SV-75

Total No. of Pages : 3

Seat No.	

S.E. (Mechanical) (Part - II) (Semester - III) (Revised) Examination, April -2018

METALLURGY

Sub. Code : 63353

Day and Date :Friday, 27 - 04 - 2018 **Total Marks : 100**

Time : 2.30 p.m to 5.30 p.m.

Instructions :
1) **Solve any three questions from each section.**
2) **Answer for both sections to be written in the same answer book.**
3) **Figures to the right indicate full marks.**
4) **Draw neat figures wherever necessary.**

SECTION - I

Q1) Answer any three of the following. Each question carries equal marks. **[18]**

a) What is Coring and Dendritic structure? Explain with neat sketches.

b) Explain what cooling curves are. Draw different types of cooling curves and evalute degree of freedom (DOF) of anyone using Gibbs phase rule.

c) What are Hume Ruthery rules for Substitutional Solid Solutions? Explain.

d) Explain what are Eutectic, Eutectoid and Peritectic transformations?

Q2) a) Draw Fe-Fe_3C equilibrium diagram. Indicate all the phases, Temperatures and Compositions. **[8]**

b) Suggest suitable materials for any four of the following and justify the same. **[8]**

i) Steel used in RCC

ii) Gears

iii) Machine tool Column

iv) Tools used in

v) Restaurant pots and pans

vi) Bearing material

P.T.O.

Q3) a) What are Malleable cast Irons? Explain the manufacturing process? Draw typical microstructure of Malleable and Gray cast iron and compare their properties. [7]

b) Draw self explanatory sketches of any three. [9]

i) Typical Microstructures of medium carbon steel and high carbon steels.

ii) Microstructures of White and gray cast irons.

iii) Microstructures of α & $\alpha + \beta$ brasses.

iv) Sn-Sb equilibrium diagram.

v) Substitutional and Interstitial solid solutions.

vi) Standard specimen for Charpy and Izod impact testing.

Q4) Write short notes on any four. **[16]**

a) Water hardenables Tool steels.

b) Stainless steels.

c) Rockwell hardness testing.

d) Cast iron.

e) Ultra sonic Testing.

SECTION - II

Q5) a) Draw Flowchart for manufacturing of self lubricating bearings? Explain why oil impreganation is must in this process? [9]

b) Draw TTT diagram for hypo eutectoid and hyper eutectoid steels and explain why mild steel cannot be hardened by quenching? [9]

Q6) a) Explain precipitation hardening in Al-Cu alloy w.r.t. composition, aging temperature and time, hardness variations. [8]

b) Elaborate case hardening processes, which steels are carburized and what is the significance of case depth? How it is measured? [8]

Q7) Differentiate clearly between any four of the following. **[16]**

a) Hardening and softening processes.

b) Compacting and sintering.

c) Austempering and martempering.

d) Flame and induction hardening.

e) CCT and TTT diagram.

Q8) Write short notes on any four of the following. **[16]**

a) Oxidation and decarburization defects.

b) Austenitic grain size.

c) Austenite to Pearlite transformation.

d) Different Powder manufacturing methods.

e) Heat treatment furnaces.

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