**JAIPURIA INSTITUTE OF MANAGEMENT, INDORE**

**PGDM**

**FOURTH TRIMESTER (Batch 2020-22)**

**END TERM EXAMINATION, FEB - 2022**

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| Course Name | **Financial Derivatives and Risk Management** | Course Code | **FIN402** |
| Max. Time | **2 hours** | Max. Marks | **40** |

**INSTRUCTIONS:**

1) Answer all the questions. The notations and letters used in the formula sheet have the same meaning as used in text book and class room lecture, as such, no further explanation is required.

2) Laptop computer, books, any written note, paper, and mobile phones are strictly prohibited. You can carry only pen, pencil, eraser and your own scientific calculator in the examination hall. Exchange of calculator is strictly prohibited.

3) Write all your answers in the Answer Script provided in the examination hall. You may use the IT Lab PCs for all calculations as assigned.

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**Questions.1 (2+2+4= 10 Marks)**

1. The market price of ABC stock has been very volatile and you think this volatility will continue for a few weeks. Thus, you decide to purchase a one-month call option contract on ABC stock with a strike price of $25 and an option price of $1.30. You also purchase a one-month put option on ABC stock with a strike price of $25 and an option price of $.50. What will be your total profit or loss on these option positions if the stock price is $24.60 on the day the options expire?
2. You currently own a one-year call option on Way-One, Inc. stock. The current stock price is $26.50 and the risk-free rate of return is 4%. Your option has a strike price of $20 and you assume that it will finish in the money. What is the current value of your call option?
3. The common stock of Winsson, Inc. is currently priced at $52.50 a share. One year from now, the stock price is expected to be either $54 or $60 a share. The risk-free rate of return is 4%. What is the value of one call option on Winsson stock with an exercise price of $55?

**Questions.2 (4+6 = 10 Marks)**

1. Can implied volatilities be expected to vary for options on the same stock with the same strike but different expirations? Answer with reasons.

(b) Suppose you look in the newspaper and see ABC trading at $50 per share. Calls on ABC with one month to expiration and an exercise price of $45 are trading at $6.50 each. Puts on ABC with one month to expiration and an exercise price of $55 are trading at $3.50 each. Are these prices reasonable? Explain. (Ignore transactions costs.)

**Questions.3 (5+5 =10 Marks)**

(a) Three put options on a stock have the same expiration date and strike prices of $55, $60, and $65. The market prices are $3, $5, and $8, respectively. Explain how a butterfly spread can be created. Construct a table showing the profit from the strategy. For what range of stock prices would the butterfly spread lead to a loss?

(b) What is the delta of a short position in 1,000 European call options on silver futures? The options mature in eight months, and the futures contract underlying the option matures in nine months. The current nine-month futures price is $8 per ounce, the exercise price of the options is $8, the risk-free interest rate is 12% per annum, and the volatility of silver futures prices is 18% per annum.

**Questions.4 (10 Marks)**

A stock index is currently 990, the risk-free rate is 5%, and the dividend yield on the index is 2%. Use a three-step tree to value an 18-month American put option with a strike price of 1,000 when the volatility is 20% per annum. How much does the option holder gain by being able to exercise early? When is the gain made?

The Black-Scholes Option Pricing formula:

