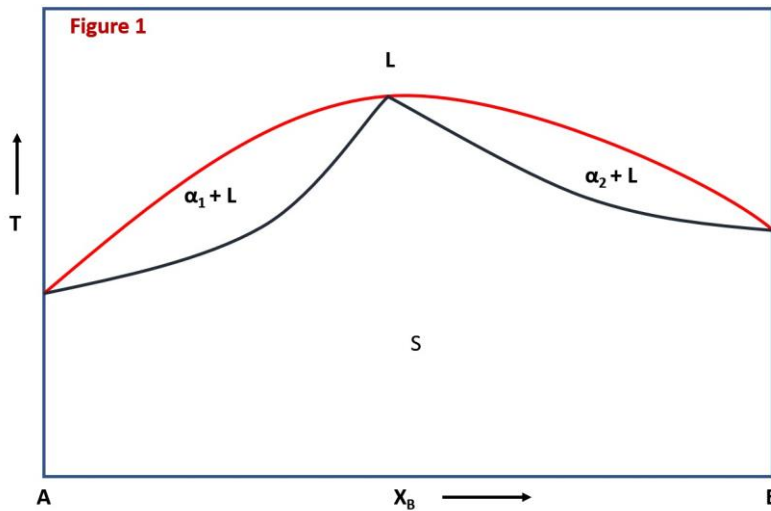
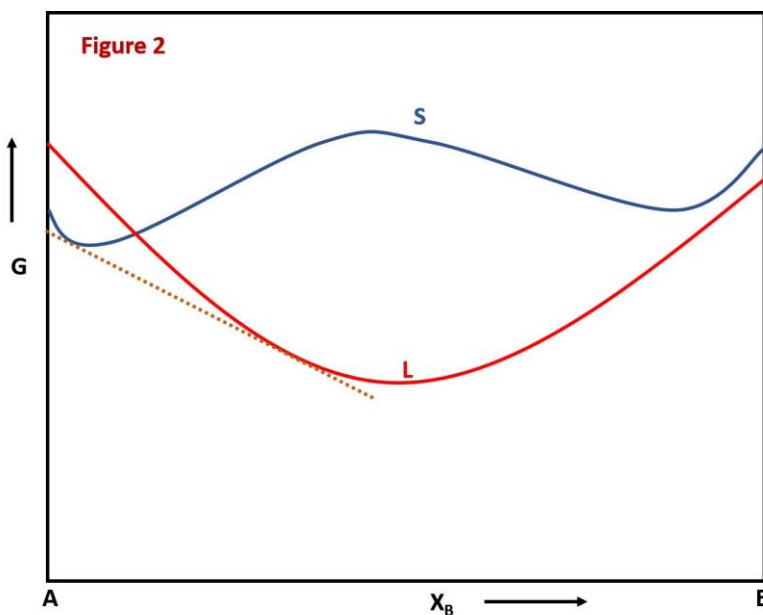


**Assignment-V**  
**Heat treatment and Surface hardening – II**  
**NPTEL-Mooc-5<sup>th</sup> week**

1. The T-X plot shown in the Fig. 1. This type of behaviour is possible with the phases of same crystal structure when



- a)  $\Delta H_{\text{mix}}^S \ll 0$  and  $\Delta H_{\text{mix}}^L = 0$   
 b)  $\Delta H_{\text{mix}}^S \gg 0$  and  $\Delta H_{\text{mix}}^L = 0$   
 c)  $\Delta H_{\text{mix}}^S = 0$  and  $\Delta H_{\text{mix}}^L = 0$   
 d)  $\Delta H_{\text{mix}}^S = 0$  and  $\Delta H_{\text{mix}}^L \ll 0$
2. Which of the following statements is NOT correct with reference to G-X plot shown in Fig. 2?



- a)  $\Delta H_{\text{mix}}^S > 0$  and  $\Delta H_{\text{mix}}^L \leq 0$

- b)  $T_A > T > T_B$
  - c)  $T_A = T_{\text{eut}} = T_B$
  - d) Phases have the same crystal structure
3. Which of the following microstructures cannot form during continuous cooling of the eutectoid steel with 0.8% carbon
- a) Fully pearlitic
  - b) Pearlitic + Bainitic
  - c) Fully Bainitic
  - d) Martensitic
4. An annealed plain carbon steel, showing fully pearlitic microstructure, has a carbon content of
- a) 0.025 wt%
  - b) 0.2 wt%
  - c) 0.4 wt %
  - d) 0.8 wt%
5. According to TTT diagram, bainite will form in eutectoid steel when heated to 900°C followed by
- a) air cooling to room temperature
  - b) quenching to room temperature
  - c) isothermal holding between eutectoid temperature and nose
  - d) isothermal holding between nose and  $M_s$  temperature
6. A steel specimen with 0.5% carbon is slowly cooled from 900°C in a furnace. The fraction of proeutectoid ferrite will be \_\_\_\_\_
- a) 12.5 %
  - b) 38.7 %
  - c) 50 %
  - d) 25 %
7. In question no. 6, the fraction of eutectoid ferrite will be \_\_\_\_\_
- a) 24.2 %
  - b) 36.2 %
  - c) 53.9 %
  - d) 74.2 %
8. In normalized hypoeutectoid steel, with increasing carbon content, the fraction of proeutectoid ferrite and yield strength \_\_\_\_\_, respectively.

- a) Increases and decreases
  - b) Decreases and increases**
  - c) Both increases
  - d) Both decreases
9. A specimen of plain carbon steel was heated to 900°C and then quenched. The quenching process was interrupted for few seconds at 200°C and then cooled to room temperature.  $M_s$  and  $M_f$  temperatures are 300°C and 50°C, respectively. The final microstructure of the steel will be
- a) Martensite
  - b) Martensite and pearlite
  - c) Pearlite and retained austenite
  - d) Martensite and retained austenite**
10. The interlamellar spacing in pearlite colony will be minimum, if the steel sample undergoes
- a) Annealing
  - b) Normalizing
  - c) Forced air cooling**
  - d) Water quenched