(ii) GIVEN

Rigid Tank
- >> 4 kg of CO(g) contained mass, m
- >> vol $\equiv V = 1\ m^3$
- >> paddle wheel $\dot{W} = -14$ W for $t = 1$ hr
- >> internal EN increase $\Delta U_{specific} = 10$ kJ/kg

FIND
(a) specific volume, $V_{specific,f}$ at final state in m^3/kg
(b) EN transfer by work in kJ
(c) EN transfer by heat, in kJ, and direction.

EQN

$$\frac{dm}{dt}_{sys} = \sum_{in} \dot{m}_{in} - \sum_{out} \dot{m}_{out}$$

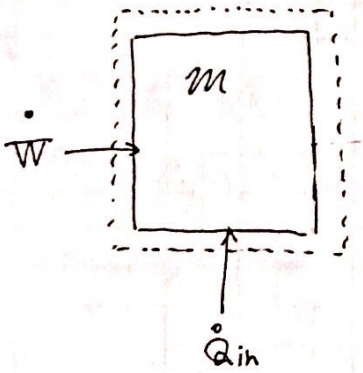
$$\Delta Q = \Delta U + \Delta W$$

$$PE = gz$$

ASSUMP closed sys.

Quasiequilibrium.
no overall KE & PE
closed sys.

FBD sys. rigid tank



SOLN

(a) the volume and mass of system does not change so

$$V_{specific} = (1\ m^3)/(4\ kg) = \boxed{0.250\ \frac{m^3}{kg}}$$

(b) work done to gas is $(-14\ W)(60 \times 60\ s) \times 10^{-3} = \boxed{-50.4\ kJ}$

(c) $\dot{Q} = \dot{U} + \dot{W}$

$$= \left(\frac{10\ kJ}{kg}\right)(4\ kg) + (-50.4\ kJ) = -10.4\ kJ$$

$$\boxed{\dot{Q}_{in} = -10.4\ kJ}$$