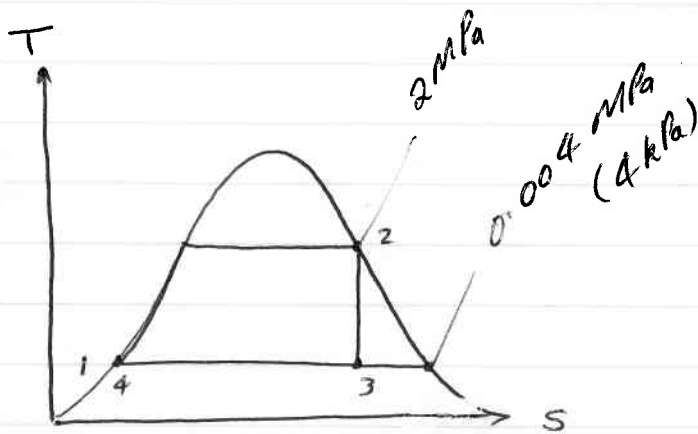


Qu 1
(a)



$$\eta_{th} = \frac{h_2 - h_3}{h_2 - h_1} \quad \& \quad s_2 = s_3$$

From tables $h_2 = 2797.2 \text{ kJ/kg}$ $s_2 = 6.337 \text{ kJ/kg K}$

$h_1 = 121.4$ "

@ 4 kPa $s_3 = s_g + x(s_g - s_f) = 6.337$

$$0.422 + x(8.475 - 0.422) = 6.337$$

whence $x = 0.735$

$$\therefore h_3 = 121.4 + 0.735 \times 2433.1 = 1908.5 \text{ kJ/kg}$$

$$\eta_{th} = \frac{2797.2 - 1908.5}{2797.2 - 121.4} = \underline{0.332} \quad (33.2\%)$$

$$w = h_2 - h_3 = 2797.2 - 1908.5 = \underline{888.7 \text{ kJ/kg}}$$

(b) Repeating calc at 4 MPa

$h_2 = 2800.3$ $s_2 = 6.069$

whence $x = \frac{6.069 - 0.422}{8.475 - 0.422} = \underline{0.701}$

$$h_3 = 121.4 + 0.701 \times 2433.1 = 1827.6 \text{ kJ/kg}$$

$$\eta_{th} = \frac{2800.3 - 1827.6}{2797.2 - 121.4} = \underline{0.364} \quad (36.4\%)$$

$$w = 2800.3 - 1827.6 = \underline{972.7 \text{ kJ/kg}}$$