K. J. SOMAIYA INSTITUTE OF MANAGEMENT STUDIES AND RESEARCH
Program:PGDM (Fin) VTrim (Batch 2017-2019)
Subject: Advanced Derivatives and Risk Management
(End Term examination)

Maximum Marks: 25
Duration: 3 hours

Date: January 7, 2019

Notes:
1. Question No.1 is COMPULSORY. Answer any 3 of the rest.
2. Make suitable assumptions if required and state them

Question 1
(10 Marks)

(a) A trader holds a delta-neutral portfolio of Nifty options. Option 1 and Option 2 are two options traded in the market. The greeks pertaining to the trader's portfolio and the traded options (1 and 2) are tabulated below. Show how the trader's portfolio can be made delta-gamma-vega neutral by taking appropriate positions. (5 marks)

Type	*Delta*	*Gamma*	*Vega*
Portfolio	*0*	*-2500*	*-4000*
Option 1	*0.6*	*0.25*	*1.0*
Option 2	*0.5*	*0.4*	*0.6*

(b) A credit default swap requires a semiannual payment at the rate of 70 basis points per year. The principal is Rs.500 million and the credit default swap is settled in cash. A default occurs after three years and eight months, and the calculation agent estimates the recovery rate at 40% of its face value shortly after the default. List the cash flows and their timing for the seller of the credit default swap. (5 marks)

Question 2
(5 Marks)

Explain how Value-at-Risk can be computed using the Historical Simulation method. In what way is it superior to the Normal Linear VaR method?

Question 3
(5 Marks)

CBC Alloys Ltd has entered into a 5-year interest rate swap on which it pays a fixed rate of 10% p.a. on a notional principal of Rs.50 crore. Assume that payments on the swap are exchanged annually. Two years have elapsed and interest rates are declining. The floating rate for the current year is 8.50%. CBC Alloys now wants to unwind the swap and requests its swap counterparty to cancel the swap. What is the value of the swap and the amount to be paid to or received from the counterparty for exiting the swap? The term structure of interest rates as of today is as follows:

TTM	**Spot rates**

1 year	8.50%
2 year	8.95%
3 year	9.25%

Question 4 (5 Marks)

An equity trader holds a portfolio of Rs.5 crore invested equally in two stocks – Maruti and TCS. The daily volatilities of these stocks are estimated as 1.5% and 0.60%. The correlation between them is estimated at 0.4. Determine the 10-day 95% Value-at-Risk (in terms of rupees) for this portfolio using the Normal Linear VaR method.

Question 5 (5 Marks)

Explain the working of 'range forwards' with an example. How are they better than a conventional forward contract?