

25/10/13



B.E / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, NOV-DEC2013

MATERIALS SCIENCE AND ENGINEERING BRANCH

SECOND SEMESTER - (REGULATION 2012)

ML 8201 – STRUCTURE AND PROPERTIES OF MATERIALS

Time: 3 hr

Max. Mark: 100

PART- A (10X2 = 20 Mark)

22

1. Which type of defects is thermodynamically stable? Why?
2. What do you mean by constitutional supercooling?
3. Name few applications based on eutectic reaction.
4. Apply Gibbs phase rule at eutectic point and comment on it.
5. State the composition and application of any one alloy of Al and Mg alloy.
6. What is the difference in appearance of fractured surface of grey cast iron and white cast iron?
7. What is the difference between graphene and graphite structure?
8. What are the roles of reinforcement in ceramics matrix composites?
9. What are liquid crystal polymers?
10. What one conductive polymer and its application?

PART- B (5 X16 = 80 Mark)

11. (i) Classify the polymers based on their molecular structure and copolymers. (4)
(ii) List the major characteristics and typical application of ABS, PTFE and polyesters. (12)
 12. (a) (i) Compare and contrast the homogeneous and heterogeneous nucleation and growth. (10)
(ii) List the type of twin, planar and bulk defects. (6)
- (OR)
- (b) (i) State Hume-Rothery Rules. (4)
(ii) Brief on the microstructure evolution on basis on solidification, dendritic and cooling curves with an example. (12)
13. (a) (i) Draw Iron–Iron carbide phase diagram, name the various field, line and reactions. (10)
(ii) Draw the typical microstructure of 1.2%C steel at 920°C, 780°C and 200°C. (6)

(OR)

(b) (i) On basis of free energy construct phase diagram of eutectic mixture.

14. (a) Brief on the influence of alloying elements in steel under classification of carbide formers and non carbide formers.

(OR)

(b)(i) Name one alloy of Nickel, Copper and Titanium and state their composition, properties and application. (9)

(ii) Brief on the classification of cast iron. (7)

15. (a) (i) Classify composites and name an example for each kind. (6)

(ii) Discuss on the strengthening mechanism of particulate, dispersion and fibre reinforced composites. (10)

(OR)

(b)(i) With use of rule of mixture derive an expression for lower and upper bound of elastic modulus of large particle reinforced composite. (8)

(ii) State application of composites in aircraft, automobile and sports products. (8)