

Pinnacle Academy

Chapter Tests

August 2018 Batch

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19th January, 2019

CA Final: New Syllabus Test of Bonds

Time Allowed-1 hour

Maximum Marks- 30

Q 1

- (a) Face value of a bond is Rs.100 and is currently quoted at a premium of 5%. It has a maturity period of 5 years during which it shall pay interest at 10%, 11%, 12%, 13% and 14% each year respectively and shall be redeemed at 5% discount.

The prevailing market interest rate is 10%.

Calculate yield to maturity and decide whether the bond is worth purchasing.

If due to market imperfections the same bond is available at Rs.100 after three years from now, is the bond worth purchasing three years from now?

(6 Marks)

- (b) A company has invested in following three bonds:

Bond	Face Value	Coupon Rate	Maturity in years	Yield	No. of Bonds Purchased
Anova	Rs.1,000	----	6 (at par)	8%	10,000
Barova	Rs.1,000	12%	----	10%	5,000
Carnova	Rs.1,000	8%	3 (at par)	12%	10,000

You are required to calculate bond price of each bond as on today, duration of each bond and portfolio duration.

(10 Marks)

Q 2

- (a) Following is the yield structure of AAA rated debenture:

Period	Yield (%)
3 months	8.5
6 months	9.25
1 year	10.50
2 years	11.25
3 years and above	12.00

Based on the expectations theory, calculate the implicit one year forward rates in year 2 and year 3

(4 Marks)

- (b) ABC Ltd. has Rs.300 million, 12 % bonds outstanding with six years remaining maturity. Since interest rates are falling, ABC Ltd. is contemplating of refunding the bonds with a Rs.300 million issue of 6 year bonds carrying a coupon rate of 10%. Issue cost of the new bonds will be Rs.6 million and the call premium is 4%. Rs.9 million being the unamortized portion of issue cost of old bonds can be written off no sooner the old bonds are called off. Marginal tax rate is 30%. Should the old bonds be refunded?

(10 Marks)

(Assessed answer papers shall be returned latest by 9th February, 2019)



Solution of Test of BondsConducted on 19th January, 2019

Q 1

(a) Calculation of Yield to Maturity (YTM):

Year	Cash Inflows	PVF (10%)	PV (10%)	PVF (5%)	PV (5%)
1	10	0.909	9.09	0.952	9.52
2	11	0.826	9.09	0.907	9.98
3	12	0.751	9.02	0.864	10.37
4	13	0.683	8.88	0.823	10.70
5	109	0.621	<u>67.68</u>	0.784	<u>85.40</u>
		Σ PVCI	103.76	Σ PVCI	125.97
		Σ PVCO	<u>105.00</u>	Σ PVCO	<u>105.00</u>
		NPV	<u>-1.24</u>	NPV	<u>20.97</u>

$$YTM = 5\% + [20.97 / 20.97 - (-1.24)] \times 5 = 9.72\%$$

As the YTM is lower than the current prevailing market interest rate of 10%, the bond is not worth buying. (OR as the net present value of the bond is currently negative, bond is not worth buying)

Calculating the value of the bond at the end of third year:

Year	Cash Inflows	PVF (10%)	PV (10%)
1	13	0.909	11.82
2	109	0.826	<u>90.08</u>
		Σ PVCI	101.90
		Σ PVCO	<u>100.00</u>
		NPV	<u>1.90</u>

As the present value of the bond is positive after 3 years, the bond is worth purchasing then.

(4 marks for YTM and 2 Marks for subsequent valuation)

(b) Determination of Bond Price:

Bond	Year	Cash Inflow	PVF (8%)	PV
Anova	6	1,000	0.630	630
			PVF (10%)	
Barova	1 - ~	120	120 / 10%	1,200
			PVF (12%)	
Carnova	1 - 3	80	2.402	192.16
	3	1,000	0.712	<u>712.00</u>
				<u>904.16</u>

(3 Marks)

Solution prepared by **CA. Ashish Lalaji**

Determination of Bond Duration:**Bond**

Anova It has duration equivalent to its maturity i.e. 6 years

Barova Duration = 1.1 / 10% i.e. 11 years

	Year	Cash Inflow	PVF (12%)	PV	Year X PV
Carnova	1	80	.893	71.44	71.44
	2	80	.797	63.76	127.52
	3	1,080	.712	<u>768.96</u>	<u>2,306.88</u>
				<u>904.16</u>	<u>2,505.84</u>

Duration = 2.77 yeras

(4 Marks)

Determination of Portfolio Duration:

Bond	Bond Price	No. of Bonds	Amount Invested	Weight
Anova	630	10,000	63,00,000	29.52%
Barova	1,200	5,000	60,00,000	28.11%
Carnova	904.16	10,000	90,41,600	42.37%
			2,13,41,600	<u>100.00%</u>

Portfolio Duration = 6 (.2952) + 11 (.2811) + 2.77 (.4237) = 6.04 years

(3 Marks)

Q 2**(a) Between years 1 and 2:**

$$[11.25 (2) - 10.5 (1) / 2 - 1 = 12 \%$$

(2 Marks)

Between years 2 and 3:

$$[12 (3) - 11.25 (2) / 3 - 2 = 13.5 \%$$

(2 Marks)

(b) Determination of Cost of Refunding the Bonds:

(Rs. in millions)

	Amount	Amount
(i) Flotation cost of new bonds		6.00
(ii) Call premium (300 X 4%)	12.00	
Less: Tax savings @ 30%	<u>3.60</u>	8.40
(iii) Tax savings on unamortised flotation cost of old bonds (9 X 30%)		<u>(2.7)</u>
Cost of refunding the old bonds		<u>11.70</u>

(2 Marks)

Solution prepared by **CA. Ashish Lalaji**

Determination of Savings p.a. and NPV on account of refund of old bonds:
(Rs. in millions)

	Amount	Amount
Old Bonds:		
(i) Interest cost (300 X 12%)	36.00	
Less: Tax savings @ 30%	<u>10.80</u>	25.20
(ii) Tax savings on flotation cost (9 / 6 i.e. 1.5 X 30%)		<u>(0.45)</u>
Cost of servicing old bonds (A)		<u>24.75</u>
New Bonds:		
(i) Interest cost (300 X 10%)	30.00	
Less: Tax savings @ 30%	<u>9.00</u>	21.00
Tax savings on flotation cost (6 / 6 i.e. 1 X 30%)		<u>(0.30)</u>
Cost of servicing new bonds (B)		<u>20.70</u>
Savings p.a. (B – A)		4.05
X PVF (7%*, 6 years)		<u>4.767</u>
PV of annual savings		19.31
Less: Initial cost of refunding the bonds		<u>11.70</u>
NPV of bond refund proposal		<u>7.61</u>

(5 + 2 = 7 Marks)

Old bonds should be refunded in view of positive NPV.

* Post tax cost of debt i.e. $10(1 - 0.3)$ i.e. 7% is used as the discount rate

(1 Mark for discount rate selection)

Solution prepared by **CA. Ashish Lalaji**



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