OPTION 1 $\quad t$ EXPRESSED IN SECONDS

$$f(t) = 3\cdot 10^3 \cdot t \quad , \quad 0 \leq t < 2\cdot 10^{-3}$$
$$= -\sqrt{6} \quad , \quad 2\cdot 10^{-3} \leq t < 4\cdot 10^{-3}$$

$$\frac{1}{T}\int_0^T f^2(t)\,dt = \frac{1}{4\cdot 10^{-3}}\left[\int_0^{2\cdot 10^{-3}} (3\cdot 10^3\, t)^2\,dt + \int_{2\cdot 10^{-3}}^{4\cdot 10^{-3}} (-\sqrt{6})^2\,dt\right]$$

$$= \frac{1}{4\cdot 10^{-3}}\left[9\cdot 10^6 \cdot \frac{t^3}{3}\Big|_0^{2\cdot 10^{-3}} + 6\cdot 2\cdot 10^{-3}\right]$$

$$= \frac{1}{4\cdot 10^{-3}}\left[\frac{9\cdot 8}{3}\cdot 10^{-3} + 12\cdot 10^{-3}\right]$$

$$= \frac{24+12}{4} = \frac{36}{4} = 9$$

$$\sqrt{\frac{1}{T}\int_0^T f^2(t)\,dt} = \boxed{V_{RMS} = 3V}$$

OPTION 2 $\quad t$ EXPRESSED IN mS

$$f(t) = 3\cdot t \quad , \quad 0 \leq t < 2$$
$$= -\sqrt{6} \quad , \quad 2 \leq t < 4$$

$$\frac{1}{T}\int_0^T f^2(t)\,dt = \frac{1}{4}\left[\int_0^2 (3t)^2\,dt + \int_2^4 (-\sqrt{6})^2\,dt\right] = \frac{1}{4}\left[9\,\frac{t^3}{3}\Big|_0^2 + 6\cdot 2\right]$$

$$= \frac{1}{4}\left[\frac{9\cdot 8}{3} + 12\right] = \frac{36}{4} = 9$$

$$\boxed{V_{RMS} = 3\,V}$$