NMIMS GLOBAL ACCESS SCHOOL FOR CONTINUING EDUCATION

NMIMS Global Access School for Continuing Education (NGA-SCE)

Subject: Corporate Finance

Internal Assignment Applicable for December 2020 Examination

Answers to Question No.1:

- **Net Present Value (NPV):** It is the difference between the present value of cash inflows and cash outflows in a given project. This method is also used to evaluate the profitability of a project.
  The formula to calculate NPV is as follows:
  $NPV = C_1/(1+r) + C_2/(1+r)^2 + C_3/(1+r)^3 + \ldots\ldots\ldots + C_n/(1+r)^n - I_o$
  Where,
  C_t = Net cash received at the end of year t
  I_o = Initial Investment outlay
  R = Discount rate or the required minimum rate of return on investment in a project
  N = Time duration of the project

- **Internal Rate of Return (IRR):** It is used to determine the discount rate that makes the NPVs of all cash flows arising out of any project equal to zero. This method doses not take into account any external factors, such as inflation. IRR also denotes the interest rate at which the NPVs of all expenses made on a project (cash outflow) equals to the NPVs of all the benefits or income arising out of the project (cash inflow). A project should be accepted if its IRR is greater than the cost of the capital invested in the project.

- **Payback Period:** It refers to the time in which the initial cash outflows of a project is expected to be recovered from the cash inflows generated by the project. It is one of the simplest investment appraisal techniques. If the payback periods are longer then it is undesirable for investment propositions. The formula to calculate payback period is as follows:
  Payback period = $\frac{\text{Investment over the life of the project}}{\text{Constant annual cash flows}}$

- **Profitability Index:** It is the ratio of the present value of the cash inflow to the present value of the cash outflow. The profitability index method s based on the time value of money and is intended to maximise the wealth of the shareholders. The profitability index should be greater than one for the selection of a project.

  The formula to calculate profitability index is as follows:

Profitability Index = Present value of cash inflow
Present value of cash outflow

Calculating present value of future cash flows of both projects using NPV method:

Year	Expected cash inflows Project-A	Expected cash inflows Project-B	Discounted factor @12%	Present value of cash inflows Project-A	Present value of cash inflows Project-B
1	-	190	0.893	-	169.67
2	-	190	0.797	-	151.43
3	-	190	0.712	-	135.28
4	600	190	0.635	381.00	120.65
5	600	190	0.567	340.20	107.73
6	926	190	0.507	469.48	96.33
	Total			**1190.68**	**781.09**

Note: The discounting factor @12% has been rounded off to the one decimal.

Net Present Value (NPV) = Present value of cash inflows – Initial Investment i.e. cash outflows

Project-A = 1190.68 – (375 + 300 + 200 + 100 + 200)

= 1190.68 – 1175

= 15.68

Project-B = 781.09 – 575

= 206.09

Since, the NPV of Project-B is greater than the NPV of Project-A, ABC Ltd. should select the Project-B.

Payback Period for each Project:

Project-A = 1175/1200 = 1.958 years

Project-B = 575/190 = 3.026 years

Profitability Index for each project:

Project-A = 1190.68/ (375+ 300*0.893+200*0.797+100*0.712+200*0.452)

= 1190.68/1054.30

= 1.129

Project-B = 781.09/575

= 1.358

Internal rate of return (IRR):

- Let us assume that the discount rate (r) = 13% for Project-A

NPV of Project-A at 13% = (600*0.613) + (600*0.543) + (926*0.480) – 1175

= 1138.08-1175

= -36.92

Since, the value of NPV is negative we have to decrease the r.

Now, NPV of Project-A at 12% = 15.68 (the same has been calculated above)

Since, the NPV of Project-A at 13% is -36.92 and NPV of Project-A at 12% is 15.68 thus we can say that IRR lies somewhere between 12% to 13%. Therefore, IRR will be 12.30% which provides the value closer to zero.

- Let us assume that the discount rate (r)= 23% for Project-B

NPV of Project-B at 23% = [(190*3.092 i.e. discounted factor @23% for 6 years) -575]

= 12.53

Since, the value of NPV is positive we have to increase the r

Now, NPV of Project-B at 24% = (190*3.019 – 575) = -1.39

Since, the NPV of Project-B at 24% is -1.39 and at 23% is 12.53 thus IRR lies somewhere between 23% to 24%. Therefore, IRR will be 23.92% which provides the value closer to zero.

Answers to Question No.2:

- **Present value of Annuity:** The present value of annuity is defined as the discounted value of the future cash flow in the present time. It is also called the discounting value of annuity. The formula to calculate the present value of annuity are as follow:
  $\mathbf{PVA_n = A[(1+i)^n - 1]/i(1+i)^n}$
  Where,
  PV = Present Value of Annuity of cash flow
  A = Annuity
  I = Rate of interest
  N = Number of years

- **Future Value of Annuity:** The calculation of the future value of annuity helps the investors to estimate the amount of return on investments and compare the risk and returns linked with the investment. The formula to calculate the future value of annuity are as follows:
  $\mathbf{FVA_n = A[(1+i)^n-1]/i}$
  Where,
  FVA_n = Future Value of Annuity of cash flow
  A = Annuity
  I = Rate of interest
  N = Number of years

In the given case, my father who is 50 years old now plans to retire after 10 years from now. He wants a fixed retirement income of Rs. 5,00,000 per annum. He also has current savings of Rs. 10,00,000 on which he excepts to earn a return of 10% p.a. compounded annually. In order to find out the amount which he should save during each of next 10 years to meet his requirement goal, we have to calculate the present value of annuity on Rs. 5,00,000 @10% for 25 years and future value of annuity on Rs. 10,00,000 @10% for 10 years, the difference of both will be he required amount which he should save during each of next 10 years.

- **Calculation of present value of annuity on Rs. 5,00,000 @10% for 25 years**

  PVA_n = 5,00,000/(1.10)+ 5,00,000/$(1.10)^2$+ 5,00,000/$(1.10)^3$+ 5,00,000/$(1.10)^4$+ 5,00,000/$(1.10)^5$+……..5,00,000/$(1.10)^{25}$
  = 5,00,000/9.077 i.e. discounting value factor of annuity of Rs.1 at 10% discount rate for 25 years.
  = Rs.55,084 rounded off

- **Calculation of future value of annuity on Rs. 10,00,000 210% for 10 years**

  FVA_n = 10,00,000$(1.10)^{10}$+ 10,00,000$(1.10)^9$+10,00,000$(1.10)^8$+10,00,000$(1.10)^7$
  + 10,00,000$(1.10)^6$……...+ 10,00,000$(1.10)^{10}$
  = 10,00,000*15.937 i.e. CVFA of Rs.1 at 10% for 10 years
  = Rs.1,59,37000

Thus, Rs.1,58,81,916 i.e. (Rs. 1,59,37000-Rs. 55,084) is the required amount which he should save during 10 years in order to meet his requirement goal.

Answers to Question No.3:

Part (a):

i. **Cost of Debt:** Cost of debt capital refers to the total cost or the rate of interest paid by an organization in raising debt capital.
Thus, $K_D = [(1-T) *R] *100$
Where,
K_D = Cost of debt
T = Tax Rate
R = Rate of interest on debt capital
In the given case, rate of interest is 10% and tax rate is 25%
So, $K_D = [10\%*(1-0.25)] *100 = 7.5\%$

ii. **Cost of Preference Share Capital:** Cost of preference capital is the sum of amount of dividend paid and expenses incurred for raising preference shares. The dividend paid on preference shares is not deducted from tax, as dividend is an appropriation of profit and not considered as an expense.
Thus, $K_p = D_p/N_p$ (assuming it is irredeemable preference share)
Where,
K_p = Cost of Preference Share
D_p = Dividend on Preference Shares
NP = Net proceeds from issue of preference share
In the given case, dividend on preference share is Rs.8 and net proceeds from issuance of preference share will be Rs.96 i.e. (Rs. 100-Rs. 4).
So, $K_p = 8/96*100 = 8.33\%$

iii. **Cost of Equity Share capital using Capital Asset Price Model (CAPM):**
CAPM helps in calculating the expected rate of return from a share of equivalent risk in the capital market. The cost of shares that carry risk would be equal to the cost of lost opportunity. The computation of cost of capital using CAPM is based on the condition that the required rate of return on any share should be equal to the sum of risk less rate of interest and premium for the risk.
According to CAPM, cost of capital can be calculated by using the following formulae:
$R_E = R_f + \beta (R_m - R_f)$
Where,
R_E = Expected rate of return on assets
β = Beta coefficient of assets
R_m = Expected return of the market

R_f = Risk free rate of interest
In the given case, R_f = 6%, R_M= 15% and β = 1.50
So, R_E = 6% + (15%-6%) *1.50 = 19.5%

Part (b):

Weighted Average Cost of Capital (WACC): It is a financial ratio that calculates a company's cost of financing and acquiring assets by comparing the debt and equity structure of the business. The WACC can be calculated mathematically by using the below formula:

WACC = (K_E * E) + (K_P * P) + (K_D * D)

Where,
E = Proportion of equity capital in capital structure
P = Proportion of preference capital in capital structure
D = Proportion of debt capital in capital structure
In the given case, Cost of equity capital = 19.5%, Cost of debt = 7.50% and Cost of Preference Capital is 8.33%
So, WACC = (19.5% * 60/100) + (8.33% * 15/100) + (7.50% * 25/100)
= 11.70% + 1.25% + 1.87%
= 14.82%