

# END TERM EXAMINATION

FOURTH SEMESTER [MBA] MAY - JUNE 2019

Paper Code: MS-224

Subject: Financial Derivatives

(Batch 2017 onwards)

Time: 3 Hours

Maximum Marks: 75

Note: Attempt any five questions. Natural log and cumulative normal distribution value tables attached. Use of calculator is allowed.

- Q1 (a) The stock price of Makers Ltd. is currently quoted at Rs. 350 in the market. The market expectation about the stock is that its value may increase or decrease by 10% in each of the next two half-years. The return on the Government security being traded in the market for same maturity is 7% p.a. The European call option on the stock with exercise price Rs. 325 is available in the market. You are required to calculate the value of call option using two-step Binomial model. (9)
- (b) Give two examples each of weather derivatives and energy derivatives along with their applications. (6)
- Q2 (a) Explain how the components of 'cost-of-carry' for index futures different from those of commodity futures. What are the other factors that may influence the index futures price? (5)
- (b) The index future price can go below the cash market price. Explain the possible reasons for the development of such market in the context of index futures contract. (3)
- (c) What are OTC derivatives? How they are different from exchange traded derivatives with respect to their origination and application? (7)
- Q3 (a) Briefly examine the framework for regulation and reporting of derivative transactions in India in light of the guidelines of RBI and SEBI. (10)
- (b) "Swaps are a series of forward rate agreements". Do you agree? Give reason for your answer. (5)
- Q4 (a) Arbitrage is an imperfect hedge with a guaranteed profit build into it. Comment. (3)
- (b) American call options, which are deep in money, must be exercised on or before the maturity date. Comment. (3)
- (c) What are swaps? How swaps can be used as an effective hedging tool? Illustrate the mechanics of interest rate swaps. (9)
- Q5 Briefly distinguish between the following:- (5x3=15)
- (a) Backwardation and Contango
- (b) Hedge Ratio under Binomial and Black-sholes Model
- (c) Forward Start Option and Chooser Option
- Q6 (a) There are different categories of participants who make the derivatives market more transparent, increase liquidity and hence increase the depth of the market. What are these categories of participants? Explain how they help in development of the derivatives market? (10)
- (b) Nifty Futures (Dec. 2018) on 1<sup>st</sup> November are selling for 10800 and the Nifty as on date is 10653. Three-month dividend yield on Nifty is 2.2% and the rate on treasury bills is 6.0%. Assuming all the stocks

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MS-224  
P.1/2



included in the Nifty are expected to pay dividends in the next 3-months. You are required to compute the fair price of the 3-month futures contract. Also explain how an arbitrageur can exploit the opportunity if the future contract is not priced fairly. Explain with calculations. What are the possible limitations to this profit making? (5)

- Q7 Supermax Ltd. is trading at Rs. 220 with call options expiring December. The annualized volatility of the stock is 25% and the return on treasury bills is 8% p.a. With a time to expiration of 30 days and strike price of Rs. 210, compute for the call option - (a) Value using Black-Scholes Model, (b) Gamma, (c) Theta, (d) Rho and (e) Vega. Assume 250 trading days in a year and use the following relations- (15)

$$\gamma_c = \gamma_p = \frac{N'(d_1)}{S\sigma\sqrt{T-t}} \quad \theta_c = -\frac{SN'(d_1)\sigma}{2\sqrt{T-t}} - r_f X e^{-r(T-t)} N(d_2)$$

$$\rho_c = X(T-t)e^{-r(T-t)} N(d_2) \quad \text{where } N'(x) = \frac{1}{\sqrt{2\pi}} e^{-\frac{x^2}{2}}$$

$$\rho_p = -X(T-t)e^{-r(T-t)} N(-d_2)$$

$$v = S\sqrt{T-t} N'(d_1) \quad \theta_p = -\frac{SN'(d_1)\sigma}{2\sqrt{T-t}} + r_f X e^{-r(T-t)} N(-d_2)$$

where:-

$$d_1 = \frac{\ln\left[\frac{S}{X}\right] + \left(r_f + \frac{1}{2}\sigma^2\right)(T-t)}{\sigma\sqrt{T-t}}$$

$$d_2 = d_1 - \sigma\sqrt{T-t}$$

- Q8 Briefly describe the following:- (3x5=15)
- Swaptions
  - Equity Forward
  - Straddle and Strangle

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MS-224  
P2/2