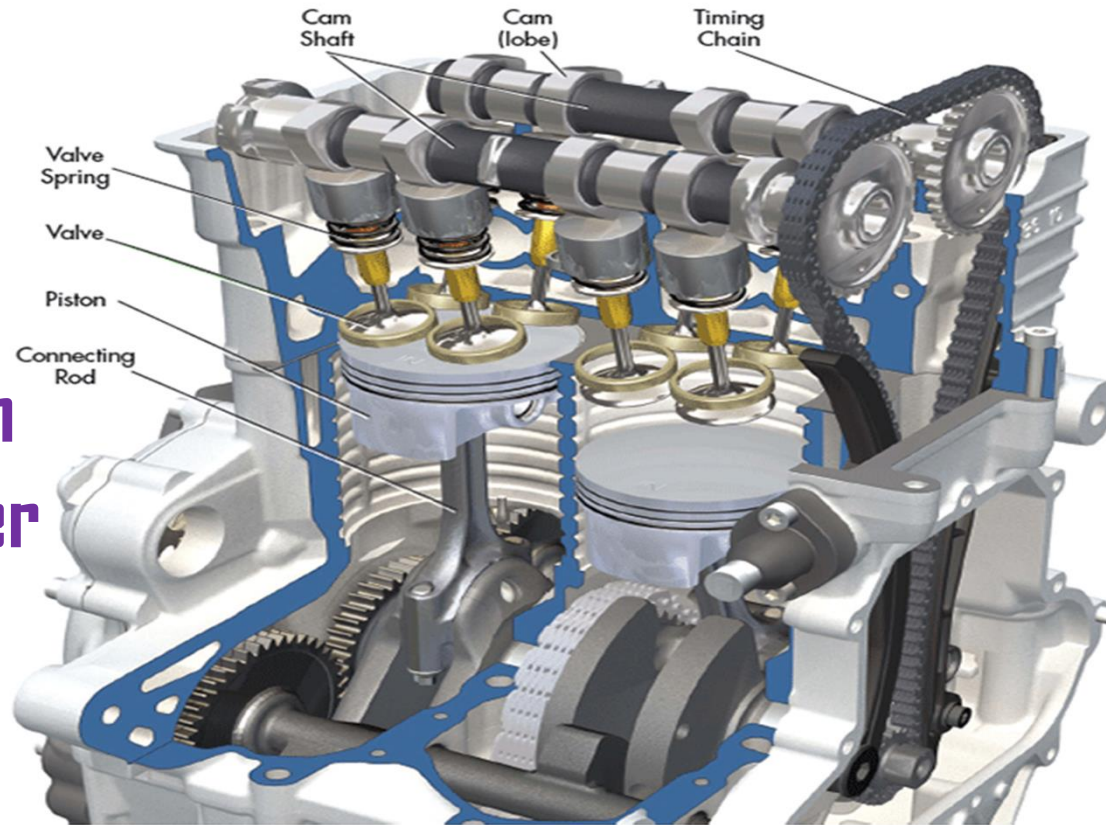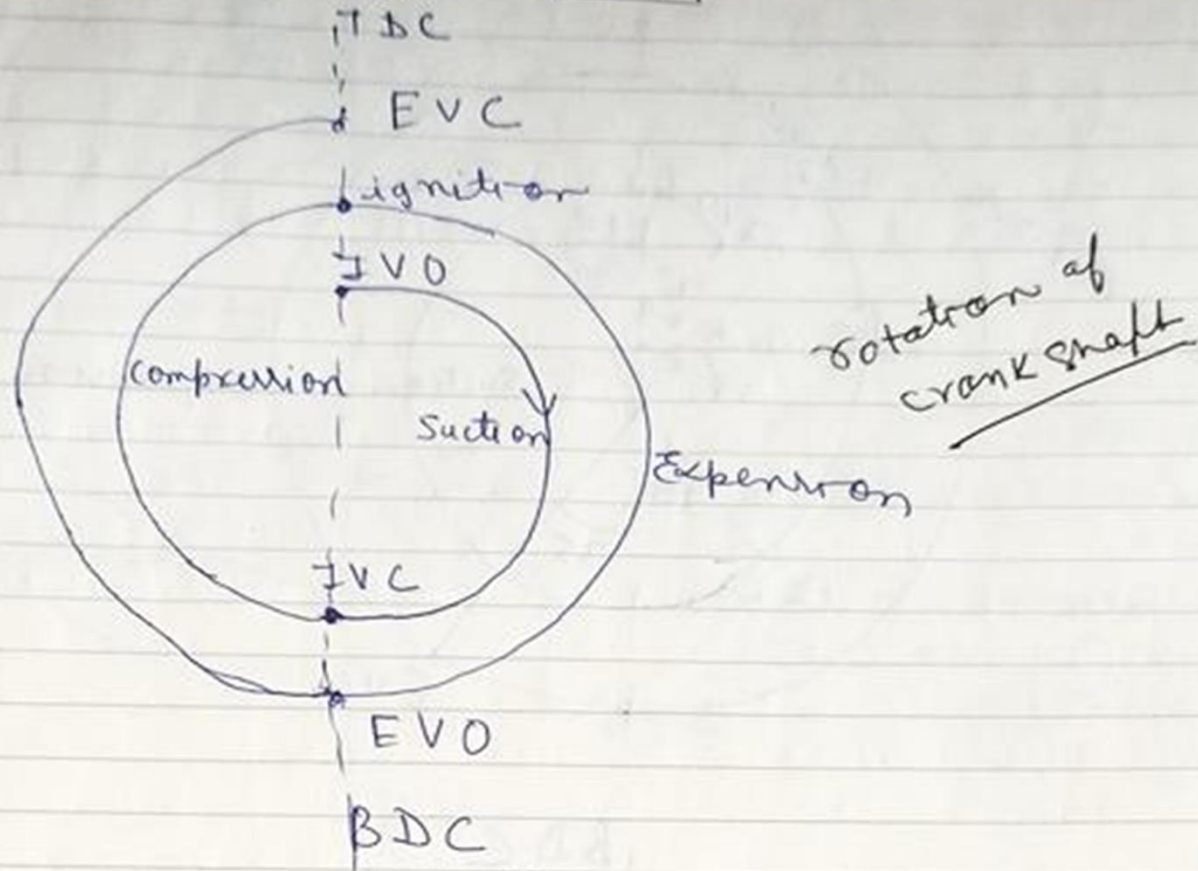# I C Engine, Steam & Nuclear Power
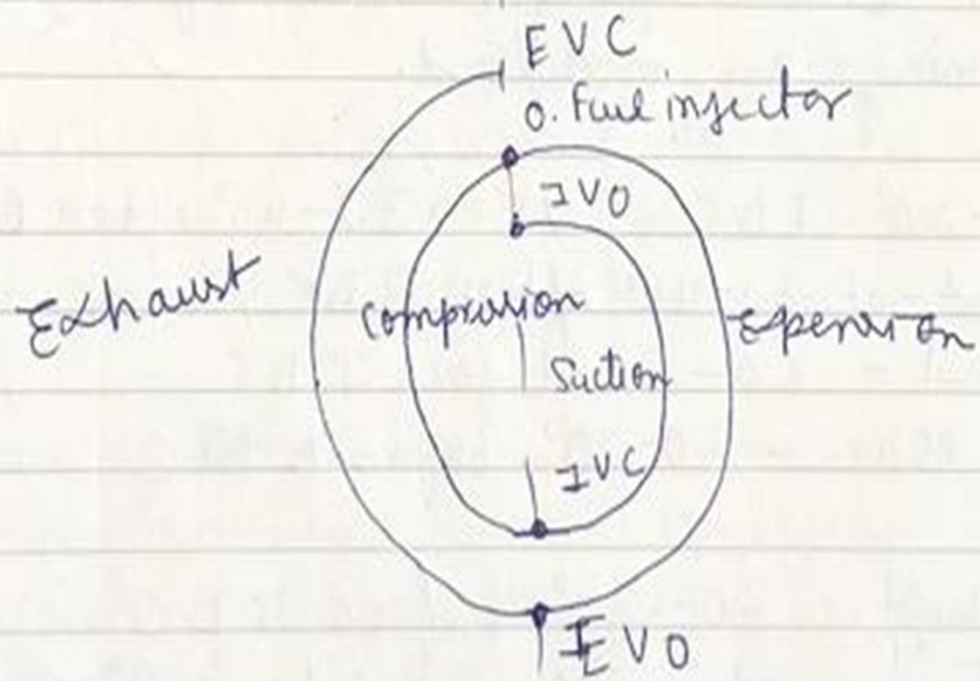
Asst. Prof. Yastuti Rao Guatam
Mechanical Engineering Department
UIET, CSJM Univ. Kanpur

Value di. Timing diagram

TDC
EVC
ignition
IVO
compression
Suction
Expension
rotation of crank shaft
IVC
EVO
BDC

Theoretical di V.T.D of otto cycle - 4S

EVC

0. Fuel injector

IVO

Exhaust

Compression

Suction

Expansion

IVC

EVO

TDC

EVC

Expansion

ignition

Compression

IVO

10°

10°

35

Suction

Expansion

350°

35

IVC

EVO

BDC
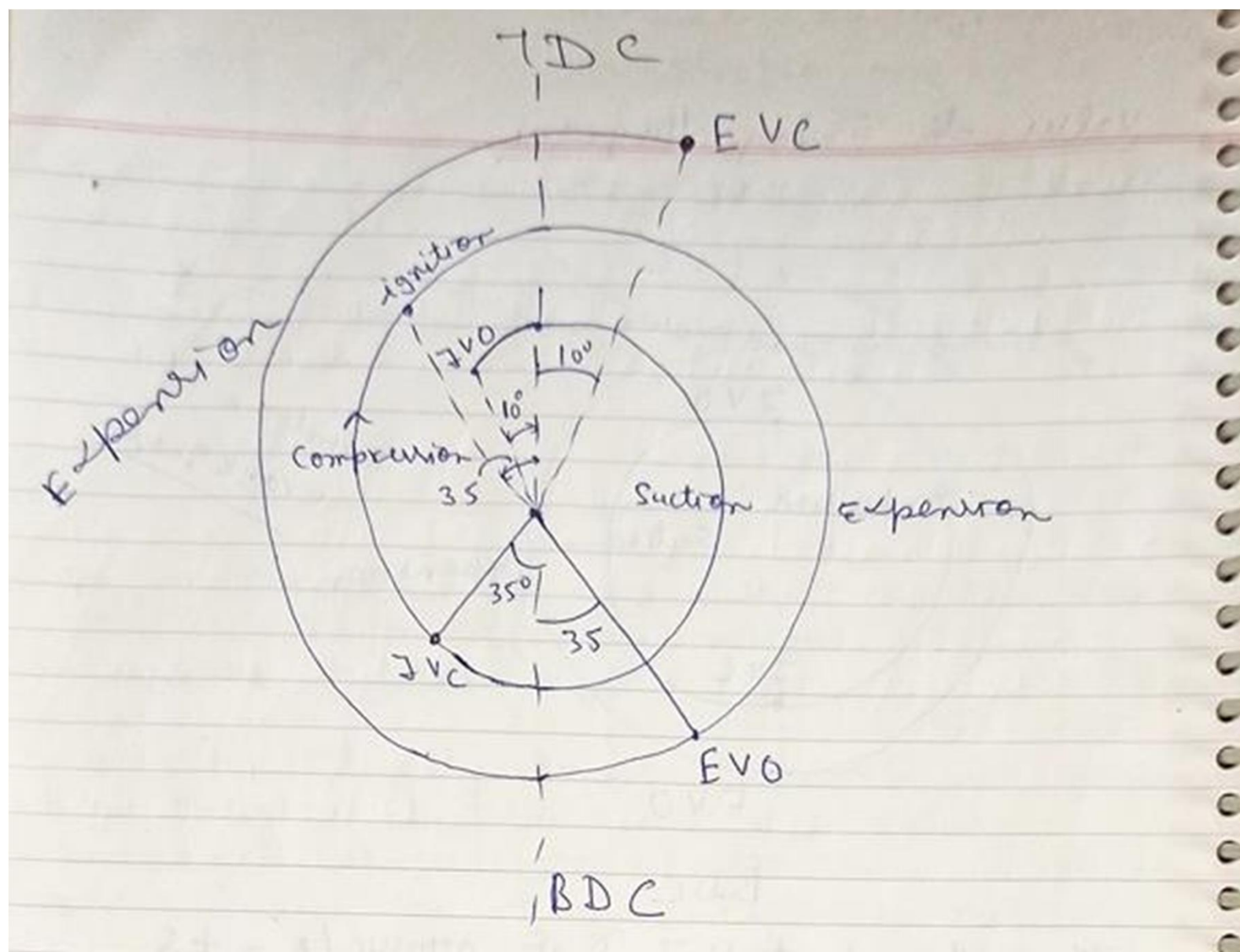
In actual cycle Practica it is difficult to open and closed the valve instantaneously. So as to get better performance of Engine the Valve timings are modified.

before

IVO →10°-20° TDC, IVC → 30°-40° after BDC

Compression Start - at 30-40° after BDC,

Compression End - 20-30 before TDC

Ignition take Place - 20-30° before TDC

Expension Start   20-30° before TDC

Expension End   at   30-50' before BDC

@

IVO — 10 – 20° before TDC
IVC — 25 – 40° after BDC

FVO 10 – 15° before TDC
FVC — 15 – 20 after TDC
Comp St — 25 – 40° after BDC
End — 10 – 15° before TDC

Comd
Expansion → 10° – 15°
Start   after TDC

End → 30 – 50° before
              BDC

EVO   30 – 50° before BDC
EVC → 10 – 15° after
                 TDC
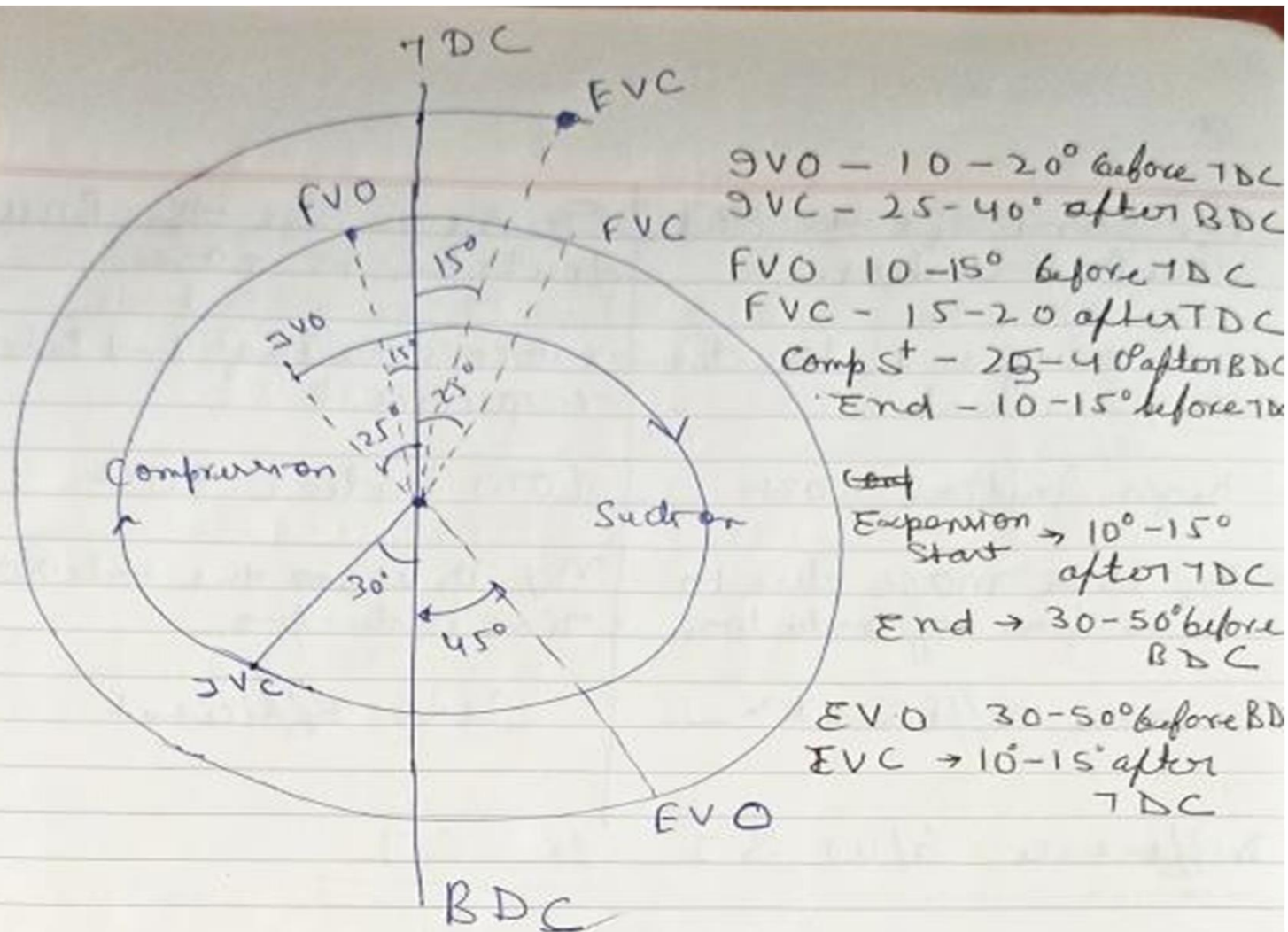
Actual value Timing diagram of 4 S, Diesel cycle.

Difference b/w - 2 Stroke and Four Stroke Engine

4 - S	2 - S
The Cycle is completed in four strokes of Piston or two revolution of Shaft.	the cycle is completed in two stroke of Piston or one revolution of cranks
because of four stroke the Turning moment is not uniform and hence the Larger fly wheel is used.	as turning moment is uniform smaller Fly wheel is used.
it has valves	it has Ports.

For same Size the Power develop is less.	For same Size the Power develop is more.
Less cooling and Lubrication requirments	more cooling and Lubrication requirment.
high initial cost	Low initial cost.
* n_v is ix more due to more time of Induction	n_v is less due to lesser the time induction.
more Efficient	Less Efficient.

Difference b/w SI & CI

SI	CI
(1) It is based on otto cycle	it is based on Deisel cycle
2) Fuel has high Self ignition temp	Low self ignition temp
3) Carburator is used for homogenious Air Fuel ratio in the Engine cylinder	Fuel is injected with the help of Fuel injector
4) ignition occurs with spark plug	ignition occurs due to high compression
) low compression ratio In Range of 6 - 10	Compression ratio in the range of 16 - 20
high speed due to smaller wt.	Low speed as the Engine are Buecky
low Efficiency due to smaller Compression ratio	high η due to large compression rato.
Lighter	heavier.

Reference

- **<u>Text Books</u>**

- *V Ganeshan – IC Engine, Sharma & Mathur – IC Engine*

- *R.K. Rajput– Power Plant Engineering*