CFE: Level 1
Sample Questions Set #4

The following are the sample questions that are illustrative of the questions that may be asked in a CFE Level 1 examination. These questions are only for illustration.

Note: *(i) Each question carries 5 marks*
(ii) In the actual exam, every wrong answer would earn -3 (negative 3) marks;
(iii) Use of Excel™ spreadsheet, even though not essential, may prove useful for answering some of the questions. No more than 20% of the total questions may require the use of Excel spreadsheet.

1. A trader is selling an at the money (ATM) digital (binary) option on USD/JPY forward to a client. The USD/JPY forward is trading at 100 and the volatility used by the trader is 9%. The trader is, therefore:

   (a) Long volatility
   (b) Short volatility
   (c) Volatility neutral
   (d) It is difficult to make say whether the trader is long or short volatility

2. Riemann Zeta function is used in analysis of which of the following products?

   (a) Barrier option
   (b) Asian (geometric average) option
   (c) Volatility swaps
   (d) Symmetric Power option

3. A trader is pricing a one year variance swap and needs a quick estimate (something like the "back of the envelope" price). The at-the-money (ATM) volatility is 25% and the skew, which is linear in strike, is 2% per 10% change in strike. The fair strike price for the variance swap (K_{var}) would be:

   (a) 23.45%
   (b) 26.46%
   (c) 29.38%
   (d) 31.18%

4. Pricing a volatility swap is not as easy as pricing a variance swap because of the presence of:

   (a) Skew
   (b) Volatility of volatility
   (c) Correlation between the spot and volatility
   (d) None of the above

5. Which one of the following mathematical identities is used in the pricing of a volatility swap:

(a) $\sqrt{y} = \frac{2}{\sqrt{\pi}} \int_0^{\infty} \frac{e^{-xy}}{1-\sqrt{x}}\, dx$

(b) $\sqrt{y} = \frac{1}{2\sqrt{\pi}} \int_0^{\infty} \frac{1-e^{-xy}}{x^{\frac{3}{2}}}\, dx$

(c) $\sqrt{y} = \sqrt{\frac{2}{\pi}} \int_0^{\infty} \frac{1-\sqrt{x}e^{-xy}}{\sqrt{x}}\, dx$

(d) $\sqrt{y} = \sqrt{\frac{2}{\pi}} \int_0^{\infty} \frac{1-\sqrt{x}\ln\left(\frac{x}{y}\right)}{\sqrt{x}}\, dx$

6. An outperformance digital option is given by the payoff:

$$Outperformance\ Digital = C * N * \theta_{\mathrm{Ret}_1(T)>\mathrm{Ret}_2(T)}$$

Where, C is the coupon paid, N is the notional and θ is the binary variable which is 1 if the return of asset one is greater than the return of asset two, zero otherwise. Which of the following about the above payoff is TRUE?

(a) The volatility sensitivity of the Outperformance Digital option is quite different from that of a regular Outperformance option;
(b) The correlation sensitivity of the Outperformance Digital option is quite different from that of a regular Outperformance option
(c) Both the Volatility and correlation sensitivities of the Outperformance Digital option is quite different from that of the regular Outperformance option.
(d) If one is selling an Outperformance Digital then the trader's position in the volatility and the correlation does not depend on the underlying assets forward price.

7. If i is an imaginary number given by $i = \sqrt{-1}$ then, i^i (i raised to the power of i) is equal to:

(a) $i \ln(i)$
(b) 1.785654….
(c) 0.20787956…
(d) Cannot be defined or calculated

8. Which of the following is the odd one out?

   (a) Heath Jarrow Morton model
   (b) BGM model
   (c) Heston's model
   (d) Vasicek model

9. The implied volatilities of 90, 100 and 110 strike call on an asset are 10%, 9.25% and 9.60% respectively. The skew convexity is:

   (a) 0.011%
   (b) 0.089%
   (c) 0.885%
   (d) None of the above

10. The eigenvalues of the correlation matrix of three asset returns is:

    (a) 2
    (b) 3
    (c) 5
    (d) 6

Notes: