Solution to (23) Answer: (C)

Equation (21.22) of McDonald (2006) is

$$\alpha_{\text{option}} - r = \frac{SV_S}{V}(\alpha - r),$$

which, for this problem, translates to

$$\gamma(S(t),t) - 0.04 = \frac{S(t) \times \Delta(S(t),t)}{C(S(t),t)} \times (0.1 - 0.04).$$

Because

$$\frac{S(0) \times \Delta(S(0),0)}{C(S(0),0)} = \frac{9}{6} = 1.5,$$

we have

$$\gamma(S(0), 0) = 0.04 + 1.5 \times (0.1 - 0.04) = 0.13$$

(which is the time-0 continuously compounded expected rate of return on the option).

Remark: Equation (21.20) on page 687 of McDonald (2006) should be the same as (12.9) on page 393,

$$\sigma_{\text{option}} = |\Omega| \times \sigma,$$

and (21.21) should be changed to

$$\frac{\alpha - r}{\sigma} = \text{sign}(\Omega) \times \frac{\alpha_{\text{option}} - r}{\sigma_{\text{option}}}.$$

Note that Ω, α_{option}, and σ_{option} are functions of t.