JAIPURIA INSTITUTE OF MANAGEMENT

JAIPURIA INSTITUTE OF MANAGEMENT, NOIDA

PGDM / PGDM (M) / PGDM (SM)

V TRIMESTER (Batch 2017-19)

END TERM EXAMINATIONS

SET – I

Course Name	Financial Derivatives & Risk Management (FDRM)	Course Code	FIN402
Max. Time	2 Hours	Max. Marks	40

INSTRUCTIONS:

- **Attempt all Questions. Scientific/ financial calculator/Normal Distribution table is allowed**

Case: Please read the data carefully and answer below mentioned questions (Q1 to Q6)

Current Market price of Maruti Suzuki India Ltd.	6,947.25 ▲42.95 0.62%	Pr. Close 6,904.30	Open 6,943.00	High 7,048.00	Low 6,853.20
Future price of Maruti Suzuki India Ltd. (Expiry: March 28th 2019; Market lot: 75)	6,985.00 ▲42.65 0.61%	Prev. Close 6,942.35	Open 6,978.60	High 7,095.80	Low 6,895.65

Option Chain

CALLS											PUTS									
OI	Chng in OI	Volume	IV	LTP	Net Chng	Bid Qty	Bid Price	Ask Price	Ask Qty	Strike Price	Bid Qty	Bid Price	Ask Price	Ask Qty	Net Chng	LTP	IV	Volume	Chng in OI	OI
1,125	-75	4	-	486.60	-37.00	75	539.60	565.15	225	6400.00	225	3.65	4.50	225	-3.70	3.90	84.55	357	-4,950	16,050
6,900	-150	5	128.42	486.10	70.20	1,275	442.80	472.70	375	6500.00	225	4.80	5.75	75	-3.65	4.80	76.18	1,247	-28,875	55,350
3,675	-3,225	54	-	340.00	-26.00	375	344.45	369.05	75	6600.00	75	5.30	12.25	75	-6.45	5.35	65.02	2,152	-7,800	33,675
6,300	-3,075	79	89.26	287.75	48.30	75	251.85	268.95	75	6700.00	75	9.15	11.50	150	-7.55	10.60	56.34	4,312	-375	47,100
23,925	-1,800	176	53.46	165.40	23.35	75	160.15	169.95	75	6800.00	600	17.00	18.00	75	-16.25	17.00	46.22	5,535	-4,725	81,075
28,950	-19,125	2,577	46.67	90.00	12.00	75	89.05	99.85	75	6900.00	975	37.00	37.50	300	-25.80	37.00	38.86	5,445	-3,825	47,400
97,200	-68,550	15,365	42.41	38.05	1.55	900	38.00	40.00	1,950	7000.00	75	78.00	87.65	75	-37.75	78.00	31.34	3,205	6,075	35,100
84,525	-9,000	14,260	40.71	11.05	-3.20	825	11.00	11.80	450	7100.00	75	147.20	158.25	75	-75.00	130.00	-	200	1,500	14,100
129,675	-10,200	7,337	44.15	4.00	-2.05	150	3.80	4.40	825	7200.00	75	236.60	261.20	75	-58.90	220.00	-	116	675	13,050
81,750	-10,800	1,995	48.42	1.70	-1.85	225	1.35	2.30	75	7300.00	375	332.05	384.75	75	34.80	383.60	97.03	44	-2,175	4,275
51,450	-10,950	456	53.09	0.80	-1.55	300	0.80	1.30	975	7400.00	375	430.50	467.00	75	-151.90	376.10	-	1	-	1,725
99,000	-22,650	529	60.55	0.55	-1.30	225	0.55	0.60	75	7500.00	1,275	521.55	562.60	1,275	-138.20	525.00	-	11	-450	2,325

Q1. Assess and determine arbitrage opportunities exist in the lower bound value of a put option with strike price 7300 (Marks 5)

Q2. In order to protect against the fall in value of the share the trader decides to take position in Future. If on March 28, 2019, Spot value and Future, value becomes Rs. 6800 and Rs 6850 respectively. Compute the basis risk exist and estimate the value for the trader. (Marks 5)

Q3. Determine the put-call parity relationship between a call and a put with strike price 7000. Determine the arbitrage opportunities available. (Marks 5)

Q4. Assess the importance of Delta and Gamma and compute the value of both Greek letters for at-the-money call and put options with March expire. The volatility of the underlying stock is 31% and risk free rate is 6.5% continuously compounding. (Marks 7)

Q5. If you are holding, short position in 250 puts with strike price 7000. Show your portfolio delta and gamma neutral by using a call with strike price 6800 and a put with strike price 7200. (Marks 8)

Q6. Determine how appropriately call and put can be used to create a long straddle for a bullish market; show its payoffs, and profit/loss with the help of a diagram. (Marks 5)

Q7. Companies X and Y have been offered the following rates per annum on a $5 million 10-year investment:

	Fixed Rate	Floating Rate
Company X	8.0%	LIBOR
Company Y	8.8%	LIBOR

Company X requires a fixed-rate investment; company Y requires a floating-rate investment. Show a swap that will net a bank, acting as intermediary, 0.2% per annum and will appear equally attractive to X and Y. (Marks 5)

Formulas

BSM Model:

$$c = S_0 N(d_1) - K e^{-rT} N(d_2)$$

$$p = K e^{-rT} N(-d_2) - S_0 N(-d_1)$$

$$\text{where } d_1 = \frac{\ln(S_0/K) + (r + \sigma^2/2)T}{\sigma\sqrt{T}}$$

$$d_2 = \frac{\ln(S_0/K) + (r - \sigma^2/2)T}{\sigma\sqrt{T}} = d_1 - \sigma\sqrt{T}$$

$$N(d_2) = N(d_1 - \sigma\sqrt{T})$$

$$N'(d_1) = e^{\left[\frac{-(d_1)^2}{2}\right]} \frac{1}{\sqrt{2\pi}}$$

$$theta_{Call} = \frac{\partial C}{\partial T} = -\left(\frac{S_t N'(d_1)\sigma}{2\sqrt{T}}\right) - RXe^{-RT} N(d_2)$$

$$N'(d_1) = e^{\left[\frac{-(d_1)^2}{2}\right]} \frac{1}{\sqrt{2\pi}}$$

$$d_2 = d_1 - \sigma\sqrt{T}$$

$$vega_{Call} = \frac{\partial C}{\partial \sigma} = S\sqrt{T} N'(d_1)$$

$$rho_{Call} = \frac{\partial C}{\partial R} = XTe^{-RT} N(d_2)$$

Gamma:

$$\Gamma = \frac{N'(d_1)}{S\sigma\sqrt{t}} \quad \text{where} \quad N'(d_1) = \frac{1}{\sqrt{2\pi}} e^{-0.5 d_1^2}$$