M. Sc. (Maths.) (Sem. IV) (CBCS) Examination

April / May - 2017

EMT - 4011 : Financial Mathematics

Faculty Code : 003

Subject Code : 016405

Time : $2\frac{1}{2}$ Hours]　　　　　　　　　　　　　　[Total Marks : **70**

Instructions :
  (1) There are 5 questions.
  (2) Attempt all the questions.
  (3) Figures to right indicate full marks.

1　Attempt the following : (Any Seven)　　　　　　　　**14**

  1. Define up-front premium and speculative price.

  2. Explain the terms bid-ask and bid-offer.

  3. Giving the examples explain the terms Asian option and Look- back option.

  4. Name the two indices of the Indian stock market.

  5. Obtain the stochastic differential equation for f (s) = AS.

  6. Explain the terms: Arbitrage and Risk- free investment.

  7. Name any two financial markets and their dealing.

  8. Explain the term financial derivatives.

  9. Distinguish between European option and American option in minimum two points each.

  10. Distinguish between call option and put option in minimum two points each.

2　AttemAt the following :　　　　　　　　　　　　　**14**

  a.　Suchitra holds an option on 23rd January 2016 to purchase hundred shares of APL industries for Rs 3 500 per share after one year. If the cost of option is Rs 100 per share and price of share is Rs 8000 per share on 23rd January 2017 then find the total profit to Suchitra on exercising the option. Also find the profit in percentage corresponding to up-front premium paid.

b. Explain: How the call option value is a function of exercise price and time to expiry ?

OR

b. Explain: Higher the asset price on expiry of call option, greater the profit.

3   Attempt the following :   **14**
    a. Explain in detail the forward and future contracts.

OR

    a. How much one should pay now to receive a guaranteed amount at the future time T ?
    b   Explain the simple model of asset prices. .

4   Attempt the following.   **14**
    a. State and prove Ito's lemma and extend the result for $f \equiv f(S, t)$.
    b. Derive the Black- Scholes partial differential equation.

5   Attempt the following : (Any Two).   **14**
    a. Discuss the mathematical significance of Black-Scholes equation and derive the boundary and final conditions for the same.
    b. Solve the Black-Scholes differential equation.
    c. What are dividends? Also define the term dividend yield and explain in detail the constant dividend yield structure and derive the Black-Scholes partial differential equation corresponding to it.

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