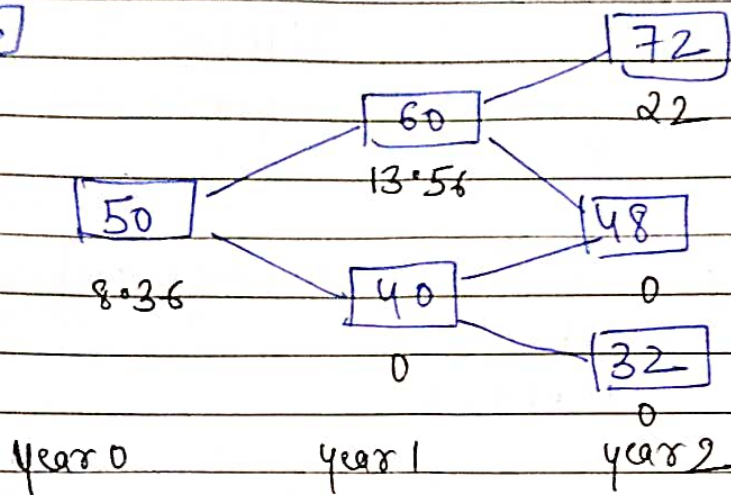


③

$$q = \frac{e^{-rt} - d}{u - d}$$

$$C = e^{-rt} (q \times P_{up} + (1-q) P_{down})$$

2.



$$u = 1.20 \quad d = 0.80 \quad q = \frac{e^{-rt} - d}{u - d} = \frac{e^{-0.06} - 0.80}{1.20 - 0.80} = 0.6545$$

$$1 - q = 0.3455$$

Option Payoffs

$$\max(S - K, 0)$$

$$At 72 \quad \max(72 - 50, 0) = 22$$

$$At 48 \text{ (from 60)} \quad \max(48 - 50, 0) = 0$$

$$At 48 \text{ (from 40)} \quad \max(48 - 50, 0) = 0$$

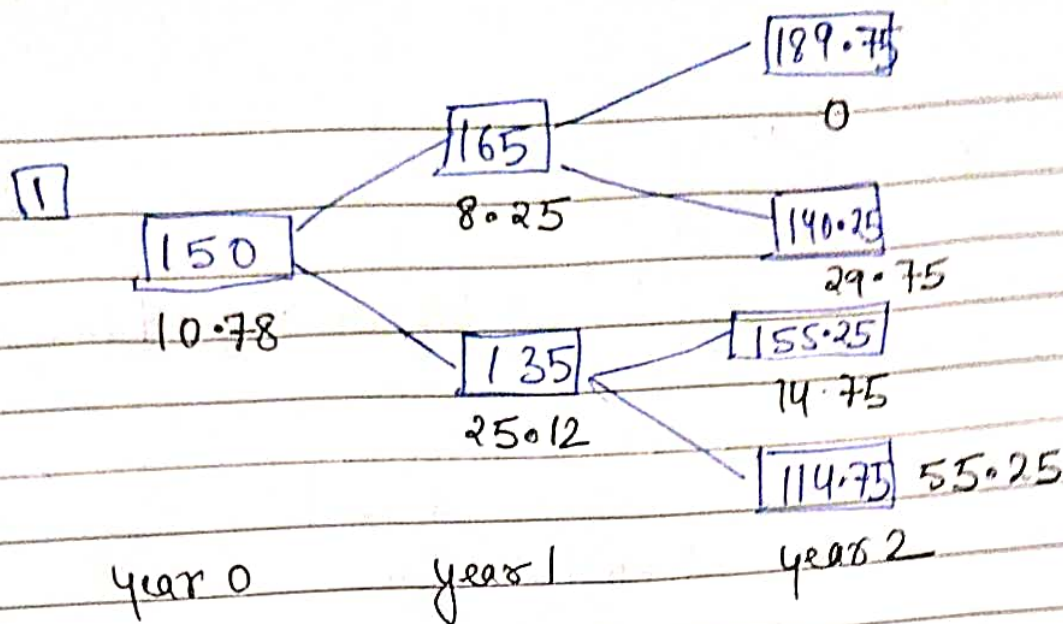
$$At 32 \quad \max(32 - 50, 0) = 0$$

$$At 60 \quad C = \frac{0.6545 \times 22 + 0.3455 \times 0}{1.0618} = 13.56$$

$$At 40 \quad C = \frac{0.6545 \times 0 + 0.3455 \times 0}{1.0618} = 0$$

Year 0

$$C = \frac{0.6545 \times 13.56 + 0.3455 \times 0}{1.0618} = 8.36$$



year 1

$$q_1 = \frac{e^{rt} - d}{u - d} \quad (u = 1.10, d = 0.90) = 0.809$$

$$1 - q_1 = 0.191$$

year 2

$$q_2 = \frac{e^{rt} - d}{u - d} \quad (u = 1.15, d = 0.85) = 0.706$$

$$1 - q_2 = 0.294$$

option Payoffs $\max(K - S, 0)$ $K = 170$

At 189.75 = 0
 At 140.25 = 29.75
 At 155.25 = 14.75
 At 114.75 = 55.25

year 1

At 165 option value = $\frac{0.706 \times 0 + 0.294 \times 29.75}{1.0618} = 8.25$

At 135 option value = $\frac{0.706 \times 14.75 + 0.294 \times 55.25}{1.0618} = 25.12$

year 0 option value = $\frac{0.809 \times 8.25 + 0.191 \times 25.12}{1.0618} = 10.78$