

[Chapter 03] 연습문제 정답

3.1

$$[\text{풀이}] \quad \therefore y = c_1 e^{4x} + c_2 e^{-5x}$$

3.2

$$[\text{풀이}] \quad \therefore y = c_1 e^{4x} + c_2 e^{7x}$$

3.3

$$[\text{풀이}] \quad \therefore y = (c_1 + c_2 x) e^{5x}$$

3.4

$$[\text{풀이}] \quad \therefore y = (c_1 + c_2 x) e^{-3.5x}$$

3.5

$$[\text{풀이}] \quad \therefore y = e^{2x} (A \cos \sqrt{5}x + B \sin \sqrt{5}x)$$

3.6

$$[\text{풀이}] \quad \therefore y = e^{-4x} (A \cos x + B \sin x)$$

3.7

$$[\text{풀이}] \quad \therefore y'' - \frac{13}{6}y' + y = 0 \quad \text{또는} \quad 6y'' - 13y' + 6y = 0$$

3.8

$$[\text{풀이}] \quad \therefore y'' - 2\pi y' + \pi^2 y = 0$$

3.9

$$[\text{풀이}] \quad \therefore \quad y'' + 25y = 0$$

3.10

$$[\text{풀이}] \quad \therefore \quad y'' + 2\gamma y' + (\gamma^2 + \delta^2)y = 0$$

3.11

$$[\text{풀이}] \quad \therefore \quad y = -3e^{-1.2x} + 3e^{-0.7x}$$

3.12

$$[\text{풀이}] \quad \therefore \quad y = \frac{1}{2}(1+x)e^{\frac{1}{2}x}$$

3.13

$$[\text{풀이}] \quad \therefore \quad y = e^{-0.3x} \sin 2x$$

3.14

$$[\text{풀이}] \quad \therefore \quad y = 4(2e^{\frac{3}{2}x} - e^{2x})$$

3.15

$$[\text{풀이}] \quad \therefore \quad y = 2(1+x)e^{-3.5x}$$

3.16

$$[\text{풀이}] \quad \therefore \quad y = e^{-x}(\cos \pi x + \sin \pi x)$$

3.17

$$[\text{풀이}] \quad \therefore \quad y = (x+2)e^{-0.25x}$$

3.18

[풀이] $\therefore y = e^{0.1x}(\cos 10x - \sin 10x)$

3.19

[풀이] $\therefore y = c_1x^2 + c_2x^3$

3.20

[풀이] $\therefore y = (c_1 + c_2 \ln x)x^4$

3.21

[풀이] $\therefore y = x^2[A \cos(\sqrt{3} \ln x) + B \sin(\sqrt{3} \ln x)]$

3.22

[풀이] $\therefore y = c_1x + c_2x^{-1}$

3.23

[풀이] $\therefore y = (c_1 + c_2 \ln x)x^{0.7}$

3.24

[풀이] $\therefore y = \sqrt{x}[A \cos(3 \ln x) + B \sin(3 \ln x)]$

3.25

[풀이] $\therefore y = 10x^{0.25} + x^{-5}$

3.26

[풀이] $\therefore y = (1 + 4 \ln x)x^{2.6}$

3.27

$$[\text{풀이}] \quad \therefore y = 3\cos(4\ln x) + \sin(4\ln x)$$

3.28

$$[\text{풀이}] \quad \therefore y = x^{-0.5} + 2x^{-1.5}$$

3.29

$$[\text{풀이}] \quad \therefore y = (c_1 + c_2 \ln x)x^{\frac{1-a}{2}}$$

3.30

$$[\text{풀이}] \quad \therefore y = e^{-2x}(A \cos \sqrt{2}x + B \sin \sqrt{2}x) + 12e^{-3x}$$

3.31

$$[\text{풀이}] \quad \therefore y = c_1 e^{4x} + c_2 e^{-x} + \frac{1}{5} x e^{4x}$$

3.32

$$[\text{풀이}] \quad \therefore y = A \cos x + B \sin x - x \cos x$$

3.33

$$[\text{풀이}] \quad \therefore y = A \cos 2x + B \sin 2x + x^2 + e^{-2x}$$

3.34

$$[\text{풀이}] \quad \therefore y = e^x - x$$

3.35

$$[\text{풀이}] \quad \therefore y = \left(\frac{1}{2} x^2 - 1 \right) e^{-x}$$

3.36

[풀이] $\therefore y = \cos 2x + 2 \sin 2x + x^2 + e^{-2x}$

3.37

[풀이] $\therefore y = y_h + y_p = e^{0.5x} - 2 \cos x + e^x$

3.38

[풀이] (a) 생략

(b) $\therefore y(t) = A \cos \sqrt{\frac{k}{m}} t + B \sin \sqrt{\frac{k}{m}} t$

3.39

[풀이] (a) $\therefore my'' + cy' + ky = 0$

(b) $\therefore y_p(t) = \frac{F_0(k - m\omega^2)}{(k - m\omega^2)^2 + \omega^2 c^2} \cos \omega t + \frac{F_0 \omega c}{(k - m\omega^2)^2 + \omega^2 c^2} \sin \omega t$

3.40

[풀이] $\therefore I(t) = e^{-3t}(3 \sin 4t - 4 \cos 4t) + 4 \cos 5t$

3.41

[풀이] $\therefore I(t) = e^{-4t}(1.5 \cos 3t - \frac{10}{3} \sin 3t) - 1.5 \cos 10t + 1.6 \sin 10t$