

B.Tech. SEM -V Production 2014 Course (CBCS) : SUMMER - 2019

SUBJECT : ENGINEERING METALLURGY

Day Tuesday
Date: 14/05/2019

S-2019-2693

Time : 10.00 AM TO 01.00 PM
Max. Marks : 60

N. B. :

- 1) All questions are **COMPULSORY**.
 - 2) Figures to the right indicate **FULL** marks.
 - 3) Draw neat and labeled diagrams **WHEREVER** necessary.
 - 4) Assume suitable data, if necessary
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Q. 1 a) Explain with respect to Fe-Fe₃C diagrams. What do you know about α - Ferrite, γ - Austenite and pearlite? (05)

b) 'Sulphur content in steel is kept is low' Why? How it is find out? (05)

OR

a) Give the classification of steels on the basis of carbon content and give AISI specification of steels. (05)

b) From Fe-Fe Carbide equilibrium diagram find the amount of phases by use of lever rule in 0.3 % Carbon and 1.2 % Carbon.(write its applications) (05)

Q. 2 a) Draw the microstructure of following: (05)

- i) Gray C.I.
- ii) Ferritic S. G. Iron

Give the manufacturing method of each.

b) Give the classification and properties of alloy cast irons. (05)

OR

a) What is malleable C. I.? How it is manufactured? List its uses. (05)

b) Give the chemical composition, properties, micro structural phases and applications of . (05)

- i) Ni hard C I
- ii) Ferrite Nodular C.I.
- iii) Gray C.I.

Q. 3 a) What do you know about: (05)

- i) OHNS
- ii) HCHC
- iii) HSLA

b) Give the different types of hot worked tool steels. (05)

OR

a) Describe the different types of stainless steels. How their classification is done? Explain the specification methods for it. (05)

P. T. O.

- b) Explain the effect of following alloying elements on the properties of tool steels: (05)
- i) Carbon
 - ii) Chromium
 - iii) Tungsten

- Q. 4 a) Explain the heat treatment for obtaining very fine grain structure in steel. Show it on T T T diagram. (05)
- b) Describe the Isoforming heat treatment in detail. (05)

OR

- a) What is Retained Austenite? What are its problems? How it is solved? (05)
- b) Explain the Hardenability test in detail. (05)

- Q. 5 a) Discuss the limitations of high carbon steel. Why only low carbon steels are carbonizing? How? (05)
- b) How the flame hardening heat treatment is carried out? (05)

OR

- a) Write short information about the following: (05)
- i) Exothermic Atmosphere
 - ii) Salt bath furnace
 - iii) Vacuum Atmosphere
- b) Discuss the surface hardening treatment in which fatigue strength and wear resistance also increased. (05)

- Q. 6 a) Give compositions and uses of the following alloys: (05)
- i) Babbitts
 - ii) Naval brass
 - iii) Invar
 - iv) LM 6
- b) Draw Cu-Be equilibrium diagram for age hardening phenomena. Explain with neat sketches. (05)

OR

- a) What are the typical alloys of copper used in engineering? Describe briefly their composition and uses. (05)
- b) Give the chemical composition, phases and applications of following: (05)
- i) Cartridge brass
 - ii) Muntz metal
 - iii) Gun metal
 - iv) Tin bronze

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