

BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI - K. K. BIRLA GOA CAMPUS
Second Semester 2022-23- Mid Semester Examination 13th March 2023
DERIVATIVE AND RISK MANAGEMENT (FIN F311, Econ 354)
(Answer all questions. Figures to the right in bracket indicate marks.)

Total :Mark: 35
Time: 90 Minutes.

1.a) Today is 15th March 2023. The Cheapest-to-deliver bond in a September 2023 Treasury bond is a 12 % coupon bond which is quoted today at Rs 115 , Delivery is expected to be made on 30th September 2023. Coupon payments on the bond are made on February 4 and August 4 each year. The term structure is flat and the rate of interest semi annual compounding is 12% p.a. The conversion factor is 1.3 What should be the quoted future price for the contract **(3 Marks)**

Assume face value as Rs100. use actual/actual norm

1.b) You are given the following

Face value of Bond Rs 1000

Coupon 12.p.a

Life of bond 15 years

Time left for maturity 7 years and 9 months from today

YTM 18%

What is the value of the Bond as of today?

(2 Marks)

2.a) The following spot and interest rates prevail in the market:

Spot rate (Rs per Euro)	86.40	86.70
Interest rate: (Rm) Rupee	8.00%	8.50%
(Rm) Euro	5.00%	5.50%

Find out:

- a) The lower bound to the 6-m forward ask rate
- b) The upper bound to the 6-m forward bid rate

(2 Marks)

2.b) Today an Interest rate Swap is entered between AMIGO Bank Ltd. and X Ltd. As per the terms, Bank will pay fixed rate and receive MIBOR. Swap is of 360 days duration and payments will be exchanged at an interval of 90 days. 90, 180,270 and 360 days MIBOR rates (Rc.,p.a) are 4.8 %, 5.2 %, 5.4% 5.6% respectively. What is the fixed rate that bank would offer if they keep an overall spread of 40 basis points? Approximate your working to 2 decimals. **(2 Marks)**

2.c) A stock is expected to pay a dividend of Rs10 per share in two months and in five months. The stock price is Rs500, and the risk-free rate of interest is 8% per annum with continuous compounding for all maturities. An investor has just taken a short position in a six-month forward contract on the stock.

- a) What are the forward price and the initial value of the forward contract?
- b) Three months later, the price of the stock is Rs480 and the risk-free rate of interest is still 8% per annum. What are the forward price and the value of the short position in the forward contract?

(2 Marks)

3.a) The three-month Eurodollar futures price for a contract maturing in six years is quoted as 95.20. The standard deviation of the change in the short-term interest rate in one year is 1.1%. Estimate the forward LIBOR interest rate for the period between 6.00 and 6.25 years in the future

(2 Marks)

3.b) A 10-year, 8% coupon bond currently sells for \$90. A 10-year, 4% coupon bond currently sells for \$80. What is the 10-year zero rate?

(2 Marks)

- 4.a)**
- Face value Rs 100
 - Semi annual coupon Rs 8
 - Time to maturity 12 years and 4 months

From the above Calculate the conversion factor.

(2 Marks)

- 4.b)**
- | | |
|--------------------|--------------------------------|
| Spot rate Rs 81/\$ | One year forward rate Rs 80/\$ |
| Interest rate (Rm) | India 10 % USA 5% |

In the above scenario how will you execute the Covered Interest arbitrage
Explain the process in detail and show the resultant profit.

You may assume 1000 units of each currency

(3 Marks)

5.a) A firm had entered into a swap arrangement for notional principal of Rs 10 million with a bank, whereby the bank paid a fixed 9% and received MIBOR semi-annually . It has three more years to go, and just has exchanged the cash flows. The 6-m MIBOR for the next payment of interest was set at 8 %. The next day, the market exhibited a fall and the 6-m MIBOR fell to 7%., leading the firm to believe that it is overpaying. They want to cancel the swap arrangement. In that event what is the amount and direction of the cash flow? Assume flat term structure and annual compounding (Use bond method)

(3 Marks)

5.b) A farmer has agreed to sell raw-cotton at Rs 80 per kg as is where is condition to a trader. Ginning waste is 20 % of quantity ginned which would fetch Rs 5 per kg .Ginning cost is Rs 8 per kg.of input. What price the trader should quote for the delivery of 10 bales of ginned cotton (1 bale is 100 Kgs) 3 months from the date of procurement, if storage and interest cost is 10 %(rc) Ignore ginning time.

(2 Marks)

5.c) At the end of one day a clearing house member is long 100 contracts, and the settlement price is \$50,000 per contract. The original margin is \$ 2,000 per contract. On the following day the member becomes responsible for clearing additional 20 long contracts, entered into at a price of \$51,000 per contract. The settlement price at the end of this day is \$ 50,200. How much does this member have to pay to its margin account with the exchange clearing house ?

(2 Marks)

(Attempt the following question if you are sure of the correct answer. No partial marking)

6.a) Interest rate influences the price of a bond. That is to say if the interest rate falls the price increases. A callable bond is an exception to this. .Why?

(2 Marks)

6.b) A foreign currency is considered as an asset providing known yield. . Why?

(2 Marks)

6.c) A company that is uncertain about the exact date when it will pay or receive a foreign currency may try to negotiate with its bank a forward contract that specifies a period during which delivery can be made. The company wants to reserve the right to choose the exact delivery date to fit in with its own cash flows. Put yourself in the position of the bank. How would you price the product that the company wants

(2 Marks)

6.d) What does the **Z spread** indicate?

(2 Marks)
