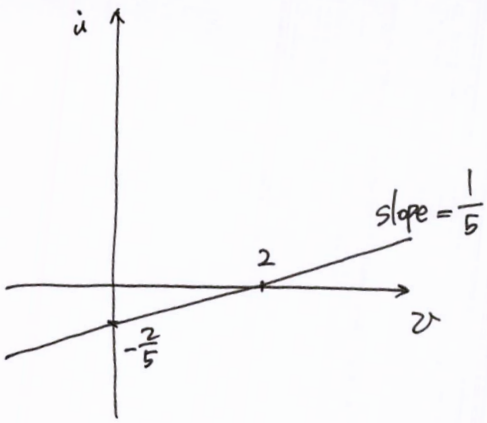
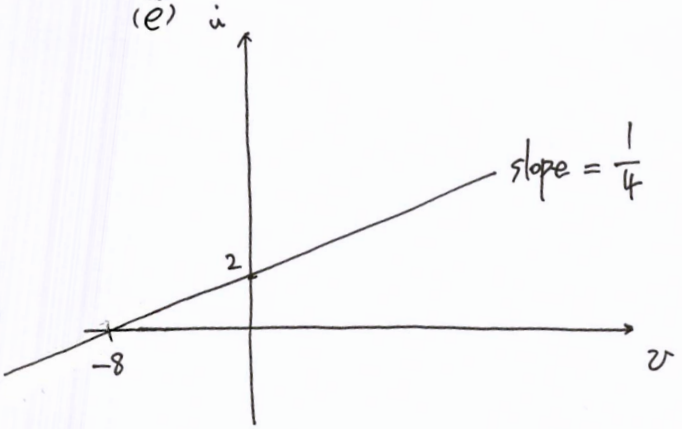
2.3 (c) 2Ω (d) 2Ω

2.8 (c)

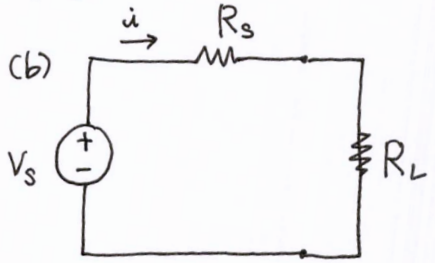


(e)



2.9 2W

2.11 (b)



$$i = \frac{V_s}{R_s + R_L}$$

Power dissipated in R_L

$$P = i^2 R_L$$

$$= \left(\frac{V_s}{R_s + R_L}\right)^2 R_L = \frac{V_s^2}{(R_s + R_L)^2} R_L$$

(R_s: fixed, R_L: variable)

$$\frac{dP}{dR_L} = V_s^2 \cdot \frac{(R_s+R_L)^2 - R_L \times 2(R_s+R_L)}{(R_s+R_L)^4}$$

$$= V_s^2 \cdot \frac{(R_s+R_L)(R_s+R_L-2R_L)}{(R_s+R_L)^4}$$

$$= V_s^2 \cdot \frac{R_s - R_L}{(R_s+R_L)^3}$$

Let $\frac{dP}{dR_L} = V_s^2 \cdot \frac{R_s - R_L}{(R_s+R_L)^3} = 0 \Rightarrow R_s = R_L$

(i) $R_L < R_s$

$\frac{dP}{dR_L} > 0$

(ii) $R_L > R_s$

$\frac{dP}{dR_L} < 0$

$\therefore$ P is maximum when $R_L = R_s$. □

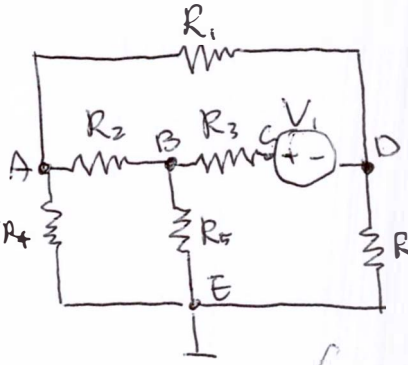
* 2.3 (c), (d) / 2.8 (c), (e) / 2.9

: You will get the point only if your answers are correct.

* Especially, without the graph, you get 0 point on problem 2.8 (c), (e)

Exercise 3.1 $\frac{8}{43}$ A

3.18 (b)



① $V_C = V_D + V_1$

② $V_E = 0$

(KCL)

Node A: $\frac{(V_A - V_E)}{R_4} + \frac{(V_A - V_B)}{R_2} + \frac{(V_A - V_D)}{R_1} = 0$

Node B: $\frac{(V_B - V_A)}{R_2} + \frac{(V_B - V_E)}{R_5} + \frac{(V_B - V_C)}{R_3} = 0$

Supernode CD: $\frac{(V_D - V_A)}{R_1} + \frac{(V_D - V_E)}{R_6} + \frac{(V_C - V_B)}{R_3} = 0$

Node E: $\frac{(V_E - V_A)}{R_4} + \frac{(V_E - V_B)}{R_5} + \frac{(V_E - V_D)}{R_6} = 0$

You must write 3 of KCL node equations

Also, if you use both of V_C and V_D, equation ① should be included. similarly, V_E - ②.

you get 0.5 point when you make a trivial mistake.

(ex) $V_C = V_D + 1$ / write V_B as V_8.

3.25 $\frac{45}{22}$ V

3.10 1) $\frac{e_2 - e_1}{3} + \frac{e_1}{6} + \frac{3 - e_1}{6} = 0$, $2 - \frac{e_2}{3} + \frac{e_1 - e_2}{3} = 0 \rightarrow i = \frac{e_1}{6} = 0.5A$

2) $i_1 = \frac{1}{6}A$. $i_2 = \frac{1}{3}A$ $i = i_1 + i_2 = 0.5A$

3) $i = \frac{1.5}{3} = 0.5A$