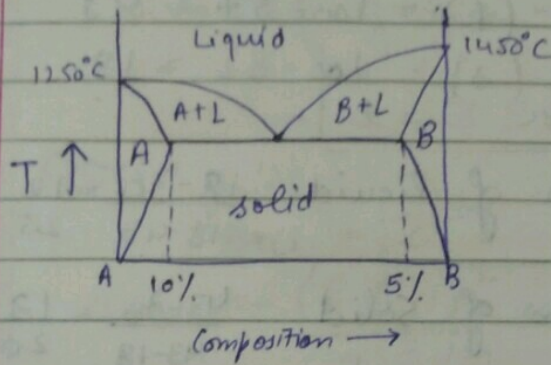


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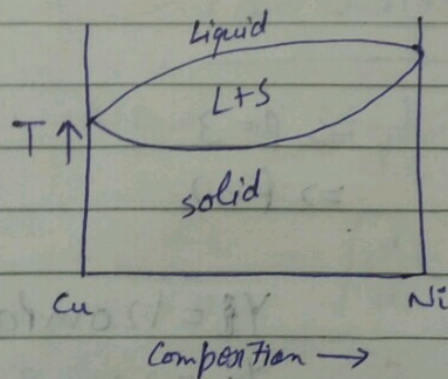
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Tut-7

1 ques →



2 ques →



3 ques →

at 2180°C

$$\% \text{ of } \text{Cr}_2\text{O}_3 \text{ (l)} = 57\%$$

$$\% \text{ of } \text{Cr}_2\text{O}_3 \text{ (s)} = 82\%$$

$$30\% \text{ wt. } \text{Al}_2\text{O}_3 \text{ and } 70\% \text{ wt. } \text{Cr}_2\text{O}_3$$

for the case of Cr_2O_3

$$\text{wt. fraction of Liquid} = \frac{82-70}{82-57} = \frac{12}{25} = 0.48$$

$$\text{wt. fraction of Solid} = \frac{70-57}{82-57} = \frac{13}{25} = 0.52$$

for the case of Al_2O_3

$$\% \text{ of } Al_2O_3 (l) = 100 - 57 = 43$$

$$\% \text{ of } Al_2O_3 (s) = 100 - 82 = 18.$$

$$\text{wt. fraction of liquid} = \frac{18 - 30}{18 - 43} = \frac{12}{25} =$$

$$\text{wt. fraction of solid} = \frac{43 - 30}{43 - 18} = \frac{13}{20} =$$

4 Ques →

$$F = C - P + 1$$

$$\textcircled{a} F = 0, C = 2 \Rightarrow P = 3$$

$$\textcircled{b} P = 1, C = 2 \Rightarrow F = 2.$$

5 Ques →

$$d_i = 0.04 \text{ mm}$$

$$d_f = 0.01 \text{ mm}$$

$$Y_i = 120 \text{ mPa}$$

$$Y_f = 220 \text{ mPa}$$

$$Y_i = Y_f \quad d = 0.0159 \text{ mm}$$

$$120 = \sigma_i + \frac{K}{\sqrt{0.04}} = \sigma_i + 5K$$

$$220 = \sigma_i + \frac{K}{\sqrt{0.01}} = \sigma_i + 10K$$

$$\Rightarrow 5K = 100 \quad \text{or } K = 20.$$

$$\Rightarrow \sigma_i = 20.$$

$$\text{Now, } \sigma_y(0.0159) = 20 + \frac{20}{\sqrt{0.0159}}$$

$$= 178.61 \text{ MPa}$$

Q6 ASTM = 7

$$n_{MC} = 2^6 = 64$$

$$\text{area of grain} = \frac{(2.54)^2}{2^6} = \frac{\pi d^2}{4}$$

Ans

$$\Rightarrow \boxed{d = 3.58 \text{ mm}}$$

ASTM = 14

$$n_{\text{Steel}} = 2^{13}$$

$$\text{area} = \frac{(2.54)^2}{2^{13}} = \frac{\pi d^2}{4}$$

$$\boxed{d = 0.314 \text{ mm}}$$

$$\text{Now } G \propto \frac{1}{\sqrt{d}}$$

$$\frac{G_1}{G_2} = \sqrt{\frac{d_2}{d_1}} = \sqrt{\frac{0.314}{3.58}} = \frac{1}{3.14}$$

$$\Rightarrow \underline{\underline{G_2 = 3.146}}$$