(ii) Write a short note on interest rate swap. 4

(b) (i) Does a perfect hedge always succeed in locking in the current spot price of an asset for a future transaction? Explain your answer. 4

(ii) Explain the difference between selling a call option and buying a put option. 2

(c) An investor buys a European put on a share for \$2.5. The stock price is \$45 and the strike price is \$42. Under what circumstances does the investor make a profit? Under what circumstances will the option be exercised? Draw a diagram showing the variation of the investor's profit with the stock price at the maturity of the option. 6

6. (a) Suppose price of a stock is \$31, exercise price is \$30, risk-free interest rate is 10% per annum, the price of a 3-month European call option is \$3 and the price of a 3-month European put option is \$2.25. Is there put-call parity? Can an arbitrageur make profit at the end of 3 months? Justify. $6\frac{1}{2}$

(b) (i) Draw and explain profit from buying a European call option on one share of a stock. Given option price is \$5 and strike price is \$100. $3\frac{1}{2}$

(ii) Draw and explain payoff from a short call position in a European option with strike price= K, price of asset at maturity = S_T. 3

(c) (i) What is the difference between the forward price and the value of a forward contract? 2

(ii) Suppose that you enter into a 3-month forward contract on a non-dividend-paying stock when the stock price is \$30 and the risk-free interest rate is 10% per annum. What is the forward price? $4\frac{1}{2}$

10/12/18 (M)

This question paper contains 4 printed pages.

Your Roll No. .....

S. No. of Paper	: 755	I
Unique Paper Code	: **32357504**	
Name of the Paper	: **Mathematical Finance**	
Name of the Course	: **B.Sc. (H) Mathematics : DSE-2**	
Semester	: **V**	
Duration	: **3 hours**	
Maximum Marks	: **75**	

(Write your Roll No. on the top immediately on receipt of this question paper.)

*Attempt any **two** parts from each question.*

Following values may be used if needed :

$e^{0.025} = 1.0253$, $e^{-0.025} = 0.975$, $e^{0.0125} = 1.0125$ *and* $e^{-0.0125} = 0.9875$.

1. (a) (i) Define present value and future value of a cash flow stream. $1\frac{1}{2} + 1\frac{1}{2}$

(ii) What are callable bonds? Discuss mortgage. $1 + 2\frac{1}{2}$

(b) (i) Find effective rate for 3% compounded monthly. $2\frac{1}{2}$

(ii) A 10% bond with 20 years to maturity has a yield of 9%. What is the price of this bond? 4

(c) A major lottery advertises that it pays the winner \$10 million. However, this prize money is paid at the rate of \$500,000 each year (with the first payment

P. T. O.