

<u>1</u>		
Maturity/	Yield	Z
0.25	6.33%	0.98
0.50	6.49%	0.97
0.75	6.62%	0.95
1.00	6.71%	0.94
1.25	6.79%	0.92
1.50	6.84%	0.90
1.75	6.87%	0.89
2.00	6.88%	0.87
2.25	6.89%	0.86
2.50	6.88%	0.84
2.75	6.86%	0.83
3.00	6.83%	0.82
3.25	6.80%	0.80
3.50	6.76%	0.79
3.75	6.72%	0.78
4.00	6.67%	0.77
4.25	6.62%	0.76
4.50	6.57%	0.75
4.75	6.51%	0.74
5.00	6.45%	0.73
5.25	6.39%	0.72
5.50	6.31%	0.71
5.75	6.24%	0.70
6.00	6.15%	0.70
6.25	6.05%	0.69
6.50	5.94%	0.68
6.75	5.81%	0.68
7.00	5.67%	0.68
7.25	5.50%	0.67
7.50	5.31%	0.67

1.a

r	6.50%
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t	coupon	pv
0.25	1.63	1.60
0.50	1.63	1.57
0.75	1.63	1.55
1.00	1.63	1.52
1.25	1.63	1.49
1.50	1.63	1.47
1.75	1.63	1.44
2.00	1.63	1.42
2.25	1.63	1.40
2.50	1.63	1.37
2.75	1.63	1.35
3.00	101.63	83.08
	price	99.27

1.b

r	6.80%
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t	c	pv
-0.50		
0.00		103.44
0.50	6.80%	106.80

1.c

t	r	c	cf	pv
-0.25	6.40%			
0.00				
0.25		6.70%	103	101.75
0.50		0.00%	0	0.00
0.75		0.30%	0.15	0.14
1.00		0.00%	0	0.00
1.25		0.30%	0.15	0.14
1.50		0.00%	0	0.00
1.75		0.30%	0.15	0.13
2.00		0.00%	0	0.00

2.25		0.30%	0.15	0.13
2.50		0.00%	0	0.00
2.75		0.30%	0.15	0.12
3.00		0.00%	0	0.00
3.25		0.30%	0.15	0.12
3.50		0.00%	0	0.00
3.75		0.30%	0.15	0.12
4.00		0.00%	0	0.00
4.25		0.30%	0.15	0.11
4.50		0.00%	0	0.00
4.75		0.30%	0.15	0.11
5.00		0.00%	0	0.00
5.25		0.30%	0.15	0.11
5.50		0.00%	0	0.00
5.75		0.30%	0.15	0.11
6.00		0.00%	0	0.00
6.25		0.30%	0.15	0.10
			price	103.20

2

c	6.50%
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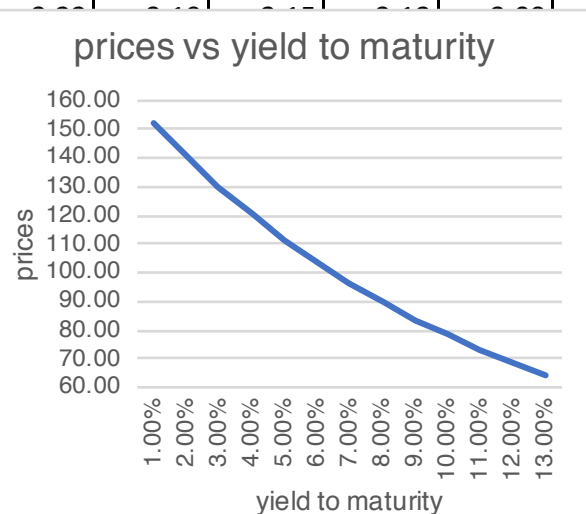
2.a

ytm	6.50%
	6.00%
	7.00%

t	coupon	Z6.5	Z6	Z7	pv6.5	pv6	pv7
0.50	3.25	0.97	0.97	0.97	3.15	3.16	3.14
1.00	3.25	0.94	0.94	0.93	3.05	3.06	3.03
1.50	3.25	0.91	0.92	0.90	2.95	2.97	2.93
2.00	3.25	0.88	0.89	0.87	2.86	2.89	2.83
2.50	3.25	0.85	0.86	0.84	2.77	2.80	2.74
3.00	3.25	0.83	0.84	0.81	2.68	2.72	2.64
3.50	3.25	0.80	0.81	0.79	2.60	2.64	2.55
4.00	3.25	0.77	0.79	0.76	2.52	2.57	2.47
4.50	3.25	0.75	0.77	0.73	2.44	2.49	2.38
5.00	3.25	0.73	0.74	0.71	2.36	2.42	2.30
5.50	3.25	0.70	0.72	0.68	2.29	2.35	2.23
6.00	3.25	0.68	0.70	0.66	2.21	2.28	2.15
6.50	3.25	0.66	0.68	0.64	2.14	2.21	2.08
7.00	3.25	0.64	0.66	0.62	2.08	2.15	2.01
7.50	3.25	0.62	0.64	0.60	2.01	2.09	1.94
8.00	3.25	0.60	0.62	0.58	1.95	2.03	1.87
8.50	3.25	0.58	0.61	0.56	1.89	1.97	1.81
9.00	3.25	0.56	0.59	0.54	1.83	1.91	1.75
9.50	3.25	0.54	0.57	0.52	1.77	1.85	1.69
10.00	103.25	0.53	0.55	0.50	54.46	57.17	51.89
				price	100.00	103.72	96.45

2.b

t	coupon	1.00%	2.00%	3.00%	4.00%	5.00%	6.00%	7.00%	8.00%	9.00%	10.00%	11.00%	12.00%	13.00%
0.50	3.25	3.23	3.22	3.20	3.19	3.17	3.16	3.14	3.13	3.11	3.10	3.08	3.07	3.05
1.00	3.25	3.06	3.03	3.00	2.98	2.95	2.92	2.89	2.87	2.85	2.81	2.77	2.73	2.69
1.50	3.25	2.97	2.93	2.89	2.85	2.81	2.77	2.73	2.69	2.65	2.61	2.57	2.53	2.49
2.00	3.25	2.89	2.83	2.78	2.73	2.67	2.62	2.57	2.53	2.49	2.43	2.36	2.29	2.23
2.50	3.25	2.80	2.74	2.67	2.61	2.55	2.49	2.43	2.39	2.31	2.23	2.16	2.09	2.03
3.00	3.25	2.72	2.64	2.57	2.50	2.43	2.36	2.29	2.23	2.16	2.09	2.01	1.92	1.84
3.50	3.25	2.64	2.55	2.47	2.39	2.31	2.23	2.16	2.09	2.01	1.92	1.81	1.73	1.63
4.00	3.25	2.57	2.47	2.37	2.29	2.20	2.12	2.04	1.96	1.84	1.73	1.63	1.53	1.43
4.50	3.25	2.49	2.38	2.28	2.19	2.09	2.00	1.90	1.81	1.71	1.62	1.52	1.43	1.35
5.00	3.25	2.42	2.30	2.20	2.09	2.00	1.90	1.81	1.71	1.62	1.54	1.44	1.36	1.26
5.50	3.25	2.35	2.23	2.11	2.00	1.90	1.80	1.71	1.62	1.54	1.46	1.36	1.26	1.19
6.00	3.25	2.28	2.15	2.03	1.92	1.81	1.71	1.62	1.53	1.43	1.35	1.26	1.19	1.11
6.50	3.25	2.21	2.08	1.95	1.83	1.72	1.62	1.52	1.43	1.35	1.26	1.19	1.11	1.05
7.00	3.25	2.15	2.01	1.88	1.75	1.64	1.54	1.44	1.35	1.26	1.19	1.11	1.05	0.98
7.50	3.25	2.09	1.94	1.80	1.68	1.56	1.46	1.36	1.26	1.19	1.11	1.05	0.98	0.91
8.00	3.25	3.00	2.77	2.56	2.37	2.19	2.03	1.87	1.74	1.61	1.49	1.38	1.28	1.19
8.50	3.25	2.99	2.74	2.52	2.32	2.14	1.97	1.81	1.67	1.54	1.42	1.31	1.21	1.11
9.00	3.25	2.97	2.72	2.49	2.28	2.08	1.91	1.75	1.60	1.47	1.35	1.24	1.14	1.05
9.50	3.25	2.96	2.69	2.45	2.23	2.03	1.85	1.69	1.54	1.41	1.29	1.18	1.07	0.98
10.00	103.25	93.45	84.62	76.66	69.48	63.01	57.17	51.89	47.12	42.81	38.91	35.39	32.19	29.30
	price	152.22	140.60	130.05	120.44	111.69	103.72	96.45	89.81	83.74	78.19	73.11	68.46	64.19



3
3.a

t	c	p
0.50	0.00%	96.80
1.00	5.75%	99.56
1.50	7.50%	100.86
2.00	7.50%	101.22

t	Z
0.50	0.97
1.00	0.94
1.50	0.90
2.00	0.87

$$99.56 = (5.75/2) * Z_{0.5} + (5.75/2 + 100) * Z_1$$

$$100.86 = (7.5/2) * Z_{0.5} + (7.5/2) * Z_1 + (7.5/2 + 100) / Z_{1.5}$$

3.b

t	c	p
1.00	8.00%	102.13
1.00	12.47%	107.00

note		
t	cf	pv
0.50	4.00	3.87
1.00	104.00	97.84
	price	101.71

bond		
t	cf	pv
0.50	6.24	6.04
1.00	106.24	99.94
	price	105.97

No, discount factor is counted today, so there is future function

4

t	ytm	Z	r_-0.25
0.25	6.23%	0.98	6.24%
0.50	6.39%	0.97	
0.75	6.51%	0.95	
1.00	6.60%	0.94	
1.25	6.68%	0.92	
1.50	6.73%	0.90	
1.75	6.75%	0.89	
2.00	6.76%	0.87	
2.25	6.77%	0.86	
2.50	6.76%	0.84	
2.75	6.74%	0.83	
3.00	6.72%	0.82	
3.25	6.69%	0.80	
3.50	6.65%	0.79	
3.75	6.61%	0.78	
4.00	6.56%	0.77	
4.25	6.51%	0.76	
4.50	6.46%	0.75	
4.75	6.41%	0.74	
5.00	6.35%	0.73	
5.25	6.29%	0.72	
5.50	6.21%	0.71	
5.75	6.14%	0.70	
6.00	6.06%	0.70	
6.25	5.96%	0.69	
6.50	5.85%	0.68	
6.75	5.73%	0.68	
7.00	5.59%	0.68	

A	A1			A2		
w	40%			25%		
c	5.00%			2.50%		
t	4.25			7.00		
t_q	coupon	PV	D	coupon	PV	D
0.25	2.5000	2.4614	0.0065	0.0000	0.0000	0.0000
0.50	0.0000	0.0000	0.0000	1.2500	1.2107	0.0074
0.75	2.5000	2.3809	0.0187	0.0000	0.0000	0.0000
1.00	0.0000	0.0000	0.0000	1.2500	1.1702	0.0143
1.25	2.5000	2.2997	0.0302	0.0000	0.0000	0.0000
1.50	0.0000	0.0000	0.0000	1.2500	1.1300	0.0208
1.75	2.5000	2.2215	0.0408	0.0000	0.0000	0.0000
2.00	0.0000	0.0000	0.0000	1.2500	1.0919	0.0268
2.25	2.5000	2.1468	0.0507	0.0000	0.0000	0.0000
2.50	0.0000	0.0000	0.0000	1.2500	1.0556	0.0324
2.75	2.5000	2.0770	0.0600	0.0000	0.0000	0.0000
3.00	0.0000	0.0000	0.0000	1.2500	1.0218	0.0376
3.25	2.5000	2.0115	0.0686	0.0000	0.0000	0.0000
3.50	0.0000	0.0000	0.0000	1.2500	0.9904	0.0425
3.75	2.5000	1.9511	0.0768	0.0000	0.0000	0.0000
4.00	0.0000	0.0000	0.0000	1.2500	0.9615	0.0472
4.25	102.5000	77.7258	3.4671	0.0000	0.0000	0.0000
4.50				1.2500	0.9347	0.0516
4.75				0.0000	0.0000	0.0000
5.00				1.2500	0.9100	0.0558
5.25				0.0000	0.0000	0.0000
5.50				1.2500	0.8883	0.0599
5.75				0.0000	0.0000	0.0000
6.00				1.2500	0.8690	0.0639
6.25				0.0000	0.0000	0.0000

6.50				1.2500	0.8546	0.0681
6.75				0.0000	0.0000	0.0000
7.00				101.2500	68.4629	5.8765
	sum	95.2757	3.8194		81.5516	6.4048

		w	p	D	wD	dollar_D	PV01/PVBP
A	1	40%	95.2757	3.8194	1.5278	145.5577	
	2	25%	81.5516	6.4048	1.6012	130.5806	
	3	20%	102.0882	0.2540	0.0508	5.1863	
	4	10%	93.6131	1.0000	0.1000	9.3613	
	5	5%	92.9248	1.9462	0.0973	9.0425	
	sum				3.3771	299.7283	-0.0300
B	1	40%	123.3532	5.4260	2.1704	267.7269	
	2	25%	86.8430	3.9838	0.9960	86.4914	
	3	20%	98.4546	0.2500	0.0500	4.9227	
	4	10%	100.0000	0.5000	0.0500	5.0000	
	5	5%	98.8238	1.4564	0.0728	7.1963	
	sum				3.3392	371.3373	-0.0371

Obviously, portfolio A is enough

A3			A4			A5		B	B1			B2
20%			10%			5%		w	40%			25%
0.30%			0.00%			3.00%		c	10.00%			3.00%
1.75			1.00			2.00		t	7.00			4.25
coupon	PV	D	coupon	PV	D	coupon	PV	D	coupon	PV	D	coupon
103.2700	101.6740	0.2490	0.0000	0.0000	0.0000	0.7500	0.7384	0.0020	0.0000	0.0000	0.0000	0.7500
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.7500	0.7264	0.0039	5.0000	4.8428	0.0196	0.7500
0.1500	0.1429	0.0010	0.0000	0.0000	0.0000	0.7500	0.7143	0.0058	0.0000	0.0000	0.0000	0.7500
0.0000	0.0000	0.0000	100.0000	93.6131	1.0000	0.7500	0.7021	0.0076	5.0000	4.6807	0.0379	0.7500
0.1500	0.1380	0.0017				0.7500	0.6899	0.0093	0.0000	0.0000	0.0000	0.7500
0.0000	0.0000	0.0000				0.7500	0.6780	0.0109	5.0000	4.5199	0.0550	0.7500
0.1500	0.1333	0.0023				0.7500	0.6664	0.0126	0.0000	0.0000	0.0000	0.7500
						100.7500	88.0093	1.8942	5.0000	4.3677	0.0708	0.7500
									0.0000	0.0000	0.0000	0.7500
									5.0000	4.2225	0.0856	0.7500
									0.0000	0.0000	0.0000	0.7500
									5.0000	4.0871	0.0994	0.7500
									0.0000	0.0000	0.0000	0.7500
									5.0000	3.9618	0.1124	0.7500
									0.0000	0.0000	0.0000	0.7500
									5.0000	3.8460	0.1247	0.7500
									0.0000	0.0000	0.0000	100.7500
									5.0000	3.7387	0.1364	
									0.0000	0.0000	0.0000	
									5.0000	3.6398	0.1475	
									0.0000	0.0000	0.0000	
									5.0000	3.5533	0.1584	
									0.0000	0.0000	0.0000	
									5.0000	3.4758	0.1691	
									0.0000	0.0000	0.0000	

									5.0000	3.4185	0.1801	
									0.0000	0.0000	0.0000	
									105.0000	70.9986	4.0290	
	102.0882	0.2540		93.6131	1.0000		92.9248	1.9462		123.3532	5.4260	

[illegible]

86.8430	3.9838		98.4546	0.2500		100.0000	0.5000		98.8238	1.4564