit rates follow ACT/360.

0.9537 = 0.9590 * (1 + Implied Yield * 182/360) / (1 + 0.70% * 182/360)

So, Implied Yield = [(0.9537/0.9590)*(1 + 0.70% * 182/360) - 1] * (360/182) = -0.0040 = -0.40%

7) Assume the rates listed below, with bid and offer listed. What is the lower arbitrage limit for 4 month USDNOK all-in forward rate?

USDNOK   8.0500 / 8.0510
USD deposit rate   0.45% / 0.55%
NOK deposit rate   1.15% / 1.25%
122 days between spot and the forward date. USD and NOK deposit rates follow ACT/360.

Lower limit is the bid-side forward rate for USDNOK, which is given by the bid side spot and NOK deposit rate, and the offer-side USD deposit rate.

8.0500 * (1 + 1.15% * 122/360) / (1 + 0.55% * 122/360) = 8.0663

8) Given the information below, calculate the FX swap points for a USDNOK position maturing in 4 months that needs to be rolled out to the 6 month date, ignoring bid/offer.

USDNOK spot   8.0500
4mo USD deposit   0.50%
6mo USD deposit   0.65%
4mo NOK deposit   1.20%
6mo NOK deposit   1.50%
122 days between spot and the 4-month forward date. 183 days between spot and the 6-month forward date. USD and NOK deposit rates follow ACT/360. (USDNOK forward points follow the common convention of 10^-4.)

Swap points are found by taking the difference between the two relevant forward rates:

8.0500 * (1 + 1.20% * 122/360) / (1 + 0.50% * 122/360) = 8.0691

8.0500 * (1 + 1.50% * 183/360) / (1 + 0.65% * 183/360) = 8.0847

8.0847 - 8.0691 = 0.0156

Then points are the rate difference times 10^4, which is +156

9) A trader (market-maker) executes a NZDUSD forward contract, buying NZD. If the spot rate (including bid/offer) is 0.7020/0.7025 and the forward point quote (also with bid/offer) is -35/-30, then what is the trader's all-in forward rate? (NZDUSD forward points follow the common convention of 10^-4.)

A market-maker would buy on the bid, meaning the lower rates for both spot and forward points.

The all-in forward would be 0.7020 combined with forward points of -35

0.7020 + (-35 * 10^-4) = 0.7020 - 0.0035 = 0.6985

10) If the 3-month NDF rate for USDTWD is 32.05, and lower than the spot USDTWD rate of 32.20, then what do we know about domestic TWD deposit rates relative to USD deposit rates? **(Indicate your answer by circling one of the following choices)**

a) **No information, non-deliverable forward rates give no information about TWD deposit rates**

b) No information, non-deliverable forward rates are always below spot rates

c) TWD deposit rates must be lower since the USD is weaker on a forward basis

d) TWD deposit rates must be higher since the USD is weaker on a forward basis

11) Why does the derivation of the Garman-Kohlhagen PDE for foreign exchange differ from the derivation of the Black-Scholes PDE for a non-dividend-paying stock? **(Indicate your answer by circling one of the following choices)**

   a)   Foreign exchange positions must be present valued using the foreign interest rate

   b)   Foreign interest rates and spot FX rates are correlated, so adjustment terms must be introduced

   c)   The FX spot rate is not a traded asset, so no riskless portfolio can be constructed

   d)   A foreign currency position must be carried using a foreign risk free bond

12) Let the EURUSD spot rate be 1.1300 and the forward rate be 1.1310. If a EUR call / USD put has a strike of 1.1000 and a premium of 0.0270 in USD pips, then what is the premium in percent of USD?

   0.0270 USD pips is based on a notional amount of EUR 1 which is USD 1.100 at the option's strike rate

   To reduce notional to USD 1 we must divide by 1.1000

   0.0270 / 1.1000 = 0.0245

13) Consider a EUR put /USD call and a EUR call / USD put with the same maturity, say in 3-months. Further assume both options have strike = forward. What do we know about the values and vegas of these two options? (Hint: consider put-call parity.) **(Indicate your answer by circling one of the following choices)**

   a)   Neither values nor vegas are equal

   b)   Vegas must be equal but values might not be equal

   c)   Values must be equal but vegas might not be equal

   d)   Values and vegas must be equal

   e)   Values must be equal and vegas have opposite sign, are equal in absolute value

14) The AUDUSD one week outright is 1.02. Which of these one week options has the largest delta in absolute value? **(Indicate your answer by circling one of the following choices)**

   a)   1.02 AUD put

   b)   1.20 AUD put

   c)   1.20 AUD call

   d)   1.00 AUD call

15) The EURGBP spot rate is 0.8700. The one week outright is 0.8720 and the one month outright is 0.8780. Which of these options have the largest gamma? **(Indicate your answer by circling one of the following choices)**

   a)   0.7700 EUR call expiring in one month

   b)   0.8780 EUR call expiring in one month

   c)   0.7780 EUR call expiring in one hour

   d)   0.8700 EUR call expiring in one hour