

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI  
(MID SEMESTER EXAMINATION)

CLASS: IMSC  
BRANCH: Maths and Computing

SEMESTER : V/ADD  
SESSION : MO/2025

SUBJECT: MA315 FINANCIAL MATHEMATICS

TIME: 02 Hours

FULL MARKS: 25

INSTRUCTIONS:

1. The question paper contains 5 questions each of 5 marks and total 25 marks.
  2. Attempt all questions.
  3. The missing data, if any, may be assumed suitably.
  4. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates
- 

		CO	BL
Q.1(a)	A sum of 9,000 paid into a bank account for two months (61 days) to attract simple interest will produce 9020 at the end of the term. Find the interest rate $r$ and the return on this investment	[2] 1	2
Q.1(b)	Find the principal to be deposited initially in an account attracting simple interest at a rate of 8% if 1,000 is needed after three months (91 days)	[3] 1	1,2
Q.2(a)	What is the interest rate if a deposit subject to annual compounding is doubled after 10 years?	[2] 1	2
Q.2(b)	You can afford to pay ₹1,000 every year for 4 years. If the interest rate is 5%, how much can you borrow?	[3] 1	2
Q.3(a)	Given that the future value of 950 subject to continuous compounding will be 1,000 after half a year, find the interest rate.	[2] 1	3
Q.3(b)	Define the logarithmic return of an asset. Derive the relation between returns of an asset and the logarithmic returns of an asset.	[3] 2	3
Q.4(a)	Define European call and European put.	[2] 2	2,3
Q.4(b)	A stock is currently priced at $S(0) = 100$ . In a one-step binomial model, the stock can move to either $S(1) = 110$ or $S(1) = 90$ . After two time-steps, the highest possible stock price is $S(2) = 121$ . (a) Find the up-factor $u$ and the down-factor $d$ . (b) Compute the lowest possible value of $S(2)$ in this model.	[3] 2	3
Q.5(a)	Write the statement of Put-Call Parity.	[2] 2	1
Q.5(b)	Suppose that 50, 40, and $y$ are the possible values of $S(2)$ , where $S(2)$ represents the price of a stock at time 2 units. Find $y$ , if stock prices follow a binomial tree	[3] 2	2

:::::25/09/2025 :::::M