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Code No.: 22802 M

VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD
M.E. (Mech. Engg.: CBCS) II-Semester Make Up Examinations, September-2017
(Advanced Design & Manufacturing)

Metallurgy of Metal Casting and Welding Processes

Time: 3 hours

Max. Marks: 70

Note: Answer ALL questions in Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

1. Classify carbon steels and their properties.
2. List the effects of alloying elements in alloy cast iron.
3. Discuss briefly the malleabilisation process.
4. List the requirements of foundry refractories.
5. Describe the importance of Heat Affected Zone in welding.
6. With the help of sketch, explain stress relieving heat treatment.
7. Define the terms - Ferrite, Austenite, Pearlite, Martensite in steels.
8. List the causes for welding stresses.
9. Categorize the Stainless steels and bring out the properties of any one.
10. Explain Weldability of aluminum alloys.

Part-B (5 × 10 = 50 Marks)

(All bits carry equal marks)

11. a) Explain the solidification of various types of alloys with neat sketches.
b) Explain Directional Solidification of alloys with respect to Gating and Riser.
12. a) Describe the metallurgy of Brasses and Bronzes.
b) Discuss the age hardening of casting with appropriate sketches of microstructures.
13. a) Explain the zones of welding Metallurgy of low carbon steels with a neat sketch.
b) Differentiate Annealing and Normalizing processes with neat sketches.
14. a) Discuss in detail about the microstructural products of weldments.
b) Categorize in detail about the residual stresses that occur in welding and their controlling methods.
15. a) Discuss in detail about Hydrogen induced cracks and Lamellar cracks during welding.
b) Describe the cold and hot cracks observed in the HAZ of metals and their remedies.
16. a) Draw the Iron-Carbon constitutional equilibrium diagram and label it completely.
b) Discuss in detail about the metallurgy of Zinc based die casting alloys.
17. Answer any *two* of the following:
 - a) Process annealing and Spheroidising.
 - b) Sketch the Scheffler diagram and label it.
 - c) Weldability of Titanium alloys.