Problem 3.

Index	Codebook entry
1	a
2	b
3	r
4	y
5	ƀ
6	a ƀ
7	ƀb
8	ba
9	ar
10	r ƀ
11	ƀa
12	arr
13	ra
14	ay
15	y ƀ
16	ƀby
17	y ƀb
18	bar
19	rr
20	ray
21	ya
22	ar ƀ
23	ƀa_-

The transmitted sequence is: 1, 5, 2, 1, 3, 5, 9, 3, 1, 4, 7, 15, 8, 3, 13, 4, 9, 7, 14.

Problem 4.

Index	Codebook entry
1	a
2	ƀ
3	h
4	i
5	s
6	t
7	th
8	hi
9	is
10	s ƀ
11	ƀh
12	ha
13	at
14	t ƀ
15	ƀi
16	is ƀ
17	ƀhi
18	is ƀh
19	hat
20	t ƀi
21	it
22	t ƀis
23	s ƀh
24	his
25	s ƀha
26	at_-

The decoded message is *this hat is his hat it is his hat*.

Problem 5.

Index	Codebook entry
1	a
2	b
3	r
4	t
5	ra
6	at
7	ta
8	ata
9	$atat$
10	$t\,b$
11	ba
12	$a\,b$
13	br
14	rat
15	$t\,ba$
16	$at\,b$
17	bab
18	bra
19	$at\_$

The decoded message is *ratatatat a rat at a rat*.

Problem 6.

The encoded sequence is: <0, 0, C(*b*)> <0, 0, C(*a*)> <0, 0, C(*r*)> <1, 1, C(*a*)>
<0, 0, C(*y*)> <5, 2, C(Δ)> <9, 3, C(Δ)> <4, 1, C(*y*)> <7, 4, C(*r*)> <3, 1, C(*y*)>
<12, 4, C(*a*)>

Problem 8.

Initial dictionary:

Index	Entry
1	S
2	b
3	I
4	T
5	H

Received sequence: 4, 5, 3, 1, 2, 8, 2, 7, 9, 7, 4

Received	Decode	Update Dictionary	
4	T	Entry 6: $T\ldots$	
5	H	Entry 6: TH	Entry 7: $H\ldots$
3	I	Entry 7: HI	Entry 8: $I\ldots$
1	S	Entry 8: IS	Entry 9: $S\ldots$
2	b	Entry 9: $S\,b$	Entry 10: $b\ldots$
8	IS	Entry 10: $b I$	Entry 11: $IS\ldots$
2	b	Entry 11: $IS\,b$	Entry 12: $b\ldots$
7	HI	Entry 12: $b H$	Entry 13: $HI\ldots$
9	$S\,b$	Entry 13: HIS	Entry 14: $S\,b$
7	HI	Entry 14: $S\,bH$	Entry 15: $HI\ldots$
4	T	Entry 15: HIT	Entry 16: $T\ldots$

Final dictionary:

Index	Entry
1	S
2	b
3	I
4	T
5	H
6	TH
7	HI
8	IS
9	$S\,b$
10	$b I$
11	$IS\,b$
12	$b H$
13	HIS
14	$S\,bH$
15	HIT
16	$T\ldots$