Part A: The Cost of Money

1) a)

given,

Beginning value = 1750 BDT

Ending value = 1985 BDT

Dividend = 100.00 BDT

$\therefore$ Capital gain = Ending value − Beginning value

$= (1985 - 1750)$

$= 235$ BDT

b) Total return = Dividend + Capital gain

$= 100 + 235$

$= 335$ BDT

c) $\text{Yield} = \dfrac{\text{Total return}}{\text{Beginning value}} \times 100$

$= \dfrac{335}{1750} \times 100$

$= 19.14\%$

d) If dividend is paid on November 15, 2023 then it wont be include in total return. So dividen will 0.

$\therefore \text{Yield} = \dfrac{\text{Total return}}{\text{Beginning value}} \times 100$

$= \dfrac{\text{Dividen} + \text{Capital gain}}{\text{Beginning value}} \times 100$

$= \dfrac{0 + 235}{1750} \times 100$

$= 13.43\%$

2.) $\therefore IP = (3.5 + 4.5 + 5.5 \times 13) / 15$

$= 5.3\%$

$\therefore MRP = 0.1 \times (t - 1)$

$= 0.1 \times (15 - 1)$

$= 1.4\%$

given,

$t = 15$ years

$LP = 1\%$

$DRP = 1.5\%$

$R_f = 3.5\%$

$\therefore$ Rate of return $= R_f + R_p$

$= R_f + [DRP + MRP + IP]$

$= (3.5 + 1.5 + 1.4 + 5.3)\%$

$= 11.7\%$

$\therefore$ The rate of Bangla Link bonds after 15 years 11.7%.

3)

Project K

$IP = (4 + 5 + 5.5 + 6 \times 9) / 12$

$= 5.7\%$

$\therefore$ Rate of return $= R_f + R_p$

$= R_f + [DRP + IP + MRP]$

$= 4.5 + 2.5 + 5.7 + 1.1$

$= 13.8\%$

given,

$t_1 = 12$ years

$R_f = 4.5\%$

$DRP = 2.5\%$

$LP = 1.75\%$

$\therefore MRP = 0.1 \times (t_1 - 1)$

$= 0.1 \times (12 - 1)$

$= 1.1$

$\therefore$ The rate of return of Project K is 13.8%

Project Z

$IP = (4 + 5 + 5.5 + 6 \times 7) / 10$

$= 5.65\%$

$\therefore$ Rate of return $= R_f + R_p$

$= R_f + [DRP + IP + LP + MRP]$

$= 4.5 + 2.5 + 5.65 + 1.75 + 0.9$

$= 15.3\%$

given,

$t_2 = 10$ years

$R_f = 4.5\%$

$DRP = 2.5\%$

$LP = 1.75\%$

$\therefore MRP = 0.1 \times (t_2 - 1)$

$= 0.1 \times (10 - 1)$

$= 0.9$

$\therefore$ The rate of return of Project Z is 15.3%

Part - B: Risk and Return

1) Bata

we know,

Expected return, $\bar{R} = \sum (R_i) \times (P_i)$

$$\therefore \bar{R}_{Bata} = (-10 \times 0.1) + (-5 \times 0.25) + (8 \times 0.3) + (12 \times 0.25) + (16 \times 0.1)$$
$$= 4.75\%$$

Standard deviation, $\delta = \sqrt{\sum (R_i - \bar{R})^2 \times P_i}$

$$\therefore \delta_{Bata} = \sqrt{(-10-4.75)^2 \times 0.1 + (-5-4.75)^2 \times 0.25 + (8-4.75)^2 \times 0.3 + (12-4.75)^2 \times 0.25 + (16-4.75)^2 \times 0.1}$$
$$= 8.63\%$$

$$\therefore CV_{Bata} = \frac{\delta_{Bata}}{\bar{R}_{Bata}} = \frac{8.63\%}{4.75\%} = 1.81$$

Apex

$$\therefore \bar{R}_{Apex} = (-12 \times 0.1) + (-3 \times 0.25) + (8 \times 0.30) + (14 \times 0.25) + (18 \times 0.10)$$
$$= 5.75\%$$

$$\therefore \delta_{Apex} = \sqrt{(-12-5.75)^2 \times 0.1 + (-3-5.75)^2 \times 0.25 + (8-5.75)^2 \times 0.30 + (14-5.75)^2 \times 0.25 + (18-5.75)^2 \times 0.1}$$
$$= 9.18\%$$

$$\therefore CV_{Apex} = \frac{\delta_{Apex}}{\bar{R}_{Apex}} = \frac{9.18\%}{5.75\%} = 1.6\%$$

Here,

$\delta_{Bata} < \delta_{Apex}$ and $CV_{Bata} > CV_{Apex}$

Here, CV_{Bata} is higher than CV_{Apex}. As we know, we will accept the project with lower risk that means lower CV. So, I should preber Apex as an investment opportunity.

5)

ABC

we know,

Expected return, $\bar{R} = \sum (r_i) \times (P_i)$

$\therefore \bar{R}_{ABC} = (-5 \times 0.30) + (12 \times 0.50) + (18 \times 0.20)$

$= 8.1\ \%$

standard deviation, $\delta = \sqrt{\sum (R_i - \bar{R})^2 \times P_i}$

$\therefore \delta_{ABC} = \sqrt{(-5-8.1)^2 \times 0.30 + (12-8.1)^2 \times 0.50 + (18-8.1)^2 \times 0.20}$

$= 8.87\%$

$\therefore CV_{ABC} = \dfrac{\delta_{ABC}}{\bar{R}_{ABC}} = \dfrac{8.87\%}{8.1\%}$

$= 1.1$ Ans

DEF

$\bar{R}_{DEF} = (-2 \times 0.30) + (14 \times 0.5) + (18 \times 0.20)$

$= 10\%$

$\delta_{DEF} = \sqrt{(-2-10)^2 \times 0.30 + (14-10)^2 \times 0.50 + (18-10)^2 \times 0.20}$

$= 8\ \%$

$\therefore CV_{DEF} = \dfrac{\delta_{DEF}}{\bar{R}_{DEF}}$

$= \dfrac{8\%}{10\%}$

$= 0.8$

Here, $\delta_{ABC} > \delta_{DEF}$ and $CV_{ABC} > CV_{DEF}$

So, Both Standard deviation and CV of DEF are lower than ABC. As, we will accept the project which has lower risk and lower δ, CV. So, I should choose DEF Project.

Part C : Capital Budgeting Techniques

6) Plan A

given,

$i = 10\%$
$= 0.10$

$CF_0 = \$40$ million

$CF = \$6.4$ million

$n = 20$ years

We know,

$$NPV = CF \times \left[\frac{1 - \frac{1}{(1+i)^n}}{i} \right] - CF_0$$

$$\therefore NPV_{(A)} = 6.4 \times \left[\frac{1 - \frac{1}{(1+0.1)^{20}}}{0.1} \right] - 40$$

$= \$14.49$ million

$= NPV_{LR\,(A)}$

To get $NPV_{(HR)}$ let assume $i = 20\%$

$$\therefore NPV_{(HR)\,A} = 6.4 \times \left[\frac{1 - \frac{1}{(1+0.2)^{20}}}{0.2} \right] - 40$$

$= \$ - 8.83$ million

We know,

$$IRR = LR + \left[\frac{NPV_{LR}}{NPV_{LR} - NPV_{HR}} (HR - LR) \right]$$

$$\therefore IRR_{(A)} = 10 + \left[\frac{14.49}{14.49 - (-8.83)} (20 - 10) \right]$$

$= 16.21\%$

$$\therefore PBP_{(A)} = \frac{\text{Initial investment}}{\text{Yearly cashflow}}$$

$$= \frac{40}{6.4}$$

$= 6.25$ year

Plan B

given,

$i = 10\%$

$= 0.1$

$CF_0 = \$12 \text{ million}$

$CF = \$2.72 \text{ million}$

$n = 20$ years

$$NPV_{(B)} = CF \times \left[\frac{1 - \frac{1}{(1+i)^n}}{i}\right] - CF_0$$

$$= 2.72 \times \left[\frac{1 - \frac{1}{(1+0.1)^{20}}}{0.1}\right] - 12$$

$$= \$\, 11.16 \text{ million}$$

$$= NPV_{LR(B)}$$

For getting NPV_{HR} lets assume $i = 25\%$

$$\therefore NPV_{HR(B)} = 2.72 \times \left[\frac{1 - \frac{1}{(1+0.25)^{20}}}{0.25}\right] - 12$$

$$= \$ -1.25 \text{ million}$$

$$\therefore IRR_{(B)} = LR + \left[\frac{NPV_{LR}}{NPV_{LR} - NPV_{HR}} [HR - LR]\right]$$

$$= 10 + \left[\frac{11.16}{11.16 - (-1.25)} (25 - 10)\right]$$

$$= 23.49\%$$

$$\therefore PBP_{(B)} = \frac{\text{Initial investment}}{\text{Yearly cashflow}}$$

$$= \frac{12}{2.72}$$

$$= 4.412 \text{ years}$$

7)

we know,

$$NPV = \frac{CF_1}{(1+i)^1} + \frac{CF_2}{(1+i)^2} + \dots + \frac{CF_n}{(1+i)^n} - CF_0$$

given,

$i = 15\%$
$= 0.15$
$n = 5$
$CF_0 = BDT\ 500000$

$$\therefore NPV = \frac{120\,000}{(1+0.15)^1} + \frac{140\,000}{(1+0.15)^2} + \frac{180\,000}{(1+0.15)^3} + \frac{200\,000}{(1+0.15)^4} + \frac{220000}{(1+0.15)^5} - 500\,000$$

$= BDT\ 52290.39$

$= NPV_{(LR)}$

To get NPV (HR) let assume $i = 25\%$

$$\therefore NPV_{(HR)} = \frac{120\cdot000}{(1+0.25)^1} + \frac{140000}{(1+0.25)^2} + \frac{180\,000}{(1+0.25)^3} + \frac{200\,000}{(1+0.25)^4} + \frac{220000}{(1+0.25)^5} - 500000$$

$= BDT\ -68230.4$

$$\therefore IRR = LR + \left[\frac{NPV_{LR}}{NPV_{LR} - NPV_{HR}}(HR - LR)\right]$$

$$= 15 + \left[\frac{52290.39}{52290.39 - (-68230.4)}(25-15)\right]$$

$= 19.34\%$

If we consider NPV then, $NPV_{LR} > 0$. So positive NPV. So I would recommend to purchase the machine.

Now if we consider IRR then,

$IRR = 19.34\% >$ Discount rate $= 15\%$

So, from this I would recommend to purchase the machine.

CamScanner

Part D: Bond Valuation

8) a)

Surma Bond

given,

MV = 1000 Tk

n = 10 years

K_d = 12%

= 0.12

We know,

Zero coupon Bond $V_B = \frac{MV}{(1+k_d)^n}$

$\therefore V_{B\,(Surma)} = \frac{1000}{(1+0.12)^{10}}$

= Tk 321.973.

b) **Tista Bond**

given,

n = 8 years

Coupon rate = 20%

= 0.20

MV = 1000 Tk

k_d = 12%

= 0.12

∴ Coupon payment, I = Face value × Coupon rate

= 1000 × 0.20

= 200 Tk

We know,

Coupon Bearing Bond, $V_B = \left[I \times \frac{1 - \frac{1}{(1+k_d)^n}}{k_d} \right] + \frac{MV}{(1+k_d)^n}$

$\therefore V_{B\,(Tista)} = \left[200 \times \frac{1 - \frac{1}{(1+0.12)^8}}{0.12} \right] + \frac{1000}{(1+0.12)^8}$

= Tk 1397.411

$\therefore V_{B}(Surma)$ = 321.973 Tk < market value = Tk 950

$\therefore V_{B}(Tista)$ = Tk 1397.411 > market value = Tk 1100

As, value of Tista Bond is greater than market value. So, the investment decision which was taken by Mr. Rony is correct and rational.

9) b) Keya Company

given,
$K_d = 10\%$
$= 0.10$

$MV = $ Face value
$= 2000$ Tk

Coupon rate $= 12\%$
$= 0.12$

$n = 7$ years

$\therefore$ Coupon payment, I = Face value $\times$ Coupon rate
$= 2000 \times 0.12$
$= 240$ Tk.

$$V_B(\text{keya}) = \left[I \times \frac{1 - \frac{1}{(1+k_d)^n}}{k_d} \right] + \frac{MV}{(1+k_d)^n}$$

$$= \left[240 \times \frac{1 - \frac{1}{(1+0.1)^7}}{0.1} \right] + \frac{2000}{(1+0.1)^7}$$

$$= \text{Tk } 2194.74.$$

Here,
$V_B(\text{keya}) <$ Market value $=$ Tk 2500

Incepta Company

given,
Coupon rate $= 9\%$
$= 0.09$
$m = 2$
$MV = 2000$ Tk
$K_d = 10\%$
$= 0.1$

$\therefore$ Coupon payment, $I = 2000 \times 0.09$
$=$ Tk 180

$$\therefore V_B = \frac{I}{K_d} = \frac{180}{0.1} = 1800 \text{ Tk}$$

$\therefore V_B(\text{Incepta}) >$ Market value $= 1700$ Tk

Here the bond value of the incepta company is greater than the market value. So, based on instrinsic value of the bonds, Investment in Incepta company will be a better investment for Mr. Zahid.

10)

ACI Company

given,
~~PAV~~ Face value = Tk 2000
Coupon Rate = 12%
= 0.12
n = 20 years
K_d = 15%
= 0.15

∴ Coupon payment, I = Face value * Coupon rate
= 2000 * 0.12
= Tk 240

∴ MV = 2000 + (2000 × 5%)
= Tk 2100

We know,

$$V_B(ACI) = \left[I \times \frac{1 - \frac{1}{(1+k_d)^n}}{k_d} \right] + \frac{MV}{(1+k_d)^n}$$

$$= \left[240 \times \frac{1 - \frac{1}{(1+0.15)^{20}}}{0.15} \right] + \frac{2100}{(1+0.15)^{20}}$$

= Tk 1630.55

Square Company

given,
Face value = 2000 Tk
n = 20 years
Coupon Rate = 14%
= 0.14
K_d = 15%
= 0.15

∴ Coupon payment I = 2000 × 0.14
= Tk 280

∴ MV = 2000 ~~+~~ − (2000 × 5%)
= Tk 1900

We know,

$$V_B(Square) = \left[I \times \frac{1 - \frac{1}{(1+k_d)^n}}{k_d} \right] + \frac{MV}{(1+k_d)^n}$$

$$= \left[280 \times \frac{1 - \frac{1}{(1+0.15)^{20}}}{0.15} \right] + \frac{1900}{(1+0.15)^{20}}$$

= Tk 1868.703

Now,
$V_B(ACI)$ = Tk 1630.55 > Market value = Tk 1600
$V_B(Square)$ = 1868.703 < Market value = Tk 1900

As, the intrinsic value of ACI company's bond is greater than their market value. So, I will purchase the bond of ACI company.