B.Tech Sem – V (2007 Course) (Production Engg.) : WINTER - 2018

SUBJECT: ENGINEERING METALLURGY

Day: Thursday
Date: 22/11/2018

W-2018-2822

Time: 02.30 PM TO 05.30 PM
Max Marks : 80

N.B. :

1) **Q. No.1** and **Q. No.5** are **COMPULSORY.** Out of the remaining attempt **ANY TWO** questions in from each Sections.
2) Figures to the right indicate **FULL** marks.
3) Answers to both the sections should be written in **SEPARATE** answer books.
4) Assume suitable data, if necessary.

SECTION – I

Q.1 Explain Why for the followings (**ANY SEVEN**): **(14)**

a) For the high carbon steels it is difficult to do machining.

b) Tempering heat treatment is must after hardening heat treatment.

c) In flow line observation test etching is must.

d) Martsite transformation result volume expansion.

e) Carburizing heat treatment requires Quenching heat treatment but it is not requires in nitriding.

f) If any steels contents High amount of Sulfur then Mn is always added

g) By spark test chemical composition is not calculated.

h) Flame and Induction hardening does requires high carbon content only.

Q.2 **a)** Which are the three reactions in Fe-Fe_3C Equilibrium diagram? Calculate the percentage of Phases at the reaction points. **(07)**

b) What is wrought iron? Give its chemical composition and applications. Draw the micro structure of it. **(06)**

Q.3 **a)** Write the characteristics of martensite transformations. **(05)**

b) What is retained austenite? How it is eliminated? **(04)**

c) Explain about Jominy End Quench test in short. **(04)**

Q.4 **a)** What is the principal of working of optical microscope? Explain it with neat ray diagram. **(04)**

b) Mention the quenching medium for the following heat treatment process. **(04)**

i) Hardening
ii) Normalising
iii) Cynaiding
iv) Conventional annealing

c) What is tempering? Why it is necessary? **(05)**

P.T.O.

SECTION – II

Q.5 Solve **ANY THREE** of the following **(14)**

a) What is tool steel? Give its classification with example.

b) What is Allotropy? Explain the intermediate phase in Fe-Fe3C diagram.

c) Define Brass and Bronze. List the properties of Brasses.

d) Explain the how malleable cast iron is manufactured?

e) Explain 18-4-1 Steel with composition and application.

Q.6 **a)** Give the chemical composition and application of following: **(04)**

i) Cartriage Brass ii) Grey cast iron
iii) Gun metal iv) Neval bronze

b) Explain the alloy steels. What do you mean by superalloys. Explain in detail. **(05)**

c) Distinguish between steels and cast irons. **(04)**

Q.7 **a)** Give the advantages of heat treatment process. Explain why hypereutectoid Steels are not heat treated above A_{cm} line ? **(05)**

b) State and Explain the following **(08)**

i) Ferrite stabilizers ii) Austenite stabilizers
ii) Graphite formers iv) Carbide formers

Q.8 **a)** Draw and explain Cu-Zn equilibrium diagram with its phases involved. **(06)**

b) Why do you mean by precipitation hardening. Explain it with steps and suitable examples **(07)**

* * * * *