

Total No. of Questions : 8]

SEAT No. :

P4596

[Total No. of Pages : 3

[4957] - 1017

S.E. (Mechanical/Automobile)

ENGINEERING METALLURGY

(2012 Pattern) (Semester - II)

Time : 2 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) Solve Question no 1 or 2, Question no 3 or 4, Question no 5 or 6, Question no 7 or 8.
- 2) Figures to the right indicate full marks.
- 3) Draw neat, well labelled sketch wherever necessary.

- Q1) a) Draw a neat, well labelled schematic eutectic system phase diagram. [4]
- b) Give only one major effect of the following elements on metallurgical properties of iron: Carbon, Aluminium, Tungsten and Nickel. [4]
- c) Explain any 5 of the following terms : [5]
- i) Dendrite
  - ii) Pearlite
  - iii) Impurity
  - iv) Solid solution
  - v) Coring
  - vi) Flow lines in forged components
  - vii) Microscopy
  - viii) Cementite

OR

- Q2) a) Explain how etching reveals the microstructure of a metallographic specimen which is polished to mirror finish? [4]
- b) What is 'tie line'? During interpretation of phase diagrams, what information do we obtain by using lever rule? [4]
- c) Specify giving values of temperature, the critical temperatures in Iron-Iron Carbide equilibrium diagram. Explain the changes that occur at these critical temperatures. [5]

P.T.O.

- Q3) a)** Differentiate between annealing and Normalising on the basis of cooling rate, microstructure, grain size and strength. [4]
- b) Draw a schematic diagram showing continuous cooling curve for Annealing, Martempering and hardening superimposed on TTT diagram. [4]
- c) Explain how inhibitors help in prevention of corrosion. What are its types? [4]

OR

- Q4) a)** Differentiate between Nitriding and carburising. [4]
- b) Explain any one corrosion prevention method. [4]
- c) What is inter-granular corrosion? [4]

- Q5) a)** What is the effect of graphite flakes in cast iron on properties of grey cast iron? [4]
- b) What is 'malleabilising' heat treatment? To which type of cast iron is it given? [4]
- c) Write short note on Nodular cast iron. [5]

OR

- Q6) a)** Why is Grey cast iron found commonly in columns but not in structural beams? [4]
- b) Can the graphite structure in grey cast iron be substantially changed by heat treatment? Explain. [4]
- c) What is meant by 'inoculation' in context of cast irons? Why is it done? [5]

- Q7) a)** What is cartridge brass? Is it single phase or dual phase? Comment on its ductility and corrosion resistance. [4]
- b) What is precipitation hardening of Aluminium alloys? [4]
- c) Write a short note on bearing materials. [4]

OR

- Q8)** a) Explain why 1% tin is added in Admiralty brass? [4]
- b) Explain the meaning of the word 'Tempers' in case of Aluminium alloys. [4]
- c) Following are some of the properties that can be considered good in case of Aluminium or its alloys : [4]
- i) Malleability.
  - ii) Strength to weight ratio.

Suggest an application each, which makes the best use of above properties.



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