① Text, 2-56h, i

(h) $g(t) = 12 + \frac{\sin 4\pi t}{4\pi t}$

$g(-t) = 12 + \frac{\sin 4\pi(-t)}{4\pi(-t)}$

$= 12 + \frac{-\sin 4\pi t}{-4\pi t}$

$= 12 + \frac{\sin 4\pi t}{4\pi t}$

$g_e(t) = \frac{g(t) + g(-t)}{2}$

$= \frac{12 + \frac{\sin 4\pi t}{4\pi t} + 12 + \frac{\sin 4\pi t}{4\pi t}}{2}$

$= \boxed{12 + \frac{\sin 4\pi t}{4\pi t}}$

$g_o(t) = g(t) - g_e(t) = \boxed{0}$

(i) $g(t) = (8 + 7t)\cos 32\pi t$

$g(-t) = (8 - 7t)\cos 32\pi(-t)$

$= (8 - 7t)\cos 32\pi t$

$g_e(t) = \frac{g(t) + g(-t)}{2} = \frac{(8+7t)\cos 32\pi t + (8-7t)\cos 32\pi t}{2}$

$= \frac{16\cos 32\pi t}{2} = \boxed{8\cos 32\pi t}$

$g_o(t) = \frac{g(t) - g(-t)}{2} = \frac{(8 + 7t)\cos 32\pi t - (8 - 7t)\cos 32\pi t}{2}$

$= \frac{14t\cos 32\pi t}{2} = \boxed{7t\cos 32\pi t}$

(2) 2-59 d, e

(d) $g(t) = 28\sin(2\pi 200t) + 12\cos(2\pi 250t)$

$f_1 = 200$ Hz, $T_1 = \frac{1}{200}$ sec; $f_2 = 250$ Hz, $T_2 = \frac{1}{250}$ sec

$$T_0 = \text{LCM}\left(\frac{1}{200}, \frac{1}{250}\right) = \frac{\text{LCM}\left(\frac{1000}{200}, \frac{1000}{250}\right)}{1000} = \frac{\text{LCM}(5,4)}{1000}$$

$$T_0 = \frac{20}{1000} = \frac{1}{50} \text{ sec}$$

Fundamental period = $\boxed{\frac{1}{50} \text{ sec}}$ fundamental

(e) $g(t) = 10\sin(5t) - 4\cos(7t)$

$$= 10\sin 2\pi\left(\frac{5}{2\pi}\right)t - 4\cos 2\pi\left(\frac{7}{2\pi}\right)t$$

$f_1 = \frac{5}{2\pi}$ Hz, $T_1 = \frac{2\pi}{5}$ sec; $f_2 = \frac{7}{2\pi}$ Hz, $T_2 = \frac{2\pi}{7}$ sec

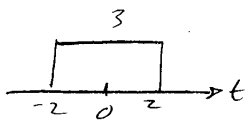
$$T_0 = \text{LCM}\left(\frac{2\pi}{5}, \frac{2\pi}{7}\right) = \frac{\text{LCM}\left(\frac{35}{2\pi}\frac{2\pi}{5}, \frac{35}{2\pi}\frac{2\pi}{7}\right)}{\left(\frac{35}{2\pi}\right)} = \frac{\text{LCM}(7,5)}{\left(\frac{35}{2\pi}\right)}$$

$$= \frac{35}{\left(\frac{35}{2\pi}\right)} = \boxed{2\pi}$$

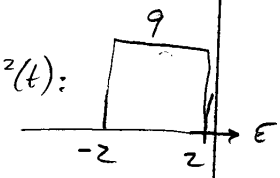
periodic

(3) Text, 2-60c, f

(c) $x(t) = 3\,\mathrm{rect}(t/4)$



$x^2(t)$:



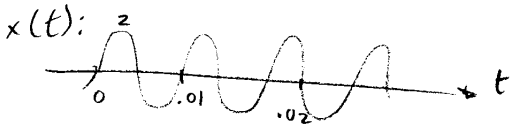
E = area of $x^2(t) = 9 \cdot 4 = \boxed{36}$

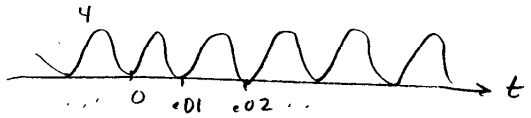
Finite E, energy signal

(f) $x(t) = 2\sin(2\pi 100 t)$

$x^2(t) = 4\sin^2(2\pi 100 t)$

$x(t)$:





$\boxed{E = \infty}$ power signal