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]**

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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.