

Abheek Ghosh - 140123047

One month historical volatility.

| | | |
|---------------|---------------------|-----------------------|
| BSE Index, | Return = 0.037698, | Volatility = 0.125823 |
| BSE Stock 1, | Return = -0.504277, | Volatility = 0.220332 |
| BSE Stock 2, | Return = -0.229947, | Volatility = 0.225026 |
| BSE Stock 3, | Return = -0.022608, | Volatility = 0.191949 |
| BSE Stock 4, | Return = 0.431687, | Volatility = 0.161686 |
| BSE Stock 5, | Return = 0.194318, | Volatility = 0.231438 |
| BSE Stock 6, | Return = -0.260754, | Volatility = 0.219663 |
| BSE Stock 7, | Return = 0.037301, | Volatility = 0.269240 |
| BSE Stock 8, | Return = -0.273298, | Volatility = 0.147365 |
| BSE Stock 9, | Return = 0.416389, | Volatility = 0.252147 |
| BSE Stock 10, | Return = -0.685055, | Volatility = 0.128151 |

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| NSE Index, | Return = -0.001612, | Volatility = 0.132604 |
| NSE Stock 1, | Return = -0.054936, | Volatility = 0.185010 |
| NSE Stock 2, | Return = -0.004940, | Volatility = 0.232486 |
| NSE Stock 3, | Return = -1.220641, | Volatility = 0.301593 |
| NSE Stock 4, | Return = -0.208974, | Volatility = 0.214274 |
| NSE Stock 5, | Return = -0.728886, | Volatility = 0.177761 |
| NSE Stock 6, | Return = -0.263720, | Volatility = 0.287098 |
| NSE Stock 7, | Return = -0.594927, | Volatility = 0.247594 |
| NSE Stock 8, | Return = -0.382656, | Volatility = 0.260864 |
| NSE Stock 9, | Return = -0.637031, | Volatility = 0.248893 |
| NSE Stock 10, | Return = 0.133499, | Volatility = 0.300795 |

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|----------------|---------------------------|--------------------------|--|
| BSE Index | Return = 0.037698, | Volatility = 0.125823, | Initial Stock price = 26560.000000 |
| K = | 13280.000000 15936.000000 | 18592.000000 2148.000000 | 23904.000000 26560.000000 29216.000000 31872.000000 34528.000000 37184.000000 39840.000000 |
| E. Call Prices | 13607.884368 11017.461242 | 8427.041825 5838.261609 | 3316.347722 1295.141489 299.128172 39.485599 3.128982 0.160795 0.005789 |
| E. Put Prices | 0.000000 0.000000 | 0.003710 1.646620 | 70.155859 639.372753 2233.782562 4564.563115 7118.629624 9706.084564 12296.352684 |
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| BSE Stock 1 | Return = -0.504277, | Volatility = 0.220332, | Initial Stock price = 319.100000 |
| K = | 159.550000 191.460000 | 223.370000 255.280000 | 287.190000 319.100000 351.010000 382.920000 414.830000 446.740000 478.650000 |
| E. Call Prices | 163.489318 132.369984 | 101.340862 71.158872 | 44.236881 23.759079 10.964472 4.389746 1.551146 0.493135 0.143656 |
| E. Put Prices | 0.000014 0.002820 | 0.095837 1.035986 | 5.236135 15.880472 34.208004 58.755418 87.038957 117.103085 147.875746 |
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| BSE Stock 2 | Return = -0.229947, | Volatility = 0.225026, | Initial Stock price = 306.450000 |
| K = | 153.225000 183.870000 | 214.515000 245.160000 | 275.805000 306.450000 337.095000 367.740000 398.385000 429.030000 459.675000 |
| E. Call Prices | 157.008161 127.123423 | 97.341143 68.441139 | 42.752187 23.211636 10.908986 4.481338 1.635851 0.540396 0.164374 |
| E. Put Prices | 0.000022 0.003656 | 0.109749 1.098117 | 5.297537 15.645358 33.231081 56.691805 83.734691 112.527607 142.039958 |
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| BSE Stock 3 | Return = -0.022687, | Volatility = 0.191949, | Initial Stock price = 439.450000 |
| K = | 179.212500 263.670000 | 307.615000 351.560000 | 395.505000 439.450000 483.395000 527.340000 571.285000 615.230000 659.175000 |
| E. Call Prices | 225.150030 182.290445 | 139.465991 97.269126 | 58.720055 29.305155 11.865852 3.928543 1.087565 0.258620 0.054227 |
| E. Put Prices | 0.000000 0.000410 | 0.035950 0.699079 | 5.010002 18.455096 43.875787 78.798472 118.817488 160.848537 203.504138 |
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| BSE Stock 4 | Return = -0.341687, | Volatility = 0.161866, | Initial Stock price = 976.050000 |
| K = | 488.025000 585.630000 | 683.235000 780.840000 | 878.445000 976.050000 1073.655000 1171.260000 1268.865000 1366.470000 1464.075000 |
| E. Call Prices | 500.074380 404.879280 | 309.694254 215.012132 | 125.908583 57.039601 19.008533 4.660228 0.866794 0.127448 0.015429 |
| E. Put Prices | 0.000000 0.000023 | 0.010122 0.523123 | 6.614699 32.940841 90.140897 170.951715 262.353405 356.809184 451.892289 |
| <hr/> | | | |
| BSE Stock 5 | Return = 0.194318, | Volatility = 0.231438, | Initial Stock price = 5249.200000 |
| K = | 2624.600000 3149.520000 | 3674.440000 4199.360000 | 4724.280000 5249.200000 5774.120000 6299.040000 6823.960000 7348.880000 7873.800000 |
| E. Call Prices | 2689.402318 2177.533874 | 1667.839492 1174.895515 | 738.702939 406.828396 195.775591 83.126939 31.633403 10.973950 3.526816 |
| E. Put Prices | 0.000713 0.091949 | 2.357245 21.372948 | 97.140051 277.225187 578.132060 977.443087 1437.909230 1929.209456 2433.722002 |
| <hr/> | | | |
| BSE Stock 6 | Return = -0.260754, | Volatility = 0.219663, | Initial Stock price = 255.750000 |
| K = | 127.875000 153.450000 | 179.025000 204.600000 | 230.175000 255.750000 281.325000 306.900000 332.475000 358.050000 383.625000 |
| E. Call Prices | 131.032255 106.908056 | 81.219992 57.019983 | 35.422890 18.995292 8.742673 3.487009 1.226266 0.387650 0.112209 |
| E. Put Prices | 0.000010 0.002162 | 0.074849 0.818391 | 4.164849 12.680802 27.371734 47.059621 69.742429 93.847364 118.515474 |
| <hr/> | | | |
| BSE Stock 7 | Return = 0.037301, | Volatility = 0.269240, | Initial Stock price = 568.150000 |
| K = | 284.075000 340.890000 | 397.705000 454.520000 | 511.335000 568.15 |

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|----------------|---------------------|------------------------|-----------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| BSE Stock 10 | Return = -0.685055, | Volatility = 0.128151, | Initial Stock price = 3240.400000 | | | | | | |
| K = | 1620.200000 | 1944.240000 | 2916.360000 | 3240.400000 | 3564.440000 | 3888.480000 | 4212.520000 | 4536.560000 | 4860.600000 |
| E. Call Prices | 1660.202881 | 1344.163457 | 1028.124696 | 712.326760 | 405.298661 | 160.030676 | 38.114968 | 5.312937 | 0.454496 |
| E. Put Prices | 0.000000 | 0.000000 | 0.000663 | 0.242151 | 9.253476 | 80.024915 | 274.148630 | 557.386024 | 868.567007 |
| | | | | | | | | | 1184.177620 |
| | | | | | | | | | 1500.192391 |

Option prices for different K, using one month historical volatility.

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|----------------|---------------------|------------------------|-----------------------------------|-------------|-------------|-------------|-------------|-------------|--------------|
| NSE Index | Return = -0.001612, | Volatility = 0.132604, | Initial Stock price = 8192.900000 | | | | | | |
| K = | 4096.450000 | 4915.740000 | 5735.030000 | 6554.320000 | 7373.610000 | 8192.900000 | 9012.190000 | 9831.480000 | 10650.770000 |
| E. Call Prices | 4197.591711 | 3398.530054 | 2599.471702 | 1801.261970 | 1028.285190 | 414.401627 | 104.329193 | 16.026201 | 1.570420 |
| E. Put Prices | -0.000000 | 0.000001 | 0.003307 | 0.855233 | 26.940110 | 212.118205 | 701.107429 | 1411.866095 | 2196.471971 |
| | | | | | | | | | 2994.068239 |
| | | | | | | | | | 3793.029997 |

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|----------------|---------------------|------------------------|-----------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| NSE Stock 1 | Return = -0.054936, | Volatility = 0.185010, | Initial Stock price = 1336.400000 | | | | | | |
| K = | 668.200000 | 801.840000 | 935.480000 | 1069.120000 | 1202.760000 | 1336.400000 | 1470.040000 | 1603.680000 | 1737.320000 |
| E. Call Prices | 684.697917 | 554.358121 | 424.090606 | 295.395179 | 177.056505 | 86.586348 | 33.732667 | 10.540274 | 2.705579 |
| E. Put Prices | 0.000000 | 0.000621 | 0.073522 | 1.718512 | 13.720255 | 53.590514 | 131.077250 | 238.225273 | 360.730996 |
| | | | | | | | | | 488.953425 |
| | | | | | | | | | 618.817371 |

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| NSE Stock 2 | Return = -0.004940, | Volatility = 0.232486, | Initial Stock price = 206.750000 | | | | | | |
| K = | 103.375000 | 124.050000 | 144.725000 | 165.400000 | 186.075000 | 206.750000 | 227.425000 | 248.100000 | 268.775000 |
| E. Call Prices | 105.927369 | 85.766651 | 65.694477 | 46.292696 | 29.136890 | 16.083217 | 7.768582 | 3.315735 | 1.270024 |
| E. Put Prices | 0.000031 | 0.003846 | 0.096204 | 0.858955 | 3.867682 | 10.978542 | 22.828439 | 38.540124 | 56.658946 |
| | | | | | | | | | 75.997419 |
| | | | | | | | | | 95.861899 |

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|----------------|---------------------|------------------------|----------------------------------|------------|------------|------------|------------|------------|------------|
| NSE Stock 3 | Return = -1.220641, | Volatility = 0.301593, | Initial Stock price = 743.500000 | | | | | | |
| K = | 371.750000 | 446.100000 | 520.450000 | 594.800000 | 669.150000 | 743.500000 | 817.850000 | 892.200000 | 966.550000 |
| E. Call Prices | 380.939368 | 308.646932 | 237.810803 | 171.816366 | 115.396080 | 71.961097 | 41.865807 | 22.906473 | 11.894161 |
| E. Put Prices | 0.010828 | 0.232683 | 1.910847 | 8.430702 | 24.524707 | 53.604017 | 96.023019 | 149.577977 | 211.079957 |
| | | | | | | | | | 277.613301 |
| | | | | | | | | | 347.051641 |

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| NSE Stock 4 | Return = -0.208974, | Volatility = 0.214274, | Initial Stock price = 2685.200000 | | | | | | |
| K = | 1342.600000 | 1611.120000 | 1879.640000 | 2148.160000 | 2416.680000 | 2685.200000 | 2953.720000 | 3222.240000 | 3490.760000 |
| E. Call Prices | 1375.748971 | 1113.874388 | 852.601925 | 597.698837 | 369.258385 | 195.470962 | 87.996591 | 34.008537 | 11.490250 |
| E. Put Prices | 0.000059 | 0.015693 | 0.633448 | 7.620578 | 41.070343 | 129.173138 | 283.588984 | 491.491147 | 730.863079 |
| | | | | | | | | | 984.727369 |
| | | | | | | | | | 1244.103864 |

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| NSE Stock 5 | Return = -0.728886, | Volatility = 0.177761, | Initial Stock price = 128.800000 | | | | | | |
| K = | 64.400000 | 77.280000 | 90.160000 | 103.040000 | 115.920000 | 128.800000 | 141.680000 | 154.560000 | 167.440000 |
| E. Call Prices | 65.990042 | 53.428077 | 40.870542 | 28.433956 | 16.917502 | 8.090333 | 3.016824 | 0.881847 | 0.207352 |
| E. Put Prices | 0.000000 | 0.000027 | 0.004483 | 0.129890 | 1.175427 | 4.910250 | 12.398733 | 22.825747 | 34.713244 |
| | | | | | | | | | 47.108399 |
| | | | | | | | | | 59.636667 |

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| NSE Stock 6 | Return = -0.263720, | Volatility = 0.287098, | Initial Stock price = 275.000000 | | | | | | |
| K = | 137.500000 | 165.000000 | 192.500000 | 220.000000 | 247.500000 | 275.000000 | 302.500000 | 330.000000 | 357.500000 |
| E. Call Prices | 140.896841 | 114.128733 | 87.787615 | 63.064889 | 41.820742 | 25.519911 | 14.390930 | 7.563375 | 3.742276 |
| E. Put Prices | 0.001954 | 0.054868 | 0.534773 | 2.633070 | 8.209945 | 18.730137 | 34.422178 | 54.415646 | 77.415570 |
| | | | | | | | | | 102.255040 |
| | | | | | | | | | 128.110295 |

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|----------------|---------------------|------------------------|----------------------------------|------------|------------|------------|-------------|-------------|-------------|
| NSE Stock 7 | Return = -0.594927, | Volatility = 0.247594, | Initial Stock price = 939.050000 | | | | | | |
| K = | 469.525000 | 563.430000 | 657.335000 | 751.240000 | 845.145000 | 939.050000 | 1032.955000 | 1126.860000 | 1220.765000 |
| E. Call Prices | 481.118131 | 389.569753 | 298.644993 | 211.469001 | 135.119745 | 76.945005 | 39.075116 | 17.866715 | 7.456729 |
| E. Put Prices | 0.000518 | 0.038617 | 0.700334 | 5.110819 | 20.348041 | 53.759778 | 107.476366 | 177.854442 | 259.030934 |
| | | | | | | | | | 346.042555 |
| | | | | | | | | | 435.792559 |

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|----------------|---------------------|------------------------|----------------------------------|------------|------------|------------|------------|------------|------------|
| NSE Stock 8 | Return = -0.382656, | Volatility = 0.260864, | Initial Stock price = 465.900000 | | | | | | |
| K = | 232.950000 | 279.540000 | 326.130000 | 372.720000 | 419.310000 | 465.900000 | 512.490000 | 559.080000 | 605.670000 |
| E. Call Prices | 238.702238 | 193.296760 | 148.320444 | 105.509836 | 68.289263 | 39.874437 | 21.053365 | 10.145495 | 4.517411 |
| E. Put Prices | 0.000682 | 0.034892 | 0.498266 | 3.127346 | 11.346462 | 28.371325 | 54.989941 | 89.521761 | 129.333365 |
| | | | | | | | | | 172.137897 |
| | | | | | | | | | 216.437916 |

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|----------------|---------------------|------------------------|----------------------------------|------------|------------|------------|------------|------------|------------|
| NSE Stock 9 | Return = -0.637031, | Volatility = 0.248893, | Initial Stock price = 161.600000 | | | | | | |
| K = | 80.800000 | 96.960000 | 113.120000 | 129.280000 | 145.440000 | 161.600000 | 177.760000 | 193.920000 | 210.080000 |
| E. Call Prices | 82.795058 | 67.041024 | 51.398048 | 36.410638 | 23.294554 | 13.299057 | 6.780794 | 3.117380 | 1.309849 |
| E. Put Prices | 0.000099 | 0.007073 | 0.125105 | 0.898704 | 3.543627 | 9.309139 | 18.551883 | 30.649478 | 44.602955 |
| | | | | | | | | | 59.564335 |
| | | | | | | | | | 75.001838 |

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|----------------|--------------------|------------------------|----------------------------------|------------|------------|------------|------------|------------|------------|
| NSE Stock 10 | Return = 0.133499, | Volatility = 0.300795, | Initial Stock price = 629.900000 | | | | | | |
| K = | 314.950000 | 377.940000 | 440.930000 | 503.920000 | 566.910000 | 629.900000 | 692.890000 | 755.880000 | 818.870000 |
| E. Call Prices | 322.734983 | 261.483953 | 201.452119 | 145.501268 | 97.655161 | 60.827912 | 35.330900 | 19.290545 | 9.991589 |
| E. Put Prices | 0.008839 | 0.192581 | 1.595519 | 7.079439 | 20.668103 | 45.275625 | 81.213385 | 126.607801 | 178.743617 |
| | | | | | | | | | 235.140023 |
| | | | | | | | | | 293.990768 |

Question 2: Data in the mentioned file.

Question 1: Part 3

Part C



























































































































































































































