

Ganpat University
M.Tech.Sem II (AMT) Mechanical Engineering
Regular Examination May-June 2012
Sub.: 3ME 202 Advanced Metal Casting & Welding Technology
Time: 3 Hours **Total Marks: 70**

- Instructions:** 1) Answer two sections separately.
2) Figures to the right indicate full marks.
3) Assume suitable data if necessary.

Section I

- Q-1** **12**
- (a) What are pattern allowances? Discuss any three patterns with neat sketch.
 - (b) What is sand testing? Explain any two sand tests in detail.
 - (c) Explain riser efficiency and directional solidification.
 - (d) What is gating ratio? Differentiate between pressurized and unpressurized gating system.
- Q-2** **11**
- (a) Explain mechanism of solidification in centrifugal casting process along with its influence on mechanical properties.
 - (b) What is investment casting? Explain role of shell moulding and solid moulding in investment casting process. Enlist advantages and applications of investment casting process.
 - (c) Differentiate between green sand moulding and CO₂ moulding process.
- OR**
- Q-2** **11**
- (a) What is die casting? Differentiate between low pressure and pressure die casting. Also list and explain characteristics and applications of die casting.
 - (b) What is continuous casting? Explain variables affecting quality of continuous casting. Discuss defects and remedies of continuous casting.
 - (c) Write short note on: Vacuum casting.
- Q-3** **12**
- Answer any three of the following questions:
- (i) Enlist and explain principles of gating system.
 - (ii) Explain fluxing and degassing of non ferrous melting practices.
 - (iii) Differentiate between white cast iron and malleable cast iron with respect to its microstructure, properties and fields of application.
 - (iv) Discuss effects of grain refinement and modification of aluminum alloys.
 - (v) Enlist casting defects. Also discuss causes and remedies of casting defects.
 - (vi) What is solidification? Differentiate between amorphous and directional solidification. Explain role of coating in metallic mould. Also discuss solidification in sand and permanent mould.

Section II

- Q-4 12
- (a) Enlist the advantages of welding techniques compare to other processes of productions.
 - (b) Differentiate between solid state welding and arc welding.
 - (c) What do you mean by welding position? Explain the different types of welding position with neat sketch.
- OR
- Q-4 12
- (a) Enlist the advantages of using inert gases in place of fluxes in the process of welding.
 - (b) Explain the criterion for selection of electrodes for a particular process of arc welding.
 - (c) Explain the "Heat affected zone" in arc welding process.
- Q-5 6
- (a) Explain the principal of MIG welding in detail with neat sketch. Also differentiate MIG & TIG.
- 5
- (b) Explain any two solid state welding process with neat sketch.
- OR
- Q-5 6
- (a) Explain the resistance welding process giving the equipment, parameters controlled and the applications.
- 5
- (b) A heat source is capable of transferring 3000 W to the surface of a metal part. The heat impinges the surface in a circular area, with intensities varying inside the circle. The distribution is as follows: 70 % of the power is transferred within the circle of diameter = 5mm, and 90% is transferred within concentric circle of diameter = 12mm. What are the power densities in (a) the 5mm diameter inner circle and (b) the 12 mm diameter ring that lies around the inner circle?
- Q-6 12
- Answer the following: (Any Three)**
- (a) Write a short note on "Defects in welded joints".
 - (b) Describe the process of gas welding along with its advantages, disadvantages and field of applications.
 - (c) Briefly explain the "Electron Beam Welding". Also differentiate EBW and LBW.
 - (d) Write a short note on "Automation in Welding."

-: End of Paper :-