① Concept of Inflation

→ Inflation is loss in purchasing power of money over time i.e cost of an item tends to increase over time.

→ If consumers of an economy came to know that prices are going to increase in coming future then they will over purchase the good this will cause shortage of various goods in the market.

8.2 measuring Inflation

→ The consumer price index (CPI) compares the cost of typical market cost of good and Services in a current month with each cost one month one year.

→ The point in the past to which current price are compare are called base period.

→ market basket normally consist of item from several group such as:
(i) Food and alcoholic bevarage
(ii) Housing, Transportation
(iii) medical care, personal care, entertainment etc.

(a) Consumer price Index (CPI)

→ The CPI measure average change in prices paid for food, shelter, medical care, transportation and other goods and services used by individual or families.

(b) Producer price index (PPI)

→ Is good measure of the industrial price increase. It is also called as whole price Index

(c) Wholesale price Index (WPI)

→ It measures and tracks the changes in the price of goods in the stage before the retail level.

(d) GDP deflator

→ GDP stands for gross domestic product the total value of all financial goods and services produced within that economy during a specified period.

Equivalence calculation under Inflation

① Market interest rate (i)

→ It is the all interest rate stated by financial institution for loan and saving account.

② Actual (current) cash flow (An)

→ It is the actual cash flow (paid) at the time purchasing good and services.

③ constant (real) cash flow (An')

→ It is the inflation-free / constant cash flow from the effect of inflation or deflation.

④ inflation rate (f)

→ measure rate of change in the value of money.
$$(i')$$

⑤ Inflation free interest rate (i) — Real or constant dollar

→ It is the rate in which the inflation effects have been removed. It is known as real interest rate and can be computed when the market interest rate and inflation

rate are given.

conversion from constant to actual cash flow

constant ko cash

actual

$$An = An' (1+f)^N$$

future ← ↓ → present   ↘ inflation rate

conversion from actual to constant cash flow

$$An' = \frac{An}{(1+f)^N}$$

$q' \Rightarrow$ inflation free interest rate

$i =$ market interest rate

$f =$ inflation rate

Adjusted discounted method

$$An' = \frac{An}{(1+f)^N (1+q')^n}$$

$$\boxed{q' = \frac{q - f}{1 + f}}$$

Calculation inflation free interest rate when inflation rate is 5% and market interest rate is 13% per year.

Soln:

$i' = ?$ $\quad\quad f = 5\%$ $\quad\quad i = 13\%$

$$i' = \frac{i - f}{1 + f} = \frac{0.13 - 0.05}{1 + 0.05}$$

$$= 0.0761$$

$$= 7.61\%$$

Find rate of inflation when price of a product has increased from Rs 5,00,000 to Rs 6,30,000 over the period of 3 yrs.
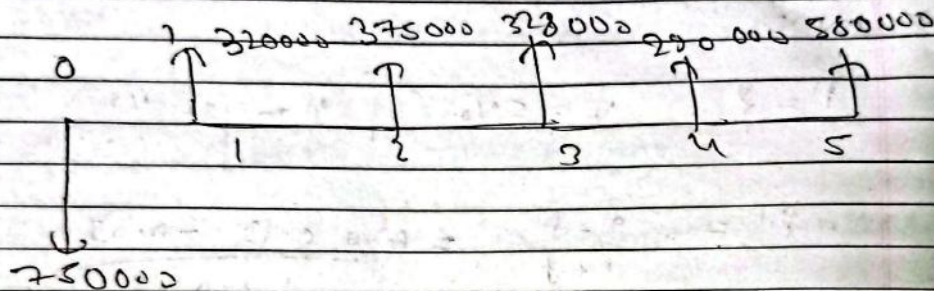
$$A_n = A_n' (1 + f)^N$$

$$6,30,000 = 5,00,000 (1 + f)^3$$

$$f = 0.08 = 8\%$$

Calculate the equipment pw of the project from the following cash flow. Assume inflation for interest rate as 5% and inflation as 10% respectively.

320000 375000 378000 290000 580000

0

1   2   3   4   5

750000

Soln⁻

$$y' = \frac{P - bf}{1+f}$$

$$0.05 = \frac{i - 0.1}{1 + 0.1}$$

$$i = 0.155 \quad \text{(market interest rate)}$$

Now,
convert all to pw #

ROX   A

0
1
2
3
4
5

RPW =

Suppose that
for first year
and 8% respec
inflation rate
price N̄   Rs

Soln⁻
price at ins

$$= 100 C$$
$$= 113.$$

Avras inflation

100 C
$$f = 6.$$

Roy	Actual $		Eq. PW
0	-750000		-750000
1	320 000		227056
2			
3			
4			
5			

Similarly #

$$EPW = 466167.32$$

Suppose that the 1st year inflation rates for first year and 2nd year are 5% and 8% respectively. Calculate the average inflation rate of two year if the base price is Rs 100.

Soln⁺

Price at end of 2nd year

$$= 100 (1 + 0.05)^1 (1 + 0.08)^1$$
$$= 113.4$$

Average inflation rate

$$100 (1 + f)^2 = 113.4$$
$$f = 6 \sim 5\%$$

Calculation the RPW using deflation method

EOX	0	1	2
Cash inflow		500000	560000
Cash or outflow)	-100000	100000	200000

3	4	5
620 000	680 000	740 000
300 000	400 000	500 000

Given cash flows are in Actual dollars.

Taken $f = 5\%$, $q' = 10\%$

$$q'_1 = \frac{i - f}{1 + f}$$

$$0.1 = \frac{i - 0.05}{1 + 0.05}$$

$$i = 0.155 = 15.5\%$$

EOX	Cash outflow
0	-1000000
1	-100000
2	-200000
3	-300000
4	-400000
5	-500000

Similarly

Calculate IRR if

Year	0
constt Dollar	-

Change constant to

Actual

use

Box	Cash outflow	Cash inflow	Net CF	PW
0	-1000000		-1000000	-1000000
1	-100000	500000	400000	346320
2	-200000			
3	-300000			
4	-400000			
5	-500000			

(similarly calc PW) #

calculato IRR if MARR = 12% and $f = 8\%$

Year	0	1	2	3	4
constant Dollar	- 6000	1500	2000	2500	3000

change constant to actual # (f uso garno)

↓

future

actual ma year Maaro gauje P
use garou NPV garoru PKR

$2000(1+0.08)^2$ $1500(1+0.08)^1$
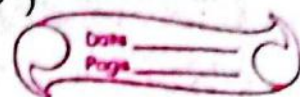
EOY	Constal Dollar	Act Dollar
0	−6000	−6000
1	1500	1620
2	2000	2332-8
3	2500	3149.28
4	3000	4081.46

                               $2500(1+0.08)^3$

$f = 8\%$

Now,   A → to $3000(1+0.08)^4$

$$NPV = -6000 + 1620(1+i)^{-1} + 2332\cdot8$$
$$(1+i)^{-2} + 3149\cdot28(1+i)^{-3} +$$
$$4081.46(1+i)^{-4}$$

$i \times k = 0.255 = 25.5\% \Rightarrow$ MARR.

account
↓

Constant dollar analysis
ma use i' when PV