

Investment / Project Appraisal - Questions

Chartered Accountancy Corporate Level Advanced Management Accounting (AMA)

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INVESTMENT APPRISAL

Example 01

A project requires an initial investment of Rs.800,000 and then earns net cash inflows as follows:

Year	1	2	3	4	5	6	7
Cash inflows (Rs000)	100	200	400	400	300	200	150

In addition, at the end of the seven-year project the assets initially purchased will be sold for Rs100,000.

Required:

Determine the project's ROCE using:

- Initial capital costs
- Average capital investment.

Example 02

A project is expected to have the following cash flows.

Year	Cash Flows Rs000
0	(1,900.00)
1	300.00
2	500.00
3	600.00
4	800.00
5	500.00

What is the expected payback period?

Example 03

A company is evaluating three mutually exclusive projects for the investment of excessive funds of Rs20Mn it is having now. It is expected to have the following profit after tax and depreciation from each project. The company depreciate its assets over the useful life on straight-line basis.

Year	Profit Rs000		
	A	B	C
0	(20,000.00)	(20,000.00)	(20,000.00)
1	2,000.00	4,000.00	(2,000.00)
2	4,000.00	5,000.00	(1,000.00)
3	(500.00)	5,000.00	1,000.00
4	1,500.00	3,000.00	3,000.00
5	2,000.00	2,000.00	6,000.00
Target Payback	3Yrs	3Yrs	3Yrs

You are required to calculate the payback period and advise the management for the suitable investment.

Example 04

Perera Company invests Rs1,000,000/- for 3 years at the annual interest rate of 15%. The interest will be compounded on annual basis.

Calculate the maturity value of this investment at end of 03rd year.

Example 05

Perera Company is expecting a maturity value of Rs1,520,875/- at end of 03rd year from now that they invested at the annual interest rate of 15%. The interest will be compounded on annual basis.

Calculate the initial investment made now.

Example 06

Cash flows related to project Y of AB Company are as follows;

Year	0	1	2	3	4
Cash flows Rs.000	(2,000.00)	400.00	600.00	700.00	800.00

If the cost of capital is 10%, **you are required** to compute the Net present value of the cash flows.

Example 07

RPT Company expect to purchase a machine. Expected cash flows are given below.

Year	0	1	2	3	4	5
Cash flows Rs.000	(1,500.00)	700.00	700.00	700.00	700.00	700.00

If the cost of capital is 10%, **you are required** to compute the Net present value of the cash flows.

Example 08

Following information is related to project A of XL Company.

Initial investment is Rs200,000/-

Annual cash receipts in to infinity are Rs20,000/-

Cost of capital is 9%.

You are required to calculate the net present value of the cash flows.

Example 09

Following information is related to project B of Amal PLC.

Year	0	1	2	3	4	5 onwards
Cash flows Rs.000	(5,000.00)	3,000.00	1,500.00	1,500.00	1,000.00	500

If the cost of capital is 10%, **you are required** to calculate the net present value of the cash flows and advise to the management whether the project should be accepted or not.

Example 10

NPV of project Y of ABC Company under four different discounting factors are given below.

Discounting Rate	NPV Rs.
8%	5,980.00
10%	1,000.00
12%	(3,550.00)
14%	(7,880.00)

You are required to compute the IRR using graphical approach.

Example 11

You are required to compute the IRR using interpolation method for the information given on example 09.

Example 12

ABC Company intends to purchase with 3 years of life time for the project of producing product X. The cost of the machine is 5Mn and no scarp value is expected at end of the project. It is expected to incur additional fixed cost of Rs3Mn for a year for this project.

Expected income and cost of product X are as follows;

	Per Unit
Selling price	15
D. Material	2
D. Labour	3
Variable overhead	2

Expected sales volume per year is 1Mn units.

Inflation rates are estimated as follows.

- Selling price 2% per annum.
- Direct labour cost 12% per annum.
- All other cost 8% per annum.

Money discounting rate of the company is 15%

You are require to compute the NPV of the project and advised whether the project should be accepted or not.

Example 13

KML Limited is in the process of evaluating a project having an estimated life of 3 years. The project requires an initial investment of Rs75Mn in a special plant which qualifies for capital allowances at 33 1/3 %. The estimated residual value of the plant at end of the project's life is Rs15Mn.

The estimates for the project is given below.

	Rs.Mn		
Year	1	2	3
Income	120	130	150
Expenses			
Material	50	55	65
Labour	30	35	40

Other overhead	25	30	40
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Following additional information is also given.

01. Depreciation is calculated on straight-line method which is included in other production cost.
02. The company is liable to pay income tax at rate of 28% on its profit and the tax payable one year in arrears.
03. The company's cost of capital is 12% per annum.

You are required to;

- Calculate the NPV of the project.
- Advise the company whether the project should be accepted.
- State two drawbacks of NPV as project evaluation technic.

Example 14

Following information is related to project B of Amal PLC.

Year	0	1	2	3	4
Cash flows Rs.000	(5,000.00)	3,000.00	2,000.00	1,500.00	1,000.00

If the cost of capital is 10%, **you are required** to calculate Profitability Index and advise to the management whether the project should be accepted or not.

Example 15

A company is evaluating three mutually exclusive projects for the investment of excessive funds of Rs20Mn it is having now. It is expected to have the following profit after tax and depreciation from each project. The company depreciate its assets over the useful life on straight-line basis.

Year	Profit Rs000		
	A	B	C
0	(20,000.00)	(20,000.00)	(20,000.00)
1	2,000.00	4,000.00	(2,000.00)
2	4,000.00	5,000.00	(1,000.00)
3	(500.00)	5,000.00	1,000.00
4	1,500.00	3,000.00	3,000.00
5	2,000.00	2,000.00	6,000.00
Target Payback	3Yrs	3Yrs	3Yrs

You are required to calculate the discounted payback period if the cost of capital of the company is 10% and advise the management for the suitable investment.

Example 16

A company is evaluating three mutually exclusive projects for the investment of excessive funds of Rs20Mn it is having now. It is expected to have the following profit after tax and depreciation from each project. The company depreciate its assets over the useful life on straight-line basis. The cost of capital of the company is 12%.

Year	Profit Rs000	
	A	B
0	(20,000.00)	(20,000.00)
1	2,000.00	4,000.00
2	4,000.00	5,000.00
3	(500.00)	5,000.00
4	1,500.00	3,000.00
5	2,000.00	

You are required to calculate the NPV of both project and advise the management.

Question 01

DG Ltd. is a leading manufacturing company and the management of the company is evaluating a proposal to purchase a new machinery to replace an existing old machinery with the view of improving the quality of their products.

The following information is provided:

(1) The cost of the new machinery is Rs.100 million, which is to be paid immediately. The useful life time of the new machinery is estimated to be 5 years and the scrap value at the end of the 5th year would be Rs.14 million.

(2) If the new machinery is purchased, the existing old machinery could be sold immediately for Rs.6 million. The existing old machinery has been fully depreciated.

(3) With the purchase of the new machinery, it is expected that the quality of the products will be increased and as a result the demand for the products will also be increased. Projected increase in demand for the company's products for the next 5 years is as follows:

Year	1	2	3	4	5
Demand (Units)	30,000	20,000	25,000	35,000	40,000

(4) Other forecasted information is as follows:

Description	Rs.
Selling price per unit	3,000

Variable cost per unit	1,500
Annual fixed cost (including depreciation)	40,000,000

(5) The cost of capital of DG Ltd. is 20% per annum.

(6) Ignore taxation.

You are required to:

(a) Recognize all the cash flows relating to the new machinery for the 5 years. (09 marks)

(b) Calculate the following based on the above cash flows:

- (i) Net Present Value (NPV).
- (ii) Internal Rate of Return (IRR). (08 marks)

(c) Assess whether investing in the new machinery is financially viable for DG Ltd. (02 marks)

Question 02

PK Ltd. manufactures and sells product Q to its' distributors. At present, the company operates at its' full capacity. It manufactures and sells 30,000 units of Q each month at a selling price of Rs.125/- per unit, with a variable manufacturing cost of Rs.85/- per unit.

The product is manufactured using a specialized machine which has been in use for over 10 years and has a scrap value of Rs.400,000/- at present.

With the recent development in technology, the company has experienced the need to invest in a new machine, to provide them better efficiency, lower costs and higher capacity. The Production Manager has carried out a research of the machines available in the market and has identified a machine which is more suitable for PK LTD.

This machine is expected to have a useful life of 5 years and the initial investment is Rs.42 million and no scrap value at the end of 5 years. The production capacity is 600,000 units per annum and the variable cost of manufacturing is Rs.70/- per unit in the first year. With the payment of the initial Rs.42 million, the machine vendor offers free service for the first 3 years, after which the annual service cost is expected to be Rs.200,000/- and Rs.250,000/- for year 4 and 5 respectively.

The company has forecasted the following for the next 5 years.

Year	1	2	3	4	5
Monthly sales units	30,000	32,000	38,000	40,500	43,000
Sales Price Per Unit	125	125	125	130	130

The variable cost of manufacturing is expected to increase by 8% per annum due to the inflation, wage increases etc. The annual fixed overheads, excluding depreciation and service cost are Rs.5,850,000/- at present and this is expected to remain constant over the next 5 years.

The company pays tax at the rate of 28% and for this machine a capital allowance of 33 1/3 % per annum is available. Assume that this machine is being financed through internally generated funds and there is no interest cost.

- (a) Recognize the cash flows relates to this machine. (06 marks)
- (b) Calculate the following based on the cash flows prepared above for this machine:
 - (i) Payback period. (03 marks)
 - (ii) Accounting rate of return. (03 marks)
- (c) Calculate the Net Present Value (NPV) of this investment using a discount factor of 15% and Assess with reasons whether PK Ltd. should go ahead with the new machine or not. (06 marks)
- (d) Calculate the Internal Rate of Return (IRR) of the new machine. (04 marks)
- (e) Explain briefly, the importance of the concept of time value money in capital expenditure decisions. (03 marks)

Question 03

CA PROFESSIONAL (STRATEGIC LEVEL I) EXAMINATION – DECEMBER 2013 13304 - STRATEGIC MANAGEMENT ACCOUNTING

Hands Lanka (Pvt) Ltd (HL) which engaged in manufacturing fabric gloves is a group company of Industrial Equipment Plc (IEP). Currently HL is making losses due to the competition. HL has recently developed a specialty dipped glove (new product) and the management is contemplating a project of a dipping plant. Total investment in machinery and installation will be Rs. 400 million out of which Rs. 300 million should be paid now and balance at the end of the first year from now (Year 1). At the end of five years from now (expected lifetime of the project) the residual value would be Rs. 50 million

You have been given the following forecasted cash flows and profits for the project, which are stated according to the present day costs and prices.

	Year 1 (Rs. Mn)	Year 2 (Rs. Mn)	Year 3 (Rs. Mn)	Year 4 (Rs. Mn)	Year 5 (Rs. Mn)
Sales	530	580	592	525	500
Materials	240	260	265	255	240
Labour	48	50	52	48	45
Overheads	120	120	120	115	110
Interest	20	15	10	5	-
Total expenses	428	445	447	423	395
Profit before tax	102	135	145	102	105

Working capital in present day's cost terms are:

	Beginning of year 1 (Rs. Mn)	Beginning of year 2 (Rs. Mn)	Beginning of year 3 (Rs. Mn)	Beginning of year 4 (Rs. Mn)	Beginning of year 5 (Rs. Mn)
Working capital	100	110	120	130	140

Additional information:

- HL has spent Rs. 400,000 to develop this new product. A competitor of HL has already offered Rs. 1 million for the technology of manufacturing this product.
- The machinery will be installed in a rented floor area owned by IEP for a rental of Rs. 1 million per year during the project period, which cost is included in overheads. This area is presently rented out by IEP to another subsidiary for the same amount. If the area is given to HL, this subsidiary will rent another location from a third party, which will cost Rs. 1.5 million per year.
- Selling prices of the gloves and working capital requirements are expected to increase by 5% per year while material and labour costs are expected to increase by 10% per year. Working capital will be released at the end of the project period.
- Depreciation is charged on straight-line basis and included in the overheads. Overheads are expected to increase by 5% every two years.
- Profits are taxable at 12% and HL has a carried forward tax loss of Rs. 30 million which will be utilised for this project subject to a maximum of 35% of assessable income. Depreciation allowance for machine is $33\frac{1}{3}\%$ per annum. Taxes are assumed to be paid in the year in which they are incurred.

- HL's real after tax Weighted Average Cost of Capital (WACC) is 15% per year, and nominal after tax WACC is 20% per year. Management of IEP will accept the project if it generates a positive net present value from the group's viewpoint.
- Discounting rates are given in the following table.

Discounting Rate	Year 1	Year 2	Year 3	Year 4	Year 5
15%	0.870	0.756	0.658	0.572	0.497
20%	0.833	0.694	0.579	0.482	0.402

You are required to:

- (a) Evaluate the acceptability of the project using net present value (NPV) and the internal rate of return (IRR) from the group's viewpoint. (You are advised to state the amounts for your calculation in Rupees thousands)

Explain the treatment of the following in your appraisal:

- Cost of product development incurred by HL
- Annual rent cost to be paid by HL to IEP
- Interest expense of HL
- Discounting rate

(16 marks)

Question 04

**CA PROFESSIONAL (STRATEGIC LEVEL I) EXAMINATION
 JUNE 2014
 13304 - STRATEGIC MANAGEMENT ACCOUNTING**

Golden Mahal Jewellers (GMJ) manufactures and sells exclusive designs of jewellery. The current manufacturing process of GMJ is labour intensive due to superior quality. At present, for one unit of an identified design, the variable cost of production is Rs. 30,000 and the selling price is Rs. 79,000. GMJ pays designer fees and sales commissions amounting to 20% of the selling price.

GMJ has conducted a research at a cost of Rs. 2 million on its product/market strategy and found that by automating the process for certain designs, they could be produced at a lower cost (with a reduction in quality as well) and offered to a separate market segment at a lower price. This market is expected to exist at least for six years and will not affect GMJ's present operations/market.

An initial investment of Rs. 30 million is required which can bring the variable cost of production to 60% of the present variable cost. Based on the research, it is expected that 1,500 units per year at a unit price of Rs. 40,000 could be sold. There will be an additional variable cost of Rs. 4,000 per unit but there will not be any incremental fixed costs. Designer fees and sales commissions are applicable as for current production.

The Weighted Average Cost of Capital (WACC) of GMJ is 10% and it is liable to pay income tax at 28% in the same year of making profits. Initial investment and research expenditure (only against this project) are deductible for tax purposes over five years on a straight line basis.

Required:

- (a) Calculate the net present value (NPV) of the project. (5 marks)
- (b) Estimate, using sensitivity analysis, the percentage by which each of the following would have to change before the project is no longer expected to be viable:
- initial outlay
 - annual contribution
 - life of the project
 - discount rate
- (9 marks)
- (c) State two (02) limitations of the sensitivity analysis performed above. (2 marks)

- (d) Describe two (02) additional factors that would be useful to help the company to decide whether to undertake the project. (2 marks)

(Total: 18 marks)

Question 05

**CA PROFESSIONAL (STRATEGIC LEVEL I) EXAMINATION
DECEMBER 2014
13304 - STRATEGIC MANAGEMENT ACCOUNTING**

You are the management accountant of Achmo (Pvt) Ltd (APL), a group of companies. The following are two major business matters discussed in the recently held board meeting.

BUSINESS MATTER - A

At present, APL has given company owned cars to all its management staff members (one car for each member) and is now planning to renew the fleet. The board has advised APL to carry out a financial evaluation of paying a vehicle allowance instead of providing company owned cars.

The following information is given to you:

Company owned cars (at present price levels)

- Cost of a new car is Rs. 5 million. Company policy is to use cars for four (04) years. APL can recover 40% of the purchase cost by selling the cars at the end of the fourth year.
- APL bears the vehicle maintenance costs including services, repairs, licensing, insurance etc. aggregating to Rs. 250,000 per year per car.
- APL pays fuel reimbursement per month per management staff member at Rs. 25,000.

Payment of vehicle allowance

- On this basis, staff members buy their own vehicles for which APL pays a monthly allowance of Rs. 80,000 per staff member during the forthcoming four

(04) year period. APL is liable to pay Employees' Provident Fund (EPF) at 12% and Employees' Trust Fund (ETF) at 3% on this monthly allowance.

- Vehicle maintenance costs stated above will be borne by the staff members.
- Staff members will still be eligible for fuel reimbursement.

Tax consultant's advice

- Vehicle maintenance cost is deductible for income tax purposes.
- APL is not entitled to depreciation allowance for motor cars. Income from sale of used cars is not liable to income tax.
- Monthly vehicle allowance, ETF and EPF are deductible expenses for income tax purposes.

Other information

- APL's nominal cost of capital is 17.6% per annum (after tax), which includes an allowance for generally-expected inflation of 5% per annum.
- APL is presently making taxable profits which are liable to income tax at 28% per annum. Taxes are paid during the year in which they arise.

BUSINESS MATTER - B

Techno Products (Pvt) Ltd (TPL) is a subsidiary of APL which manufactures Product X and currently sells 50,000 units per annum. The market for Product X will exist only for the next three years. TPL is presently experiencing a decline in demand for Product X due to competition.

If TPL does not take any action to defend competition, the next three years' sales will come down by 20% from the present level. Selling price per unit is Rs. 1,500 of which 60% is variable cost. TPL will not increase the selling price during the next three years.

- If TPL changes the design of the product which will cost Rs. 2 million initially, annual sales are expected to be as follows;

Probability	Sales (units)
0.4	60,000
0.6	70,000

Further, due to this change the variable manufacturing cost is expected to be as follows;

Probability	Variable manufacturing cost (Rs.)
0.5	950 per unit
0.5	1,000 per unit

- TPL can carry out an advertising campaign which will cost Rs. 5 million annually during the three year period. Then the expected annual sales will be as follows;

Probability	Sales (units)
0.3	65,000
0.7	75,000

Due to financial constraint, TPL will select only one option from the above two alternatives i.e. changing product design or carrying out an advertising campaign.

Assume all cash flows occur at the respective year-end.

You are required to:

BUSINESS MATTER - A

- (a) Evaluate the financial desirability for APL, of paying a monthly allowance to its management staff instead of providing company owned cars, in real terms, using net present value (NPV) and advise the board on the decision they should make.

(8 marks)

- (b) Determine the values of the following variables at which the company is indifferent to choosing either option.

(i) Monthly vehicle allowance

(ii) Purchase price of a car

(5 marks)

(c) Advise the board by interpreting your results in (b) (i) and (ii) above. (2 marks)

BUSINESS MATTER - B

Draw a fully labeled decision tree showing the options available to TPL and based on the present values, recommend the decision that TPL should make. (Assume TPL's cost of capital as 15%) (13 marks)

Question 06

CA BUSINESS LEVEL

BUSINESS MANAGEMENT ACCOUNTING _ KB2

JUNE 2015

Auto Sort (Pvt) Limited (ASL) is an automobile repairing company which has forecasted the following repair revenue (at present price level) for the next four years, with the existing facilities.

Repair revenue forecast (contribution equals to 60% of repair revenue)

Year	Y1	Y2	Y3	Y4
Annual repair revenue (Rs. million)	10	12	15	17

The increase in annual repair revenue is due to the expected increase in the number of repairs.

The management of ASL is considering an expansion plan by investing in a repair booth.

The following information is gathered and presented at the present price levels.

Investment in repair booth (based on present price levels)

- The purchase price of the repair booth is Rs. 10 million. In addition, an installation cost of Rs. 2 million is payable immediately. The repair booth can be

used for the next 4 years and 30% of the purchase price could be realised at the end of fourth year by sale of scraps. The ground concreting work required for the installation of the repair booth was completed two months ago for which Rs. 1 million was already paid by the company.

- The maintenance cost of the repair booth is Rs. 2 million per year which will increase with the age of the repair booth by 10% annually for the third and fourth years.
- If the repair booth is used, the contribution from the present operation (repair revenue less cost of materials for the repair) which is 60% of repair revenue, can be increased to 80%.
- By using the repair booth, ASL could generate an additional repair revenue of Rs. 5 million per annum (for Y1 = Rs. 5 million) with 80% contribution. Due to increase in demand this revenue will increase by 10% annually for the 2nd and 3rd years and remain at that level for the 4th year.
- The repair booth will allow ASL to cut down annual labour expenses by Rs. 500,000 while increasing the annual electricity cost by Rs. 200,000.
- ASL is presently paying income tax at 28% during the same year in which such liabilities arise. ASL is eligible to claim a 33 1/3% depreciation allowance on the repair booth and installation cost.
- All figures indicated above will inflate at a uniform rate of 5% per annum. ASL's money (nominal) after tax cost of capital is 17.6%.

Required:

- (a) **Evaluate** whether the investment in the repair booth is financially desirable to ASL.
 (Use the net present value (NPV) method calculated in real terms).
 (11 marks)
- (b) (i) **Calculate** the non-discounted payback period for this investment.
 (ii) **Explain** why this method is often used by companies.
 (4 marks)
- (c) **Assess** the maximum possible cost of capital at which the project is financially desirable for the company.
 (3 marks)
- (d) It has now been informed by the supplier that production has been stopped at present due to an operational issue, and the repair booth price is expected to be increased in another one year's time. As per the supplier, ASL can confirm the order for a repair booth at the present price (Rs. 10 million) by advancing full payment immediately. Otherwise, ASL can purchase it at the increased price after one year from now. Whichever option is chosen, the repair booth will be delivered to ASL after one year from now and the amounts of other operational cash flows for the 4 year period will not change.
- (i) **Evaluate** the effect on the NPV calculated in (a) above from immediately advancing full payment for the repair booth.
 (3 marks)
- (ii) **Calculate** the maximum revised price at which it is financially advisable for ASL to buy the repair booth instead of advancing money.
 (4 marks)
- (Total: 25 marks)**

Question 07

CA BUSINESS LEVEL

BUSINESS MANAGEMENT ACCOUNTING _ KB2

December 2017

Nemo (Pvt) Ltd (NPL) is a manufacturing company. A recent study has found that there is a potential to expand the business by investing in a state-of-the-art manufacturing system. Since the current manufacturing capacity is restricted, the directors believe that

this expansion will stimulate additional sales. The expansion project would require an initial expenditure of Rs. 120 million. The project is expected to have a disposal value at the end of 5 years which is equal to 10% of the initial expenditure. The following schedule reflects a recent market research survey regarding the estimated annual sales revenue from additional sales over the project's lifetime.

Level of demand	Sales (Rs. million)	Probability (From years 1-3)	Probability (From years 4-5)
High	200	30%	10%
Medium	150	50%	60%
Low	80	20%	30%

NPL has current sales of Rs. 300 million per year, which is expected to exist in the future as well. It expects that the present contribution to sales ratio of 35% will increase to 40% with the implementation of the new manufacturing system. Additional expenditure on fixed overheads is expected to be Rs. 20 million per annum. NPL pays 28% corporate tax on profits. 75% of the tax is paid during the same year and the balance in the following year. NPL's current operations generate taxable profits. Capital expenditure is tax allowable in three equal annual instalments. NPL's cost of capital is 18%.

Required:

- (a) **Evaluate** using the net present value (NPV) method, whether the investment in the new manufacturing system is financially worthwhile. (11 marks)
- (b) **State** three (03) benefits of the NPV method in project appraisal when compared to other appraisal techniques. (3 marks)
- (c) **Calculate** the cost of capital at which the management of NPL would be indifferent in making the investment in the new manufacturing system. (3 marks)
- (d) **Evaluate** the sensitivity of the project:
 - (i) to changes in the expected annual contribution
 - (ii) to changes in annual fixed overheads. (8 marks)

(Total: 25 marks)