



JOIN
VIT QUESTION PAPERS
ON TELEGRAM



VIT
Vellore Institute of Technology
Vellore, Tamil Nadu, India

Continuous Assessment Test – II

Programme Name & Branch: B.Tech (Mechanical Engineering)

Course Name & Code: Materials Engineering and Technology – MEE1005

Class Number: VL2018195002154; VL2018195002072; VL2018195002275;

Slot: B1+TB1

Exam Duration: 90 minutes

Max. Marks: 50

Answer all questions

5 x 10 = 50 Marks

Q.No.

Question

- The eutectic reaction in a binary system is given as
 $L (49\text{wt}\%A) \leftrightarrow \alpha (35\text{wt}\%A) + \beta (53\text{wt}\%A) \text{ (at } 1345^\circ\text{C)}$
Draw the portion of phase diagram above 600°C , melting point of A is 1450°C and that of B is 1855°C , at 600°C solid solubility of A in B i.e., composition of α -phase is 0%A and that of β -phase is 70%A.
- Suppose an alloy AB (from the phase diagram obtained from question no. 1) of unspecified composition is held at 1350°C in the two-phase $L + \alpha$ region. How many variables can you specify independently? Give reasons. Also, give the range of overall alloy composition for which eutectic mixture will not be present in the microstructure of an alloy cooled slowly from the liquid phase to room temperature.
- An alloy AB was used for making solders. It has been seen practically that the alloy should have at least 85% of the eutectic mixture in the microstructure. Find out the composition limits of the alloys for soldering. [Hint: At eutectic temperature, A with 19%B dissolved in it and liquid (61.9%B) are in equilibrium].
- What is the carbon concentration of an iron-carbon alloy for which the fraction of total cementite is 0.10 wt%.
 - What is the proeutectoid phase for an iron-carbon alloy in which the mass fractions of total ferrite and total cementite are 0.86 and 0.14 respectively? What is the composition of the alloy?
- Draw the cooling curve of Cu-35%Ni alloy and map it with the phase diagram. [Hint: The melting temperature of Cu and Ni are 1085°C and 1453°C respectively]. Apply Gibb's phase rule and find the degree of freedom of Cu-35%Ni alloy at 1100°C and 1250°C and also draw the schematic microstructures of Cu-35%Ni alloy at the above mentioned temperatures.

SEARCH VIT QUESTION PAPERS
ON TELEGRAM TO JOIN