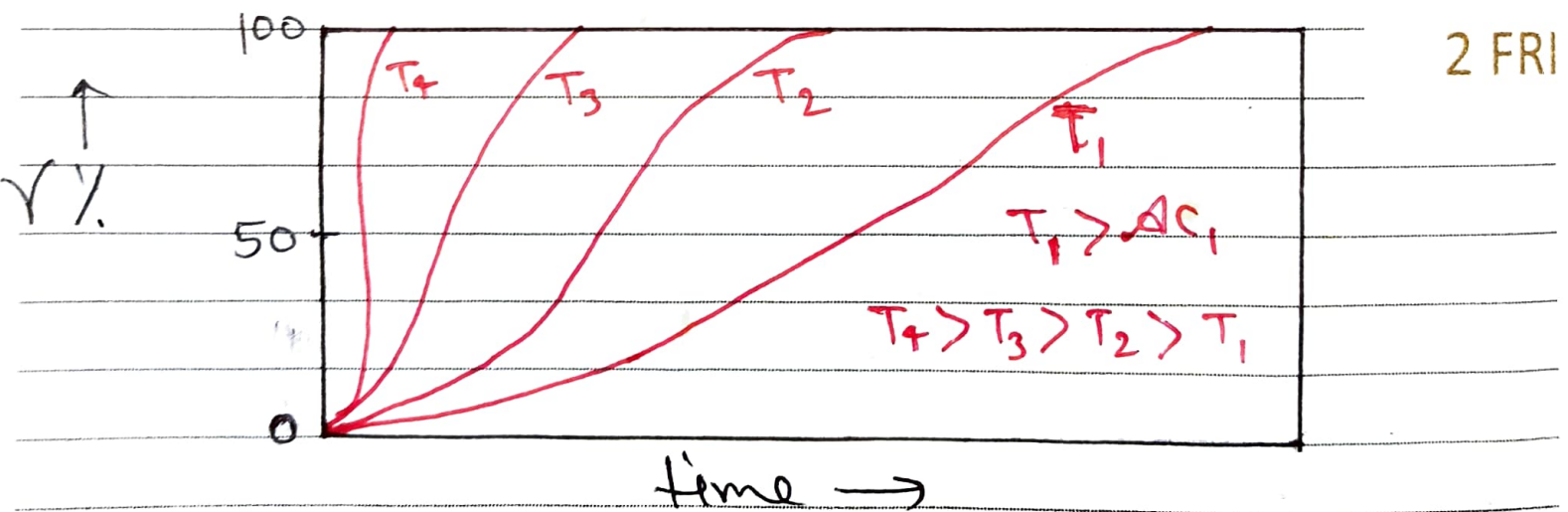


Kinetics of Formation of Austenite

- ① In practice, it is not possible to heat a steel with equi^m rate of heating. The formation of austenite on heating always occurs at a temp.ⁿ higher than that predicted by the Fe-C equi^m dia^g.
- ② The grain size of austenite at heat-treatment temp.^r largely controls the resultant mechanical prop¹ after heat-treatment. Therefore, the study of kinetics of formation of austenite is of great importance.
- ③ A simple approach to the study the kinetics of austenite formation is to heat a no. of steel samples to different temp.^r above the eutectoid temp.^r.
- ④ Heating is done by immersing samples in contact cont. temp.^r baths. A no. of samples are immersed in a cont. temp.^r bath & are taken out one by one after a definite interval of time, followed

1 THU
by immediate quenching which will result in the formation of martensite from transformed austenite. The amount of martensite formed will depend on the amount of transformed austenite which in turn will depend on the temp.^r at which the steel sample has been heated & the holding time at that temp.^r.

The % of transformed γ with time for a given temp.^r can be known. The sequence of operation is employed for different temp.^r.



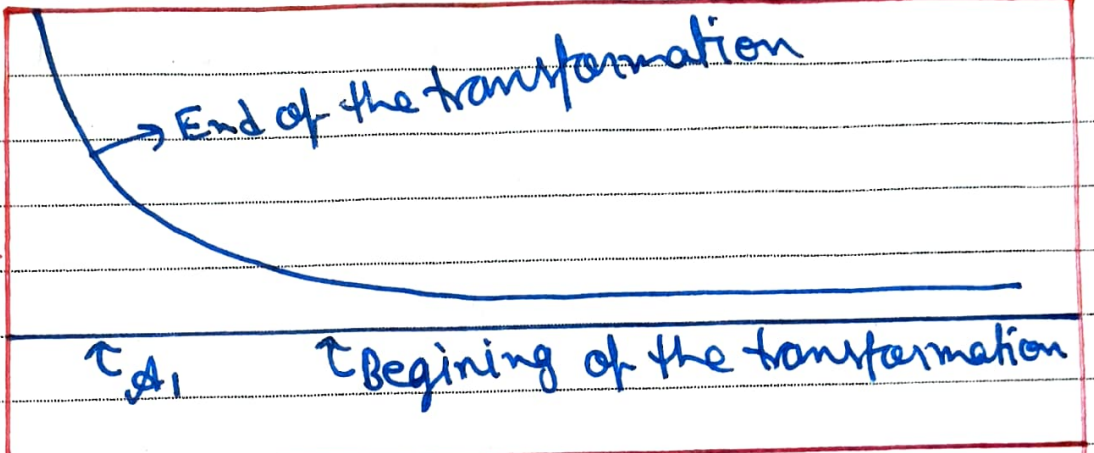
Transformation of pearlite to austenite as a fun of time at different temp.^r.
It can be easily concluded that the lower the transformation temp.^r, the more is time req^d to complete the transformation.

Effect of temp^r on time req^d for completion of transformation of P to Y.

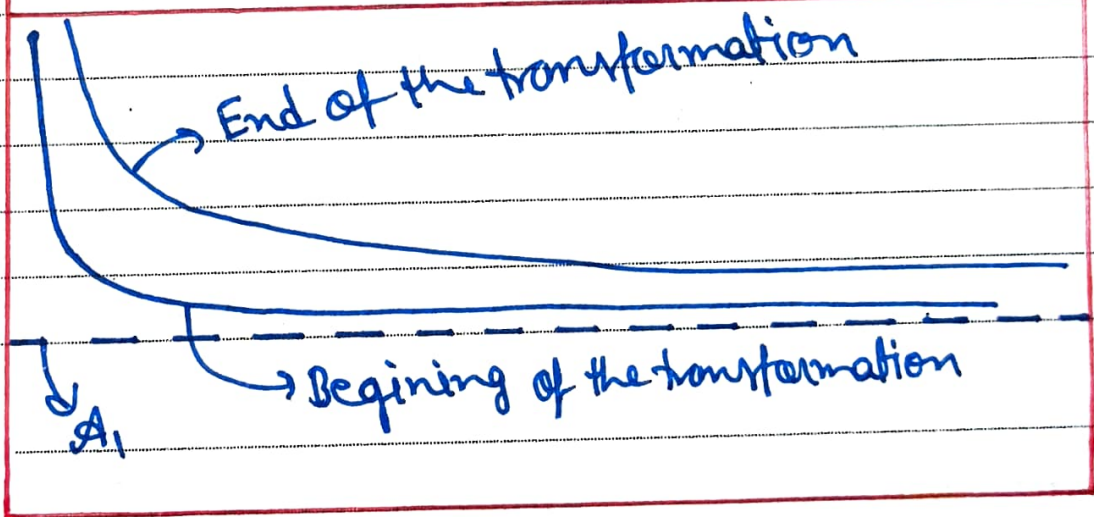
3 SAT

of P to Y.

temp^r ↑



temp^r ↑



4 SUN

Time →

Effect of temp^r on the time req^d for start & End of transformation of P to Y.

- The end of the transformation curve does not reveal any information about the nature (homogeneity) of austenite.
- The curved line only ensures that all the pearlite has been transformed into austenite.

→ for a given temp.^r, most of the 'p' 5 MON will be transformed into austenite within the time interval b/w the two curved lines.

→ The process of austenite formation on heating proceeds by nucleation + growth reaction. Therefore, the factors which can vary either the rate of nucleation or rate of growth or both will change the Kinetics of austenite formation.

→ Two such parameters are transformation temp.^r + holding time at transformation temp.^r.

In addition, there are some other 6 TUE factors which control the Kinetics of transformation.