



## Engineering Metallurgy (1080)

P. Pages : 2

Time : Three Hours

Max. Marks : 100

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Answer sheet should be written with blue ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. All questions are compulsory and attempt **any two** bits out of a, b, c from each questions.
5. Neat diagram must be drawn wherever necessary.
6. Black figures to the right indicate full marks.
7. Assume suitable data if necessary.
8. Use of electronic non - programmable pocket calculator is allowed.

### UNIT - I

1. a) i) Define and explain the following terms. 6  
i) Ferrite ii) Bainite iii) Cementite  
ii) Find the chemical composition of the following steels. 4  
i) 25C5 ii) T75 W18Cr4V1 iii) AISI 1040 iv) AISI 2440  
b) Draw Fe - Fe<sub>3</sub>C diagram and with respect to it explain the solidification characteristics for 0.4% carbon steel and 1.2% carbon steel when slowly cooled from temperature above A<sub>3</sub> and A<sub>cm</sub> respectively. 10  
c) Write short notes on. 10  
i) Mechanism of etching.  
ii) Flow lines observation

### UNIT - II

2. a) Explain pearlite and bainite transformation from austenite in detail. 10  
b) Show the following heat treatment cycles separately on I. T diagram 10  
(Avoid all cycles in one diagram and no explanation is required only draw neat diagrams).  
i) Isothermal Annealing  
ii) Martempering  
iii) Ausforming  
iv) Austempering  
v) Isoforming.

- c) Write short notes on. 10  
 i) TTT diagram of eutectoid steel.  
 ii) Tempering.

### UNIT - III

3. a) What is carburising ? Explain the types of carburising. 10  
 b) Explain the need of surface hardening and describe flame hardening. 10  
 c) Write short notes on. 10  
 i) Salt bath furnace.  
 ii) Continuous furnace

### UNIT - IV

4. a) i) State true or false and justify. 6  
 i) For the same hardness alloy steels are generally tougher than plain carbon steels.  
 ii) Malleable C. I. is obtained from Gray C. I. by annealing for a long time.  
 iii) Tool steels should be preheated before austenizing.  
 ii) Explain any two effect of alloying element with examples. 4  
 b) Explain Malleable C. I in detail with its types. 10  
 c) i) Explain heat treatment cycle for 18:4:1 type of HSS. 5  
 ii) Differentiate between white C. I and Gray C.I. 5

### UNIT - V

5. a) Give composition and uses of the following alloys. 10  
 i) Cartridge brass.  
 ii) Muntz Metal  
 iii) Brazing brass  
 iv) Gun metal  
 v) Invar  
 b) Differentiate clearly between the following pairs : 10  
 i) Brasses and Bronzes.  
 ii) Fiber Reinforced composites and Laminated composites.  
 c) What are the requirement of bearing materials ? Give composition and properties of any three bearing materials. 10

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