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

   a) $\Delta H_{\text{mix}}^S << 0$ and $\Delta H_{\text{mix}}^L = 0$
   b) $\Delta H_{\text{mix}}^S >> 0$ 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 $\Delta H_{\text{mix}}^L << 0$

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) $T_A = T_{euct} = T_B$

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.
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. Ms and Mf 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