MAHINDRA UNIVERSITY HYDERABAD
École Centrale School of Engineering
Minor-I Examinations, September 2024

Program: B.Tech. Branch: CM (2022 Batch) Year: 3^{rd} Semester: I

Subject: Financial Mathematics (MA3116)

Date: 13/09/2024 **Start Time: 10:00 AM**
Time Duration: 1.5 Hours **Max. Marks: 30**

Instructions:

1. Answer all questions.
2. Using scientific calculator is allowed.

Q 1:

Marks : 10

a) Define the following : (i)Arbitrage, (ii) European Call Option, (iii) European Put Option, (iv) Martingale process.

Q 2:

Marks : 10

a) Consider a 3-period binomial model of stock price process. Assume $P(H) = 1/3$ and $P(T) = 2/3$. Let the initial stock price be $S_0 = 8$, $u = 2$ denote up-factor, $d = 0.5$ denote down-factor. Compute the conditional expectations $E_2(S_2)$, $E_1(S_3)$, $E_2(S_3)$.

Q 3:

Marks : 10

a) Consider a 3-period binomial model of asset pricing. Let the initial stock price be $S_0 = 10$ per share, $u = 2$ be up factor, $d = 0.5$ be down factor, $r = 0.25$ be rate of interest per time period, $K = 15$ be strike price.

(i) Compute the look-back option price process.

(ii) Let $\{S_n\}$ denote the stock price process and $\{M_n\}$ denote maximum till date stock price process. Then show that $\{(S_n, M_n)\}$ is a two dimensional Markov process.