Problem 1

a. Maximum of 2 (diagonal), -4 (vertical) and -11 (horizontal)

b. 2

c.
```
t t c a      or      t t c a
t - - a              - t - a
```

d. (i) 4

(ii)
```
t t c a g
t a c a -
```

Problem 2

a. 5

b.
```
h  a  -  t
e  a  s  t
```

		h	a	t
	0	-4	-8	-12
e	-4	-1	-5	-9
a	-8	-5	4	0
s	-12	-9	0	3
t	-16	-13	-4	5

Note: For problems 3 and 4, (a) and (b) should have read as follows:

a. What is the optimal semi-global alignment score?

b. What is the optimal semi-global alignment?

I apologize if this caused any confusion. As a result, I will only look at your dynamic programming matrix and you will not be graded on your answers to (a) and (b)

Problem 3

a. 11

b. - a c a c
t a c - c

		t	a	c	c
	0	0	0	0	0
a	0	-1	5	1	-1
c	0	-1	1	10	6
a	0	-1	4	6	9
c	0	-1	4	9	11

Problem 4

a. 5 points

b. t a t a -
c a - a g

		c	a	a	g
	0	0	0	0	0
t	0	-1	-1	-1	-1
a	0	-1	4	4	0
t	0	-1	0	3	3
a	0	-1	4	5	2

Problem 5

		t	o	e
	0	0	0	0
s	0	0	0	0
t	0	5	1	0
e	0	1	4	6
p	0	0	0	3
s	0	0	0	0

```
Alignment is:  t - e
               t o e
```

Note: for *local* alignment, traceback begins with the highest scoring value anywhere in the matrix, and stops at 0. For example, the optimal local alignment score between *toer* and *steps* is also 6 and yields the same alignment as above.

		t	o	e	r
	0	0	0	0	0
s	0	0	0	0	0
t	0	5	1	0	0
e	0	1	4	6	2
p	0	0	0	2	5
s	0	0	0	0	1