Construction Financial Management

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Final Term Exam paper

Submitted by

Name: Rahmatwali

ID: 15602

Submitted to

Instructor: Sir. Doc.Engr. Zeshan Ahad

Answer Sheet

Answer Q1:

1.1 Net present value method is a popular capital budgeting technique that takes into account the time value of money. NPV accounts for the time value of money. It provides a method for evaluating and comparing capital projects or financial products with cash flows spread over time, as in loans, investments, payouts from insurance contracts plus many other application It uses net present value of the investment project as the base to accept or reject a proposed investment in projects like purchase of new equipment, purchase of inventory, expansion or addition of existing plant assets and the installation of new plants etc. applies to a series of cash flows occurring at different times. The present value of a cash flow depends on the interval of time between now and the cash flow. It also depends on the discount rate. NPV accounts for the time value of money. It provides a method for evaluating and comparing capital projects or financial products with cash flows spread over time, as in loans, investments, payouts from insurance contracts plus many other applications.

1.2. equivalent annual cost (EAC) is the cost per year of owning and operating an asset over its entire lifespan. It is calculated by dividing the NPV of a project by the "present value of annuity factor":

$AEC = NPV/A_{tr}$ $A_{tr} = \{1-1/(1+r)^t\}/r$

where

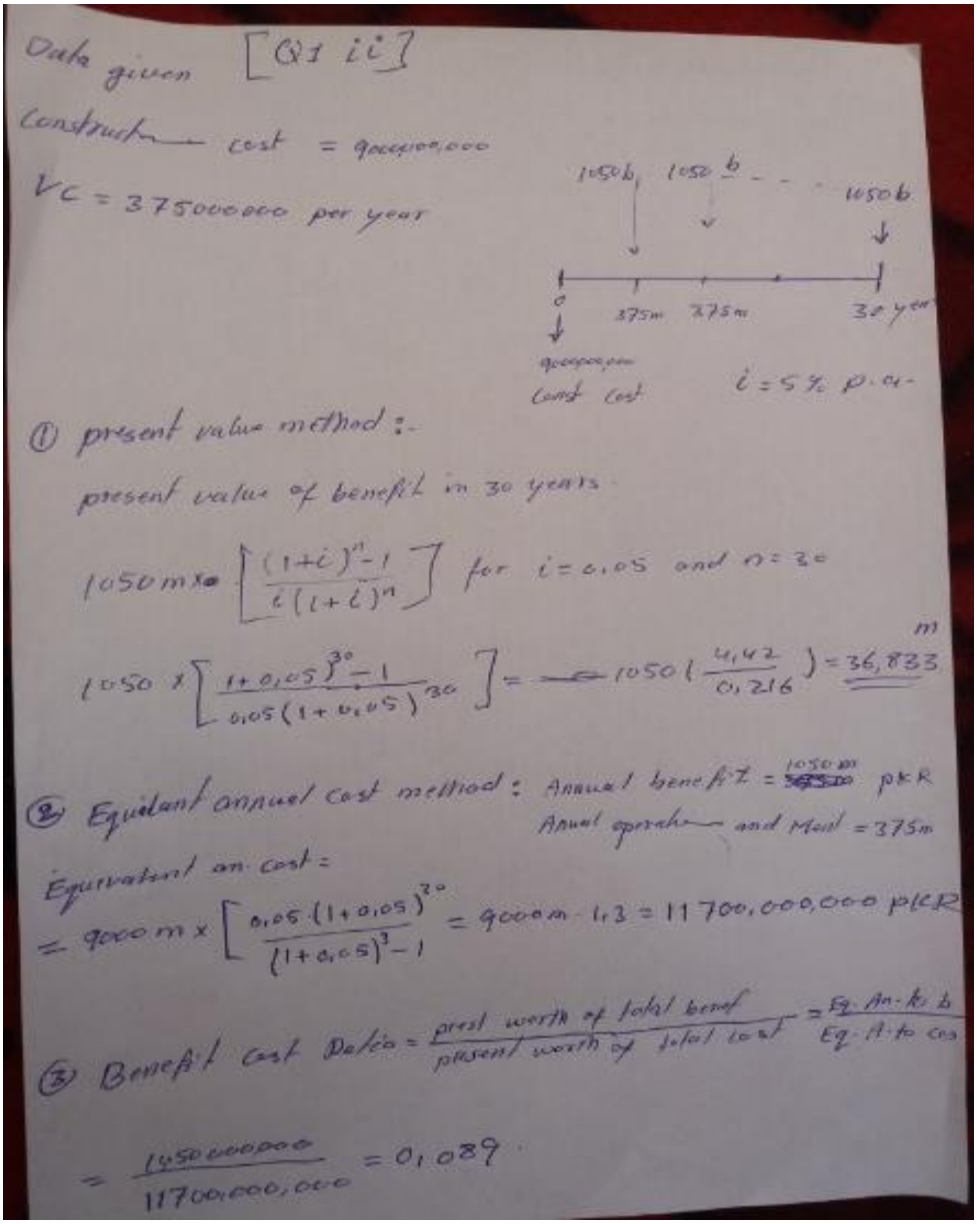
where r is the annual interest rate and

t is the number of years.

- 1.3: Benefits of benefit-cost ratio; The benefit of using the benefit-cost ratio (BCR) is that it helps to compare various projects in a single term and helps to decide faster which projects should be preferred and which projects should be rejected.

- It compares benefit and cost at the same level that is it considers the time value of money before giving any outcome based on absolute figures as there could be a scenario that project appears to be lucrative without considering time value and when we consider time value the benefit-cost ratio goes less than 1.

1.4; part i:Financial analysis



Q2 Answer;

2.1 IRR(Internal Rate of Return):

What Is Internal Rate of Return – IRR?

The internal rate of return (IRR) is a metric used in capital budgeting to estimate the profitability of potential investments. The internal rate of return is a discount rate that makes the net present value (NPV) of all cash flows from a particular project equal to zero. IRR calculations rely on the same formula as NPV does.

Formula and Calculation for IRR:

It is important for a business to look at the IRR as the plan for future growth and expansion. The formula and calculation used to determine this figure follows.

$$0 = \text{NPV} = \sum_{t=1}^{T} \frac{C_t}{(1+IRR)^t} - C_0$$

where:

C_t = Net cash inflow during the period t

C_0 = Total initial investment costs

IRR = The internal rate of return

t = The number of time periods

To calculate IRR using the formula, one would set NPV equal to zero and solve for the discount rate (r), which is the IRR. Because of the nature of the formula, however, IRR cannot be calculated analytically and must instead be calculated either through trial-and-error or using software programmed to calculate IRR.

Generally speaking, the higher a project's internal rate of return, the more desirable it is to undertake. IRR is uniform for investments of varying types and, as such, IRR can be used to rank multiple prospective projects on a relatively even basis. Assuming the costs of investment are equal among the various projects, the project with the highest IRR would probably be considered the best and be undertaken first.

IRR is sometimes referred to as "economic rate of return" or "discounted cash flow rate of return." The use of "internal" refers to the omission of external factors, such as the cost of capital or inflation, from the calculation.

2.2 Difference between IRR and NPV:

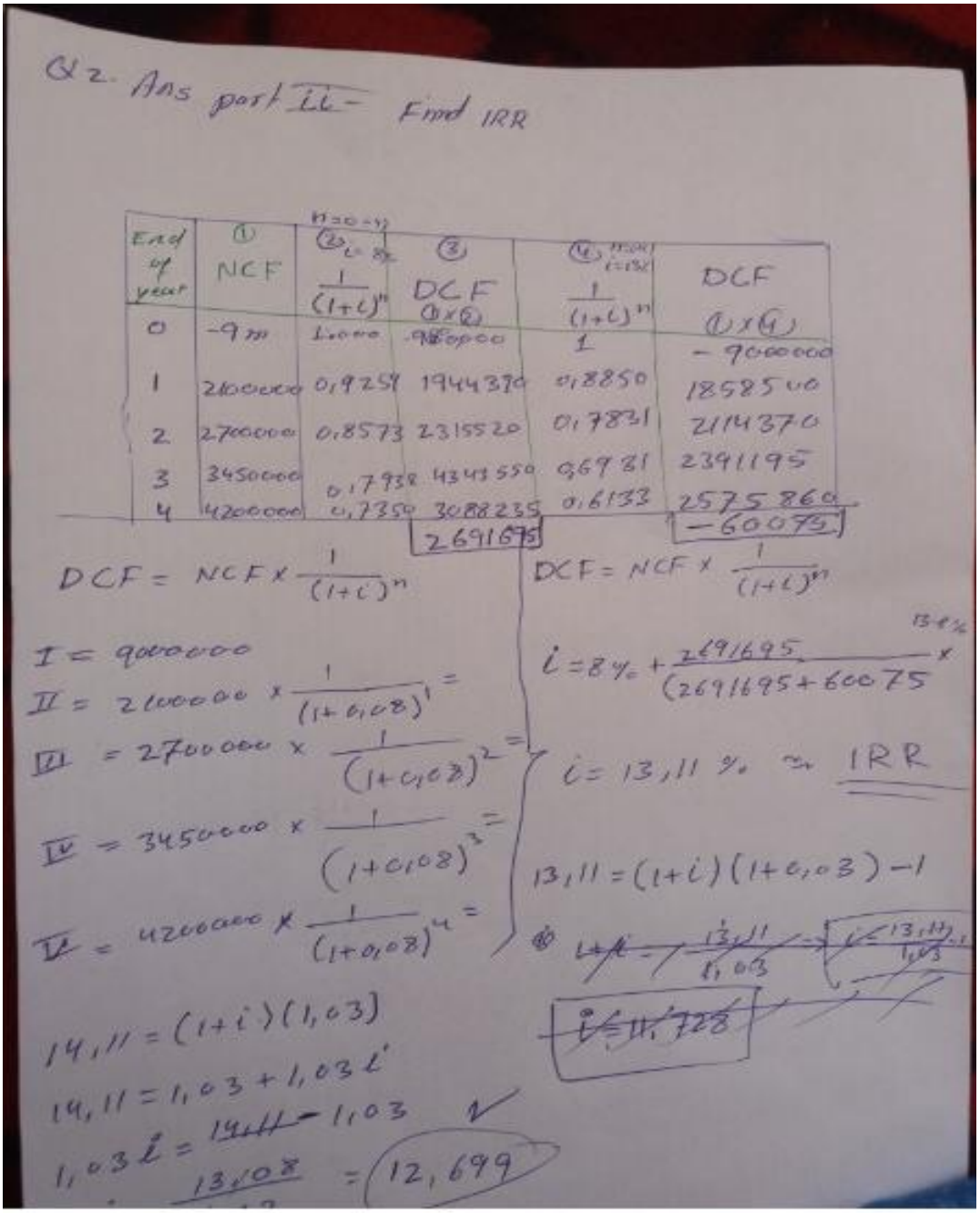
NPV and IRR are both used in the evaluation process for capital expenditures. Net present value (NPV) discounts the stream of expected cash flows associated with a proposed project to their current value, which presents a cash surplus or loss for the project. The internal rate of return (IRR) calculates the percentage rate of return at which those same cash flows will result in a net present value of zero. The two capital budgeting methods have the following differences:

- ✓ Outcome. The NPV method results in a dollar value that a project will produce, while IRR generates the percentage return that the project is expected to create.
- ✓ Purpose. The NPV method focuses on project surpluses, while IRR is focused on the breakeven cash flow level of a project.
- ✓ Decision support. The NPV method presents an outcome that forms the foundation for an investment decision, since it presents a dollar return. The IRR method does not help in making this decision, since its percentage return does not tell the investor how much money will be made.
- ✓ Reinvestment rate. The presumed rate of return for the reinvestment of intermediate cash flows is the firm's cost of capital when NPV is used, while it is the internal rate of return under the IRR method.
- ✓ Discount rate issues. The NPV method requires the use of a discount rate, which can be difficult to derive, since management might want to adjust it based on perceived risk levels. The IRR method does not have this difficulty, since the rate of return is simply derived from the underlying cash flows.

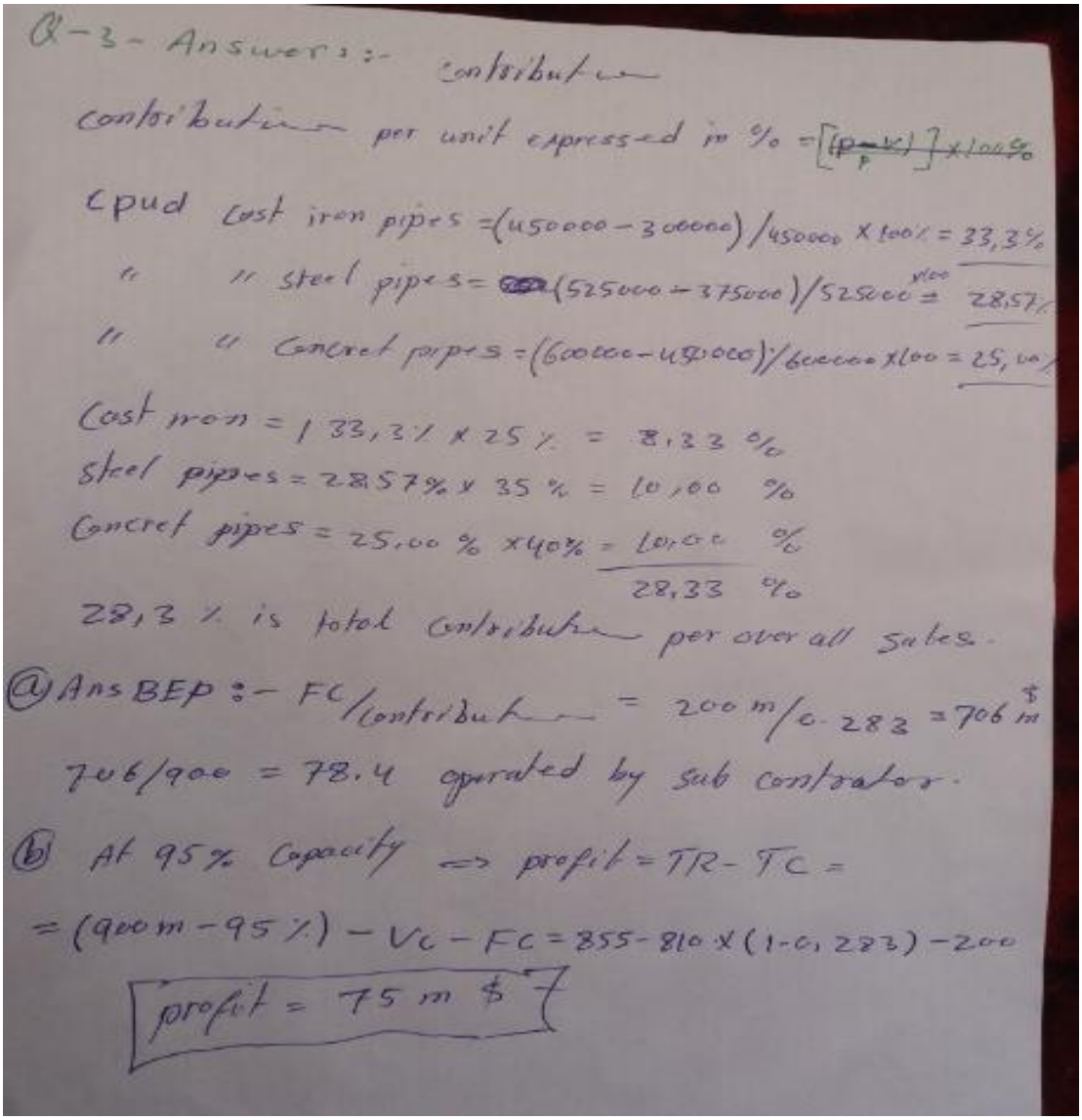
2.3; Inflation: Inflation is an economic term that refers to an environment of generally rising prices of goods and services within a particular economy. As general prices rise, the purchasing power of consumers decreases. The measure of inflation over time is referred to as the rate of inflation or the inflation rate. Commonly, people may refer to inflation as "the rising cost of living."

For example, prices for many consumer goods are double that of 20 years ago. When you hear your grandparents recall, "A movie and a bag of popcorn only cost a buck-twenty-five when I was your age," they are making an observation about inflation—the rising cost of goods and services over time, and the decrease in the purchasing power of the dollar.

Q2 answer ii:


Q2. Ans part ii- Find IRR
End of year
① NCF
② i=8% 1/(1+i)^n
③ DCF ①×②
④ i=13% 1/(1+i)^n
DCF ①×④
0 -9m 1,0000 -9000000 1 -9000000
1 2100000 0,9259 1944390 0,8850 1858500
2 2700000 0,8573 2315520 0,7831 2114370
3 3450000 0,7938 4343550 0,6931 2391195
4 4200000 0,7350 3088235 0,6133 2575860
2691695 -60075
DCF = NCF × 1/(1+i)^n
I = 9000000
II = 2100000 × 1/(1+0,08)^1 =
III = 2700000 × 1/(1+0,08)^2 =
IV = 3450000 × 1/(1+0,08)^3 =
V = 4200000 × 1/(1+0,08)^4 =
14,11 = (1+i)(1,03)
14,11 = 1,03 + 1,03i
1,03i = 13,08
= 12,699
DCF = NCF × 1/(1+i)^n
i = 8% + 2691695/(2691695+60075) × 5%
i = 13,11 % ≈ IRR
13,11 = (1+i)(1+0,03) -1
i = 11,728

Q3 Answer:



Q-3- Answer:- contribution

contribution per unit expressed in % = $\left[\frac{(P-V)}{P}\right] \times 100\%$

Cpud cost iron pipes = (450000 − 300000) / 450000 × 100% = 33,3%

" " steel pipes = (525000 − 375000) / 525000 × 100 = 28,57%

" " Concret pipes = (600000 − 450000) / 600000 × 100 = 25,00%

Cost iron = 33,3% × 25% = 8,33 %

Steel pipes = 28,57% × 35 % = 10,00 %

Concret pipes = 25,00 % × 40% = 10,00 %

28,33 %

28,3 % is total contribution per over all Sales.

(a) Ans BEP :- FC / contribution = 200 m / 0.283 = 706 m $

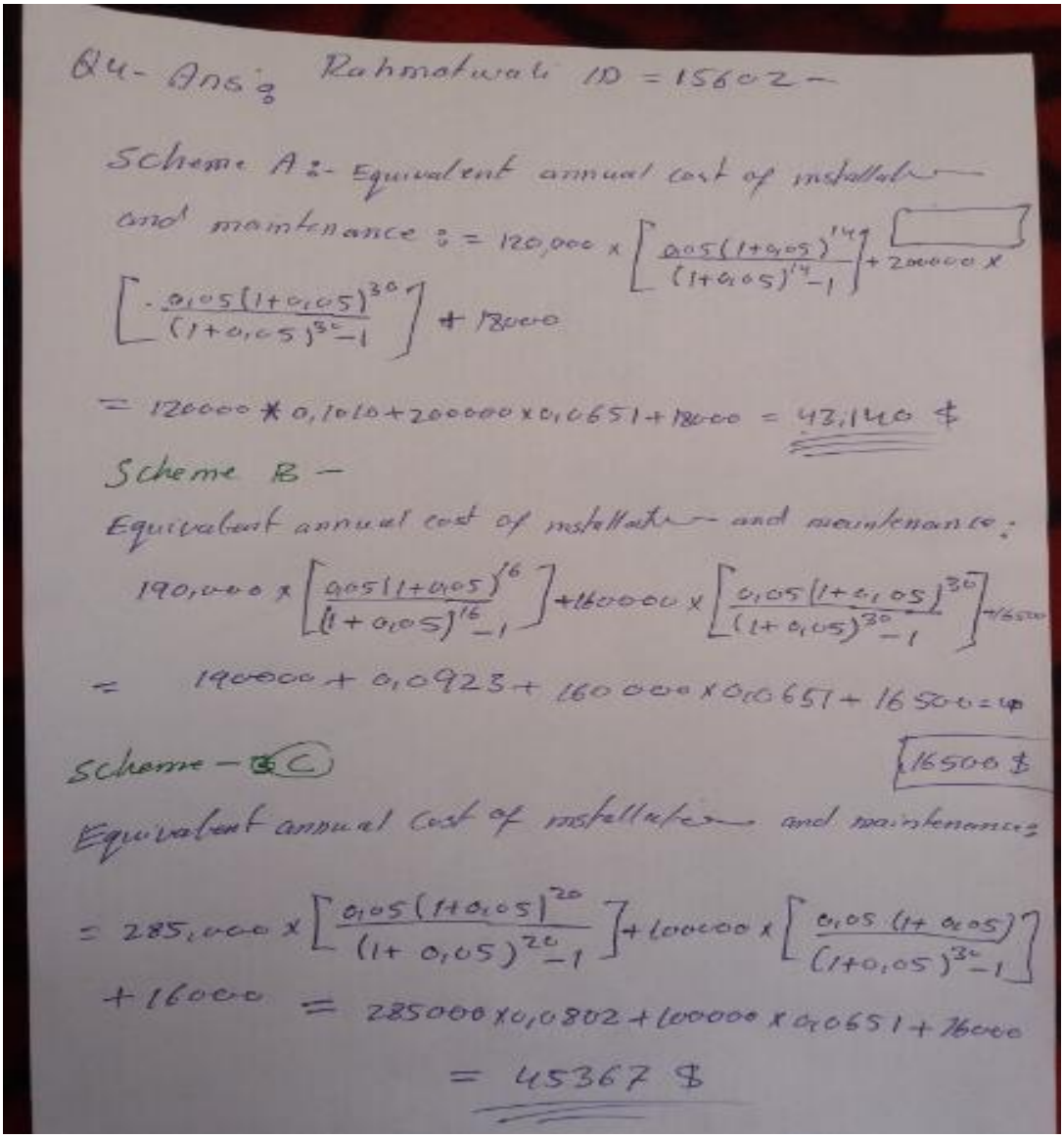
706/900 = 78.4 operated by sub contractors.

(b) At 95% Capacity ⇒ profit = TR − TC =

= (900 m − 95%) − Vc − FC = 855 − 810 × (1 − 0,283) − 200

profit = 75 m $

Q4 Answer:



Q4- Ans: Rahmatwali ID = 15602-

Scheme A:- Equivalent annual cost of installation and maintenance :- $= 120{,}000 \times \left[\frac{0.05(1+0.05)^{14}}{(1+0.05)^{14}-1}\right] + 200000 \times \left[\frac{0.05(1+0.05)^{30}}{(1+0.05)^{30}-1}\right] + 18000$

$= 120000 * 0.1010 + 200000 \times 0.0651 + 18000 = 43{,}140\ \$$

Scheme B –

Equivalent annual cost of installation and maintenance:

$190{,}000 \times \left[\frac{0.05(1+0.05)^{6}}{(1+0.05)^{16}-1}\right] + 160000 \times \left[\frac{0.05(1+0.05)^{30}}{(1+0.05)^{30}-1}\right] + 16500$

$= 190000 + 0.0923 + 160000 \times 0.0651 + 16500 = 43{,}140\ \$$

Scheme – C

Equivalent annual cost of installation and maintenance:

$= 285{,}000 \times \left[\frac{0.05(1+0.05)^{20}}{(1+0.05)^{20}-1}\right] + 100000 \times \left[\frac{0.05(1+0.05)}{(1+0.05)^{30}-1}\right] + 16000$

$= 285000 \times 0.0802 + 100000 \times 0.0651 + 16000$

$= 45367\ \$$