Enrollment No. _____

Shree Manibhai Virani and Smt. Navalben Virani Science College (Autonomous), Rajkot

Affiliated to Saurashtra University, Rajkot

SEMESTER END EXAMINATION NOVEMBER - 2017

M.Sc. Mathematics

16PMTDC05 – FINANCIAL MATHEMATICS

Duration of Exam – 3 hrs ***Semester – III*** ***Max. Marks – 70***

***Part A** (5x2= 10 marks)*

Answer **ALL** questions

1. Define: up-front premium and asset price.
2. What is bid-ask and bid-offer?
3. State any two financial markets and their dealings.
4. Define: European option
5. Explain the terms: Arbitrage and Sensitivity to volatility.

***Part B** (5x5= 25 marks)*

Answer **ALL** questions

6a. Define call option and explain How the call option value is a function of exercise price and time to expiry.

OR

6b. Define put option and explain "Higher the exercise price more is received for the asset at the expiry of put option".

7a. Explain in detail the forward and future contracts.

OR

7b. What are options for?

8a. State and prove Ito's lemma and extend the result for

OR

8b. Explain in detail the elimination of randomness.

9a. How much one should pay now to receive a guaranteed amount at the future time T.

OR

9b. Obtain the stochastic differential equation for $f(S) = \log S$ and $f(S) = S$..

10a. Distinguish between call option and put option in minimum four points.

OR

10b. Giving the examples explain the term 'Risk' and their type.

***Part C** (5x7= 35 marks)*

Answer **ALL** questions

11a. Derive stochastic differential equation and also give the economically reasonable justification of the derived equation.

OR

11b. State the assumptions of the Black-Scholes analysis and derive the Black-Scholes partial differential equation.

12a. Solve the Black-Scholes differential equation.

OR

12b. Discuss the mathematical significance of Black-Scholes equation and derive the boundary and final conditions for the same.

13a. What is put-call parity?

OR

13b. What is an American option? Why it is worth to hold an American option in comparison to an European option?

14a. 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.

OR

14b. Explain discrete dividend structure and derive the jump condition for the same.

15a. Ambrish holds an option to purchase 100 shares of Akshar Industries at Rs.400 per share and cost of option is Rs.50 per share. If the market price is Rs.300 per share at the time of expiry then will Ambrish exercise the option? Why? Justify your answer.

OR

15b. Amruta holds an option on 23rd May 2015 to purchase 100 shares of Sahjanand Enterprise for Rs.3500 per share after one year.If the cost of option is Rs.100 per share and the price of share is Rs.4000 per share on 23rd May 2016 then find the total profit to Amruta if she exercise the option. Also find the profit in percentage corresponding to cost of option.