

Material Science & Metallurgy (2131904)

Assignment: - 1 Introduction of MSM

1. Define metallurgy. Explain importance of metallurgy.
2. What are the engineering requirements of materials?
3. Which are the types of metallurgy? Explain any one.
4. Explain selection criteria for material for engineering materials.
5. Differentiate micro and macro examination.
6. Explain classification of engineering material.

Assignment: - 2 Solid Solution and Crystal geometry

1. Justify B.C.C. is less dense than F.C.C.
2. Define atomic radius and atomic packing factor for B.C.C., F.C.C. and H.C.P.
3. What is solid solution? Explain the types of solid solution.
4. Discuss the factors affecting on solid solution.
5. What is crystallization? Explain mechanism of crystallization.
6. What is imperfection in crystal? Explain their effect on properties.

Assignment: - 3 Plastic Deformation

1. What is Plastic deformation? Explain deformation by slip.
2. Explain the slip in different lattice structures.
3. What is strain hardening? Explain the effects of strain hardening on properties.
4. What is Recrystallization? Explain the effects on properties of ductile material.

Assignment: - 4 Solidification of metals and phase diagram

1. Explain methods to control the grain structure resulting from solidification.
2. Explain solidification defects.
3. Explain unary and binary equilibrium phase diagram.
4. Explain Gibb's phase rule.
5. Explain lever rule and different reaction like eutectic, eutectoid.

Assignment: - 5 Iron Carbon Diagram

1. Explain allotropy of iron.
2. Explain iron carbon diagram with critical reactions.
3. Explain iron – iron carbon diagram for hypo eutectoid steel and hyper eutectoid steel.
4. Explain TTT diagram.

Assignment: - 6 Heat Treatment

1. Explain full annealing and stress relieve annealing
2. Explain difference between annealing and normalizing
3. What is heat treatment? List the purpose of heat treatment.
4. What is hardening? Why tempering is done after hardening?
5. What is surface hardening process? explain
 - a. Gas carburizing
 - b. Flame hardening
 - c. Induction hardening
 - d. Nitriding
 - e. Carbonitriding
 - f. cyaniding
6. What is austempering and martempering?

Assignment: - 7 Non Ferrous Alloys

1. Give composition, properties and use of Y- alloy.
2. What is purpose of alloying? Give effect of nickel on alloying element.
3. Give composition and use of monel metal and nichrome.
4. Explain various types of brass and bronze.
5. State composition and application of muntz metal and german silver.

Assignment: - 8 Cast Iron and Steel

1. Write short note on wrought iron.
2. Give difference between gray cast iron and nodular cast iron.
3. Explain malleable cast iron in detail.
4. Write short note on white cast iron.
5. Give in brief about HSS and its types.
6. Give short note on SS and its types.
7. What is difference between alloy cast iron and chilled cast iron?

Assignment: - 9 Non Destructive Test

1. Explain DPT testing.
2. What are the advantages of NDT over the destructive testing? Explain magnetic particle method.
3. Explain radiography.
4. Explain ultrasonic test with advantages and applications.
5. Explain jominey end quench test for the hardenability.

Assignment: - 10 Powder Metallurgy

1. What is PM? Explain basic process.
2. Explain characteristics of powder.
3. Which are the methods of manufacturing of powder? Explain automation.
4. Explain sintering process.
5. Write application of PM.
6. Write advantages and limitations of PM.