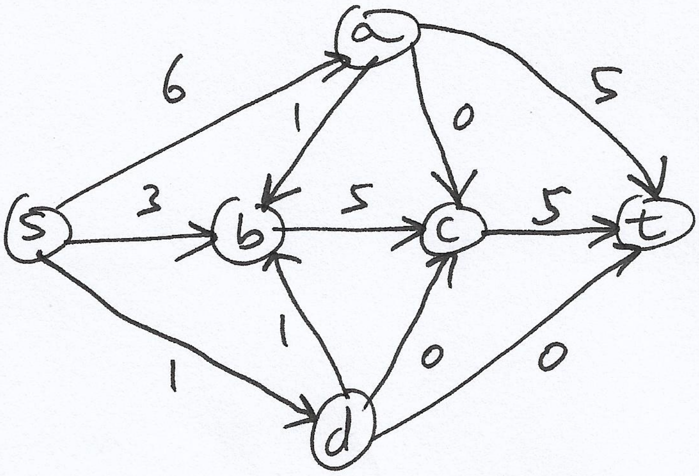
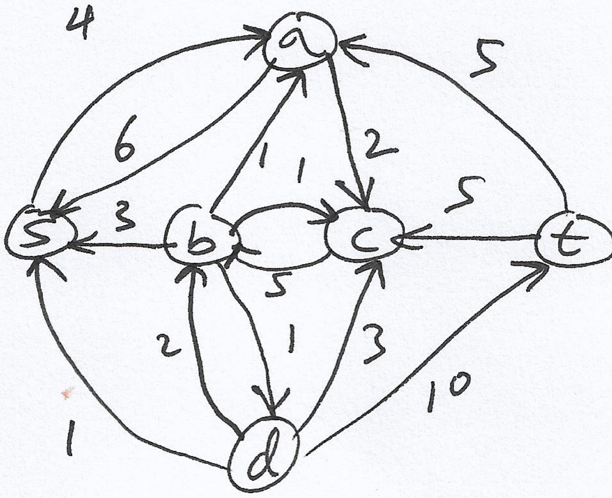
4: (a) $v(f)$ = flow out of s = $6+3+1 = 10$ (2)

f

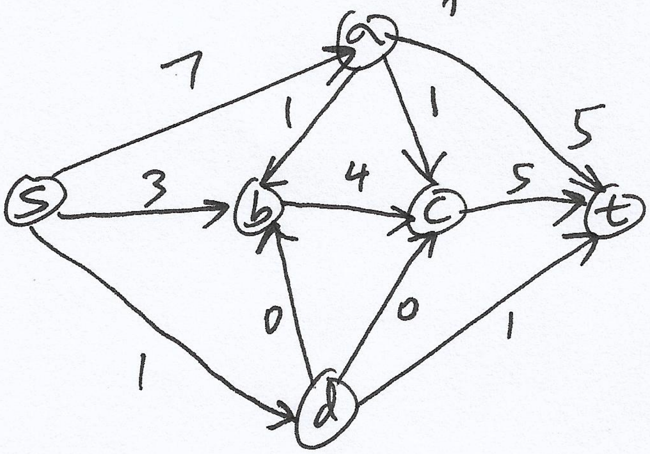




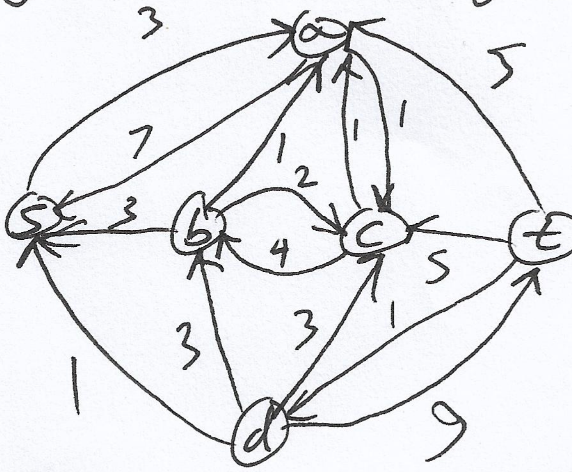
(2)

This is not a max flow because an s-t path s-a-c-b-d-t exists in G_f with bottleneck = 1. (2) Augmenting this flow, we get:

f'



$G_{f'}$



(2)

Now there is no s-t path in $G_{f'}$ ⇒

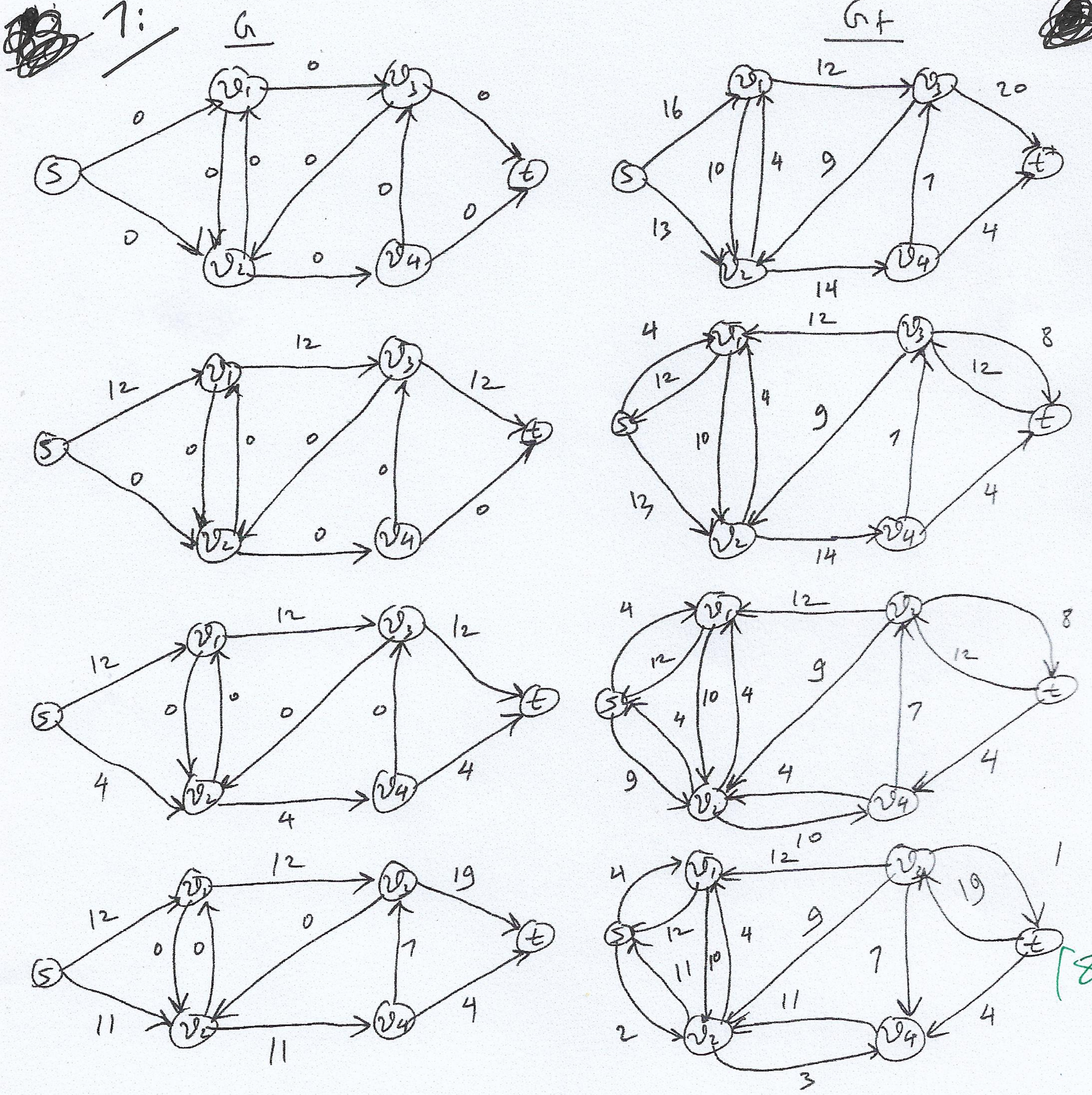
max flow = $7+3+1 = 11$ = flow out of s. (2)

(b) min-s-t-cut = {set of vertices in $G_{f'}$ reachable from s}, {set of vertices in $G_{f'}$ not reachable from s}

= {s, a, b, c}, {d, t}. (5)

min cut capacity = capacity into {d, t} = $5+5+1 = 11$ (5)

[redacted] 7: [redacted] 2



(8)

ⓐ max s-t flow = $12 + 11 = 23$ (2)

ⓑ Min s-t cut is given by the set of vertices reachable from s in G_f = $\{s, v_1, v_2, v_4\}, \{t, v_3\}$ (5)

Size of min cut = capacity coming in $\{t, v_3\}$

$= 12 + 7 + 4 = 23$ (5)