

THE INTITUTE OF COST AND MANAGEMNET ACCOUNTANTS OF BANGLADESH  
CMA DECEMBER 2018 EXAMINATION  
PROFESSIONAL LEVEL- IV  
SUBJECT: 401. FINANCIAL MANAGEMENT

**Model Solution**

**Solution to the question No.1**

(a)

**Optimistic Budget**

	<b>Current Production</b>	<b>Contract A</b>	<b>Contract B</b>	<b>New Product</b>	<b>Total</b>
	Tk.	Tk.	Tk.	Tk.	Tk.
Sales:	15,00,000	5,00,000	3,00,000	2,40,000	25,40,000
Variable Costs:	5,00,000	2,00,000	1,20,000	1,20,000	9,40,000
Contribution	10,00,000	3,00,000	1,80,000	1,20,000	16,00,000
Fixed Cost:	8,00,000	-	-	40,000	8,40,000
Profit:	2,00,000	3,00,000	1,80,000	80,000	7,60,000

Contract A: Variable Cost = 40% of Tk. 5 lac = Tk.2,00,000

Contract B: Variable Cost = 40% of Tk.. 3 lac= Tk.1,20,000

New Product:

Sales = Tk. 30,000X 8 months=Tk. 2,40,000

Variable Cost = 50% of Tk. 2.4 lac = Tk.1,20,000

Fixed Cost = Tk. 5,000 X 8 months= Tk. 40,000

**Pessimistic Budget**

	<b>Current Production</b>	<b>New Product</b>	<b>Total</b>
	Tk.	Tk.	Tk.
Sales:	15,00,000	90,000	15,90,000
Variable Costs:	5,50,000	45,000	5,95,000
Contribution	9,50,000	45,000	9,95,000
Fixed Cost:	8,00,000	15,000	8,15,000
Profit:	1,50,000	30,000	1,80,000

**Calculations:**

**Current Production: Variable Cost goes up by 10%**

Current Production: Variable Cost goes up by 10%

Variable Cost = Tk.5 lac + 10% of Tk. 5 lac = Tk.5,50,000.

New Product: Sales = Tk. 30,000 x 3 months = Tk.90,000.

Variable Cost = 50% of Tk. 90,000 = Tk.45,000.

Fixed Cost = Tk.5,000 x 3 months = Tk.15,000.

Sensitivity factors:

- (i) 'More likely to win Contract A' is clearly stated and so Contract A is not included in the Pessimistic Budget.
- (ii) Similarly, there is no certainty to win Contract B, and therefore, Contract B is also not considered in the Pessimistic Budget.

However, if the contract B is won at a later date (of course, remote possibility), the profit of Tk. 1,80,000 (shown in the Optimistic budget) would accrue

**(b)**

Computation of required components

- Current Assets = Stock+ Debtors+ Cash= Tk.(1,50,000+50,000+1,00,000)= Tk.3,00,000
- Current Liabilities = Creditors + Bank overdraft= Tk.(1,00,000+ 50,000) =Tk.1,50,000
- Liquid Assets= Current Assets – Inventory = Tk.(3,00,000-1,50,000) = Tk.1,50,000
- Absolute Liquid Assets= Cash= Tk.1,00,000
- Owners equity= Share capital+ 10% preference share capital+ Reserve and surplus= Tk.(2,00,000+ 1,00,000+ 1,00,000)= Tk.4,00,000
- Total fixed assets= Plant & machinery+ Land & building= Tk.(2,00,000+2,00,000)= Tk.4,00,000
- Total debt= 20% debenture+ Long term loan+ Current Liabilities= Tk.(1,00,000+50,000+ 1,50,000)= Tk.3,00,000
- Working Capital = Current Assets- Current Liabilities= Tk.(3,00,000-1,50,000)= Tk.1,50,000

Ratios:

1. Current ratio= Current Assets/ Current Liabilities= 3,00,000/1,50,000=2:1
2. Liquid Ratio= Liquid Assets/ Current Liabilities= 1,50,000/1,50,000=1:1
3. Absolute Liquid Ratio= Absolute Liquid Assets/ Current Liabilities= 1,00,000/1,50,000=1:1.5
4. Current Assets Owners equity ratio= Current Assets/ Owners equity= 3,00,000/4,00,000=0.75:1
5. Debt equity ratio= Total debt/ owners equity= 3,00,000/4,00,000= 0.75:1
6. Inventory Turnover ratio= Cost of Goods Sold/ Average Inventory= No info/1,50,000
7. Current Asset to Liquid asset ratio= Current Asset / Liquid Asset= 3,00,000/1,50,000= 2:1
8. Capital Gearing Ratio= (Preferred share + Debenture+ Long Term Debt)/Share capital = 2,50,000/2,00,000=1.25:1

## Solution to the question No. 2

(c)

In order to find out the WACC, the specific cost of capital of different sources may be calculated as follows:

### Cost to debenture:

$$\begin{aligned} \text{Int, I} &= \text{Tk.13} \\ \text{SV} &= (\text{Sale Price-Flotation cost}) = 100 - 4 = \text{Tk.96} \\ \text{RV} &= \text{Tk. 100} \\ \text{tax} &= 50\% \\ \text{N} &= 10 \text{ year} \\ \text{Kd} &= \frac{[I + (RV - SV) / N] (1 - t)}{(RV + SV) / 2} \\ &= \frac{[13 + (100 - 96) / 10] (1 - .5)}{(100 + 96) / 2} \\ &= 6.84\% \end{aligned}$$

### Cost to Pref. Shares:

$$\begin{aligned} \text{PD} &= \text{Tk.14} \\ \text{RV} &= \text{Tk.100} \\ \text{SV} &= (\text{Sale Price-Flotation cost}) = \text{Tk.}(100 - 5) = \text{Tk.95} \\ \text{N} &= 10 \text{ years} \\ \text{Kp} &= \frac{D + (RV - SV) / N}{(RV + SV) / 2} \\ &= \frac{14 + (100 - 95) / 10}{(100 + 95) / 2} \\ &= 14.87\% \end{aligned}$$

### Cost to Equity Shares:

$$\begin{aligned} \text{P0} &= (\text{Sale Price-Flotation cost}) = \text{Tk.}(22 - 2) = \text{Tk.20} \\ \text{D1} &= \text{Tk.2} \\ \text{g} &= 7\% \\ \text{Ke} &= \frac{D1}{P0} + g \\ \text{Ke} &= \frac{2}{20} + .07 \\ &= 17\% \end{aligned}$$

### Calculation of WACC (Book Value)

Source	Amount	Weight	C/C	WxC/C
Pref. of shares	Tk. 2,00,000	.10	.1487	.01487
Equity shares	Tk. 10,00,000	.50	.1700	.08500
Debentures	Tk. <u>8,00,000</u>	<u>.40</u>	<u>.0684</u>	<u>.02736</u>
	Tk. <u>20,00,000</u>	<u>1.00</u>		<u>.12723</u>

So, WACC (BV) is 12.72% or 12.8%

### Calculation of WACC (Market Value)

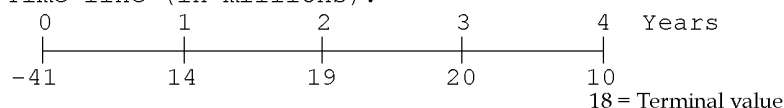
Source	Amount	Weight	C/C	WxC/C
Pref. of shares	Tk. 2,40,000	.072	.1487	.010706
Equity shares	Tk. 22,00,000	.663	.1700	.112710
Debentures	Tk. <u>8,80,000</u>	<u>.265</u>	<u>.0684</u>	<u>.018126</u>
	Tk. <u>33,20,000</u>	<u>1.000</u>		<u>.141542</u>

So, WACC (MV) is 14.2%

### Solution to the question No. 3

(a)

Time line (in millions):



Calculate NPV of merger and determine PV of all cash inflows:

$$NPV_{\text{Merger}} = \$6.00/\text{share} \times 2,000,000 = \$12.0 \text{ million.}$$

$$\$12.0 = -\$41 + \frac{\$14}{(1 + IRR_M)^1} + \frac{\$19}{(1 + IRR_M)^2} + \frac{\$20}{(1 + IRR_M)^3} + \frac{\$28}{(1 + IRR_M)^4}.$$

$$PV \text{ of discounted cash flows} = 41 + 12 = 53.$$

Use the complete cash flows to calculate the IRR or k.

Using trial-and-error or Using interpolation method:

Let IRR=17%,

$$PV = \$14(1.17)^{-1} + \$20(1.17)^{-2} + \$20(1.17)^{-3} + \$28(1.17)^{-4}$$

$$= \$11.9658 + \$13.8798 + \$12.4874 + \$14.9422 = \$53.2752$$

Let IRR=18%,

$$PV = \$14(1.18)^{-1} + \$20(1.18)^{-2} + \$20(1.18)^{-3} + \$28(1.18)^{-4}$$

$$= \$11.8644 + \$13.6455 + \$12.1726 + \$14.4421 = \$52.1246$$

If IRR 17%, the PV = \$53.2752

If IRR 18%, the PV = \$52.1246

Difference 1%, PV = \$1.1506

Therefore, IRR = 17% + [(\$53.2752-\$53.0000)/ \$1.1506]% = 17.00%+0.24% = 17.24%

Alternatively, IRR can be computed by using Financial calculator solution:

Inputs:  $CF_0 = -53$ ;  $CF_1 = 14$ ;  $CF_2 = 19$ ;  $CF_3 = 20$ ;  $CF_4 = 28$ .

Output:  $IRR = 17.236 \approx 17.24\% = k_{\text{Merger}}$ .

(b)

Time line (in millions):

0	1	2	3	4	5	Years
$k = 16\%$						
-10	4	4	6	6	5*	Projected cash flows
NPV=?	3.2	3.2	4.8	4.8	4	Unrestricted flows

\*Calculate the expected terminal value cash flow:

Expected terminal cash flow ( $CF_5$ ) =  $0.5(\$8) + 0.5(\$2) = \$4 + \$1 = \$5.0$  million

Calculate the unrestricted cash flows that can be repatriated to the parent firm:

Unrestricted cash flows = 80% of the projected cash inflows.

Numerical solution (in millions):

Year	Projected Cash Flow	Percent Unrestricted	Unrestricted Repatriable Cash Flows
1	\$4	0.80	\$3.2
2	4	0.80	3.2
3	6	0.80	4.8
4	6	0.80	4.8
4	5	0.80	4.0

$$\begin{aligned}
 NPV &= -\$10.0 + \frac{\$3.2}{(1.16)} + \frac{\$3.2}{(1.16)^2} + \frac{\$4.8}{(1.16)^3} + \frac{\$4.8}{(1.16)^4} + \frac{\$4}{(1.16)^4} \\
 &= -\$10.0 + \$2.75862 + \$2.37812 + \$3.07516 + \$2.65100 + \$2.20916 \\
 &= \$3.07203 \approx \$3.07 \text{ million.}
 \end{aligned}$$

(c)

The Black-Scholes model calculates the value of the call option as:

$$\begin{aligned}
 V &= P[N(d_1)] - Xe^{-k_{RF}t} [N(d_2)] \\
 &= \$40[0.5987] - \$40e^{-(0.12)(0.25)}[0.5199] \\
 &= \$23.948 - \$20.181 \\
 &= \$3.77
 \end{aligned}$$

#### **Solution to the question No. 4**

**(a)**

Step 1: Find the current number of shares outstanding:

$$\text{Shares} = \text{NI/EPS} = \$480 \text{ million}/\$3.20 = 150 \text{ million shares.}$$

Step 2: Find the number of shares after the repurchase:

$$\text{New shares} = 150 - \$1,200/\$32 = 150 - 37.5 = 112.5 \text{ million shares.}$$

Step 3: Find the new EPS after the repurchase:

$$\begin{aligned} \text{EPS} &= [(\text{EBIT} - \text{INT})(1 - T)]/\text{New shares} \\ &= [(\$800 - \$84) \times 0.6]/112.5 = \$3.818667. \end{aligned}$$

Step 4: Find the new stock price:

$$\begin{aligned} \text{Stock price} &= \text{EPS}/\text{New WACC} \\ &= \$3.818667/0.11 = \$34.72. \end{aligned}$$

**(b) (i)**

First, we will calculate the cost of common equity and then use that to solve for the WACC.

$$k_s = k_{RF} + (k_M - k_{RF})b$$

$$k_s = 5\% + (6\%)1.1$$

$$k_s = 11.6\%.$$

Weight of debt and equity:

$$\text{Debt} = \text{Debt}/(\text{total debt \& equity}) = \$1 \text{ billion}/\$5 \text{ billion} = 20\%; \text{ therefore, equity} = 100\% - 20\% = 80\%$$

$$\begin{aligned} \text{WACC} &= w_d k_d (1 - T) + w_c k_s \\ &= (0.2)(7.5\%)(1 - 0.4) + (0.8)(11.6\%) \\ &= 10.18\%. \end{aligned}$$

**(b) (ii)**

To unlever the beta, we must use the Hamada equation, substituting the known values.

$$b_L = b_U [1 + (1 - T)(D/E)]$$

$$1.1 = b_U [1 + (1 - 0.4)(1/4)]$$

$$1.1 = b_U [1.15]$$

$$b_U = 0.9565$$

**(b) (iii)**

First, we must find the levered beta after the recapitalization, using the unlevered beta calculated in the previous problem.

$$\begin{aligned} b_L &= b_U[1 + (1 - T)(D/E)] \\ &= 0.9565[1 + (1 - 0.4)(2/3)] \\ &= 0.9565[1.4] \\ &= 1.3391. \end{aligned}$$

$$\begin{aligned} k_s &= k_{RF} + (k_M - k_{RF})b_L \\ &= 5\% + (6\%)1.3391 \\ &= 13.03\%. \end{aligned}$$

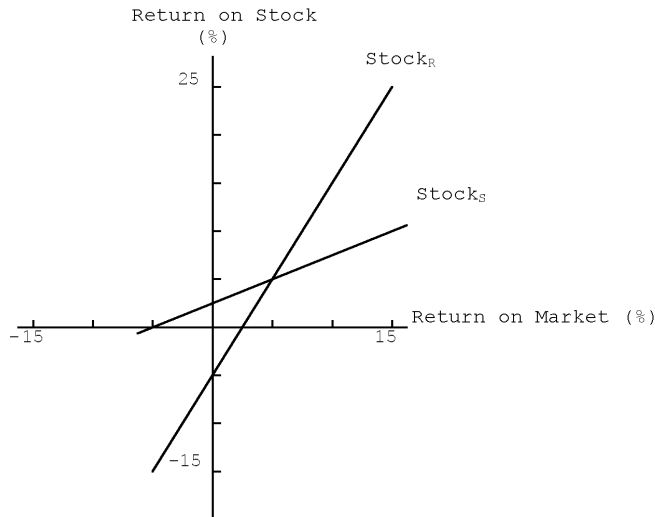
**Solution to the question No. 5**

**(a)**

EBIT	\$2,000,000	
Int	<u>500,000</u>	(\$5,000,000 debt □ 10% coupon)
EBT	\$1,500,000	
Taxes	<u>600,000</u>	(\$1,500,000 EBT □ 40% tax rate)
NI	\$ 900,000	
Project funding	<u>720,000</u>	\$1,200,000 project funded:
Residual earnings		0.60 equity = \$720,000
payable as dividends	<u>\$ 180,000</u>	0.40 debt = \$480,000

Dividend payout ratio = \$180,000/\$900,000 = 20.00%

(b) (i) Plot the returns of Stocks R and S and the market.



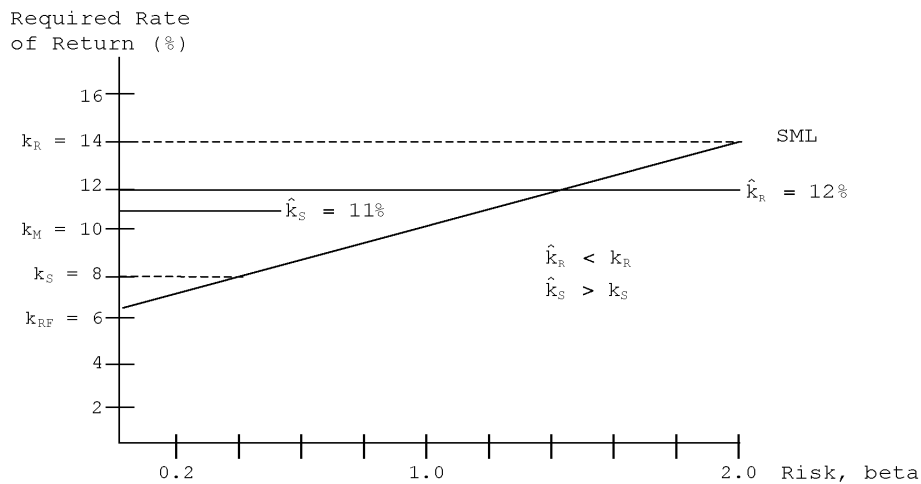
Calculate beta using the rise over run method or calculator regression function.

$$\frac{Y_2 - Y_1}{X_2 - X_1} = \text{beta} \quad \text{Stock}_R: \frac{25 - 5}{15 - 5} = \frac{20}{10} = 2.0 = \text{beta}_R.$$

$$\text{Stock}_S: \frac{10 - 5}{15 - 5} = \frac{5}{10} = 0.5 = \text{beta}_S.$$

The difference in betas is:  $\text{Beta}_R - \text{Beta}_S = 2.0 - 0.5 = 1.5$

(ii) Draw SML.



Calculate required returns for Stocks R and S.

$$k_R = 6\% + (10\% - 6\%)2.0 = 14\%.$$

$$k_S = 6\% + (10\% - 6\%)0.5 = 8\%.$$



Calculate the difference between the expected and required returns.

$$\hat{k}_R - k_R = 12\% - 14\% = -2.0\%.$$

$$\hat{k}_S - k_S = 11\% - 8\% = 3.0\%.$$

$$\text{Widest margin} = \hat{k}_S - k_S = 3.0\%.$$

**= THE END =**