

$$\frac{\text{Market Price of Convertible Bond}}{\text{Straight Value of Bond}} - 1 = \frac{₹ 900}{₹ 700} - 1 = 28.6 \%$$

- (f) Favorable income differential per share

$$\frac{\text{Coupon Interest from Debenture} - \text{Conversion Ratio} \times \text{Dividend Per Share}}{\text{Conversion Ratio}}$$

$$\frac{₹ 85 - 30 \times ₹ 1}{30} = ₹ 1.833$$

- (g) Premium pay back period

$$\frac{\text{Conversion premium per share}}{\text{Favourable Income Differential per Share}} = \frac{5}{1.833} = 2.73 \text{ years}$$

Question – 22

Following information is related to the Convertible Bond of A Ltd. which is currently priced at ₹ 1060 per Bond:

- (1) Conversion Parity Price - ₹ 53
- (2) Conversion Premium – 10.41667%
- (3) Percentage of Downside Risk with respect to Straight Value of Bond – 12.766%

Calculate:

- (i) No. of shares on Conversion.
- (ii) Current Market Price Per Share of A Ltd.
- (iii) Straight Value of Bond

(MTP October – 2023)

Solution:

- (i) The No. of share on Conversion shall be computed as follows:**

$$\text{Conversion Parity Price} = \frac{\text{Bond Price}}{\text{No. of Shares on Conversion}}$$

$$₹ 53 = \frac{1060}{\text{No. of Shares on Conversion}}$$

Accordingly, No. of shares on Conversion = 20

- (ii) To determine current Market Price Per Share of A Ltd. we shall use Conversion Premium as follows:**

$$\text{Conversion Premium} = \frac{\text{Market Price of Bond} - \text{Conversion Value of Bond}}{\text{Conversion Value of Bond}}$$

$$0.1041667 = \frac{1060 - \text{Conversion Value of Bond}}{\text{Conversion Value of Bond}}$$

Conversion Value of Bond = ₹ 960

Since the No. of share on Conversion = 20

The current market price of share of A Ltd. shall be = ₹ 960 / 20 = ₹ 48 per share

- (iii) To determine the Straight Value of Bond we shall use Percentage of Downside Risk as follows:**

Percentage of Downside Risk

$$= \frac{\text{Market Price of Bond} - \text{Straight Value of Bond}}{\text{Straight Value of Bond}}$$

$$0.12766 = \frac{1060 - \text{Straight Value of Bond}}{\text{Straight Value of Bond}}$$

Straight Value of Bond = ₹ 940 per Bond

Question – 23

Saranam Ltd. has issued convertible debentures with coupon rate 12%. Each debenture has an option to convert to 20 equity shares at any time until the date of maturity. Debentures will be redeemed at ₹ 100 on maturity of 5 years. An investor generally required a rate of return of 8% p.a. on a 5-year security. As an investor when will you exercise conversion for given market prices of the equity share of (i) ₹ 4, (ii) ₹ 5 and (iii) ₹ 6.

Cumulative PV factor for 8% for 5 years : 3.993

PV factor for 8% for year 5 : 0.681

(SM TYK – 23)

Solution:**Intrinsic Value of Debenture**

$$IV_0 = (12 \times 3.993) + (100 \times 0.681)$$

$$= ₹ 116.016$$

Conversion Value

$$\text{Price} = ₹ 4 [20 \times 4] = ₹ 80$$

$$\text{Price} = ₹ 5 [20 \times 5] = ₹ 100$$

$$\text{Price} = ₹ 6 [20 \times 6] = ₹ 120$$

Investor will exercise option when price of share is ₹ 6

Question – 24

XYZ company has current earnings of ₹ 3 per share with 5,00,000 shares outstanding. The company plans to issue 40,000, 7% convertible preference shares of ₹ 50 each at par. The preference shares are convertible into 2 shares for each preference shares held. The equity share has a current market price of ₹ 21 per share.

- (i) What is preference share's conversion value?
- (ii) What is conversion premium?
- (iii) Assuming that total earnings remain the same, calculate the effect of the issue on the basic earning per share (a) before conversion (b) after conversion.
- (iv) If profits after tax increases by ₹ 1 million what will be the basic EPS (a) before conversion and (b) on a fully diluted basis?

Solution:

$$(i) \quad \text{Conversion Value} = ₹ 21 \times 2 = ₹ 42$$

$$(ii) \quad \text{Conversion Premium} = \frac{₹ 50 - 42}{42} \times 100 = 19.05\%$$

$$(iii) \quad \text{EPS}$$

	Before Conversion	After Conversion
EAT	15,00,000	15,00,000
(-) PD $[40,000 \times 7\%]$	1,40,000	-
Earnings	13,60,000	15,00,000
÷ No.	5,00,000	5,80,000 $[5,00,000 + 40,000 \times 2]$
EPS	2.72	2.586
EPS Reduced by	0.28 $(3 - 2.72)$	0.414

(iv) Revise EPS

	Before Conversion	After Conversion
EAT	25,00,000	25,00,000
(-) PD $[40,000 \times 7\%]$	1,40,000	-
Earnings	23,60,000	25,00,000
÷ No.	5,00,000	5,80,000 $[5,00,000 + 40,000 \times 2]$
EPS	4.72	4.31

Question – 25

A Ltd. has issued convertible bonds, which carries a coupon rate of 14%. Each bond is convertible into 20 equity shares of the company A Ltd. The prevailing interest rate for similar credit rating bond is 8%. The convertible bond has 5 years maturity. It is redeemable at par at ₹ 100. The relevant present value table is as follows.

Present Values	t_1	t_2	t_3	t_4	t_5
$PVIF_{0.14,t}$	0.877	0.769	0.675	0.592	0.519
$PVIF_{0.08,t}$	0.926	0.857	0.794	0.735	0.681

You are required to estimate:

(Calculations be made upto 3 decimal places)

- Current market price of the bond, assuming it being equal to its fundamental value,
- Minimum market price of equity share at which bond holder should exercise conversion option; and
- Duration of the bond.

Solution:

(i) Current Market Price of Bond

Time	CF	PVIF 8% PV (CF)	PV (CF)
1	14	0.926	12.964
2	14	0.857	11.998
3	14	0.794	11.116
4	14	0.735	10.290
5	114	0.681	<u>77.634</u>
		$P_0 =$	<u>124.002</u>

Say ₹ 124.00

(ii) Minimum Market Price of Equity Shares at which Bondholder should exercise conversion option:

$$\frac{124.00}{20.00} = ₹ 6.20$$

(iii) Duration of the Bond

Year	Cash flow	P.V. @ 8%		Proportion of bond value	Proportion of bond value × time (years)
1	14	0.926	12.964	0.105	0.105
2	14	0.857	11.998	0.097	0.194
3	14	0.794	11.116	0.089	0.267
4	14	0.735	10.290	0.083	0.332
5	114	0.681	<u>77.634</u>	<u>0.626</u>	<u>3.130</u>
			<u>124.002</u>	<u>1.000</u>	<u>4.028</u>

Question – 26

A hypothetical company ABC Ltd. issued a 10% Debenture (Face Value of ₹ 1000) of the duration of 10 years, currently trading at ₹ 850 per debenture. The bond is convertible into 50 equity shares being currently quoted at ₹ 17 per share.

If yield on equivalent comparable bond is 11.80%, then calculate the spread of yield of the above bond from this comparable bond.

The relevant present value table is as follows.

Present Values	t_1	t_2	t_3	t_4	t_5	t_6	t_7	t_8	t_9	t_{10}
$PVIF_{0.11,t}$	0.901	0.812	0.731	0.659	0.593	0.535	0.482	0.434	0.391	0.352

PVIF _{0.13, t}	0.885	0.783	0.693	0.613	0.543	0.480	0.425	0.376	0.333	0.295
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(RTP November – 2019)

Solution:

(1) Yield of Bond (YTM)

$$11\% = (\text{₹ } 100 \times 5.580) + (1,000 \times 0.352) = \text{₹ } 941$$

$$13\% = (\text{₹ } 100 \times 5.426) + (1,000 \times 0.295) = \text{₹ } 887.60$$

2%	₹ 103.40
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$$\text{YTM} = 11 + \left(\frac{2}{103.40} \times 91 \right)$$

$$\begin{aligned} \text{Spread of yield} &= 12.76 - 11.80 \\ &= 0.96\% \end{aligned}$$

(2) COLLABLE BOND OR BOND REFUNDING

Question – 27

M/s Trans India Ltd. is contemplating calling ₹ 3 crores of 30 years, ₹ 1,000 bond issued 5 years ago with a coupon interest rate of 14 per cent. The bonds have a call price of ₹ 1,140 and had initially collected proceeds of ₹ 2.91 crores due to a discount of ₹ 30 per bond. The initial floating cost was ₹ 3,60,000. The Company intends to sell ₹ 3 crores of 12 per cent coupon rate, 25 years bonds to raise funds for retiring the old bonds. It proposes to sell the new bonds at their par value of ₹ 1,000. The estimated floatation cost is ₹ 4,00,000. The company is paying 40% tax and its after tax cost of debt is 8 per cent. As the new bonds must first be sold and their proceeds, then used to retire old bonds, the company expects a two months period of overlapping interest during which interest must be paid on both the old and new bonds. What is the feasibility of refunding bonds?

Solution:

Incremental Cash Outflows

$$\text{Repayment of old bond } (30,000 \text{ Bonds} \times 1,140) = \text{₹ } 3,42,00,000$$

$$\text{Issue of new bonds} = (\text{₹ } 3,00,00,000)$$

Floataction cost of new bonds	= ₹ 4,00,000
Tax savings on call premium (42,00,000×40%)	= (16,80,000)
Tax saving on unamortized expense of old bonds	
$\left[\frac{9,60,000 + 3,00,000}{30} \times 25 \right] = 10,50,000 \times 40\%$	= (4,20,000)
Interest on overlapping period [After Tax]	
$\left(3,00,00,000 \times 14\% \times \frac{2}{12} \right) (1 - 0.40)$	= 4,20,000
Incremented cash outflows	<u>= ₹ 29,20,000</u>

Incremented Cash Inflows

	Old (14%)	New (12%)
Interest on bonds [After Tax]	$(3,00,00,000 \times 14\%) (1-0.40)$ = 25,20,000	$(3,00,00,000 \times 12\%)$ $(1 - 0.40) = 21,60,000$
Tax savings on floatation cost	$\left(\frac{12,60,000}{30} \times 40\% \right) (16,800)$	$\left(\frac{4,00,000}{25} \right) \times 40\%$ (6,400)
	25,03,200	21,53,600

Incremented Cash Inflows (25,03,200 – 21,53,600) = 3,49,600 p.a.

$$\begin{aligned} \text{PVC I} &= 3,49,600 \times \text{PVAF}, 8\%, 25 \\ &= 3,49,600 \times 10.675 = ₹ 37,31,980 \end{aligned}$$

$$(-) \text{ PVCO} = ₹ 29,20,000$$

$$\text{NPV} = ₹ 8,11,980$$

Since NPV is positive, hence bond should be refunded.

Question – 28

ABC Ltd. has ₹ 300 million, 12 per cent bonds outstanding with six years remaining to maturity. Since interest rates are falling, ABC Ltd. is contemplating of refunding these bonds with a ₹ 300 million issue of 6 year bonds carrying a coupon rate of 10 per cent. Issue cost of the new bond will be ₹ 6 million and the call premium is 4 per cent. ₹ 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 of ABC Ltd. is 30 per cent. You are required to analyze the bond refunding decision.

(SM TYK – 25 & RTP May – 2020)

Solution:

Incremental Cash Outflows (Millions)

Repayment of old bond ($\text{₹ } 300 \text{ million} \times 1.04$)	= ₹ 312
Issue of new bonds	= (₹ 300)
Issue cost of new bonds	= ₹ 6
Tax savings on call premium ($300 \times 4\% \times 30\%$)	= (₹ 3.60)
Tax saving on unamortized expenses of old bonds ($9 \times 30\%$)	= (₹ 2.70)
Incremental cash outflows	<u>= 11.70 Million</u>

Incremented Cash Flows

	Old (12%)	New (10%)
Interest [After Tax]	$(300 \times 12\%) (1 - 0.30)$ = 25.20	$(300 \times 10\%) (1 - 0.30)$ = 21.00
Tax Savings on Amortization expenses	$\left(\frac{9}{6} \times 30\%\right) (0.45)$	$\left(\frac{6}{6} \times 30\%\right) (0.30)$
	24.75	20.70

Incremented cash Inflows $24.75 - 20.70 = 4.05$ Million p.a.

$$\begin{aligned}
 K_d &= I (1 - t) \\
 &= 10 (1 - 0.30) \\
 &= 7\% \\
 PVCI &= 4.05 \times PVAF, 6, 7\% \\
 &= 4.05 \times 4.767 = 19.31 \\
 (-) PVCO &= 11.70 \\
 NPV &= 7.61
 \end{aligned}$$

Since NPV is positive, hence bond should be refunded.

(4) EXTENDABLE BONDS**QUESTION – 29**

Pet feed plc has outstanding, a high yield Bond with following features:

Face Value	£ 10,000
Coupon	10%
Maturity Period	6 Years
Special Feature	Company can extend the life of Bond to 12 years.

Presently the interest rate on equivalent Bond is 8%.

- (a) If an investor expects that interest will be 8%, six years from now then how much he should pay for this bond now.
- (b) Now suppose, on the basis of that expectation, he invests in the Bond, but interest rate turns out to be 12%, six years from now, then what will be his potential loss/ gain if the company extends the life of Bond for another 6 years.

Solution:

Investor expects that after 6 years, interest rate will be 8%. In this situation, company will not extend [Market में कम Rate पर company को पैसे मिल जाएगा]

$$\begin{aligned}
 \text{PVC I} &= (£ 1,000 \times \text{PVAF}, 8\%, 6) (£ 1,000 \times \text{PVF}, 8\%, 6) \\
 &= (£ 1,000 \times 4.623) \times (£ 1,000 \times 0.630) \\
 &= £ 10,923
 \end{aligned}$$

Value of bond at the end of 6th year if yield (12%)

$$\begin{aligned}
 &= (£ 1,000 \times 4.111) \times (£ 1,000 \times 0.507) \\
 &= £ 9,181
 \end{aligned}$$

$$\begin{aligned}
 \text{Expected loss} &= £ 10,923 - £ 9,181 \\
 &= £ 1,742
 \end{aligned}$$

(V) YIELD STRUCTURE OR TERM STRUCTURE OF INTEREST RATE**Question – 30**

From the following data for Government securities, calculate the forward rates:

Face Value (₹)	Interest Rate	Maturity (Year)	Current Price (₹)
1,00,000	0%	1	91,500
1,00,000	10%	2	98,500
1,00,000	10.5%	3	99,000

Solution:**1 Year Rate**

$$91,500 = \frac{1,00,000}{(1 + r)^1}$$

$$r = \left(\frac{1,00,000}{91,500} - 1 \right) \times 100 = 9.29\%$$

1 Year FR after 1 Year

$$98,500 = \frac{10,000}{(1.0929)} + \frac{1,10,000}{(1.0929)(1 + r)}$$

$$r = 12.65\%$$

1 Year FR after 2 Years

$$99,000 = \frac{10,500}{1.0929} + \frac{10,500}{(1.0929)(1.1265)} + \frac{1,10,500}{(1.0929)(1.1265)(1 + r)}$$

$$r = 11\% \text{ p.a.}$$

Question – 31

ABC Ltd. issued 9%, 5 year bonds of ₹ 1,000/- each having a maturity of 3 years. The present rate of interest is 12% for one year tenure. It is expected that Forward rate of interest for one year tenure is going to fall by 75 basis points and further by 50 basis points for every next year in further for the same tenure. This bond has a beta value of 1.02 and is more popular in the market due to less credit risk.

Calculate:

- (i) Intrinsic value of bond.