

GUJARAT TECHNOLOGICAL UNIVERSITY
ME Semester –I Examination Feb. - 2012

Subject code: 712801N**Date: 11/02/2012****Subject Name: Advance Casting Technology****Time: 10.30 am – 01.00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1 (a) Explain the technical and economic characteristics in the selection of casting process. Write specific advantages offered by casting process. 07
- (b) Describe the influence of clay content and percentage of tempering water on the strength of moulding sand. 07

- Q.2 (a) Discuss the different ingredients of moulding sand. Also compare these ingredients with the ingredients of core sands. 07
- (b) Describe the following patterns with their neat sketch and indicate the production circumstances in which each would be used. (i) Match plate pattern (ii) Split patterns (iii) Sweep patterns (iv) Skeleton pattern (v) Follow board pattern. 07

OR

- (b) List five important properties desired as a pattern material. Describe at least three important materials used for pattern making and compare them. 07

- Q.3 (a) Explain how nucleation occurs and grows in the freezing of the pure metal. Discuss the difference between homogeneous and heterogeneous nucleation. 07
- (b) With a neat sketch, give the principle of operation, merits-demerits and applications of shell moulding process. 07

OR

- Q.3 (a) Compare die casting and full mould process from the point of process, product and applications. 07
- (b) Give a short review about the directional solidification process. Differentiate between progressive and directional solidifications and show how directional solidification can be achieved by controlling progressive solidification during design stage and moulding stage of a casting. 07

- Q.4 (a) Describe with neat sketch the various components of good running/gating system. Discuss the functions to be performed by each. 07
- (b) Discuss (i) External Chill (ii) Internal Chill. "The use of internal chill is more suitable than external one". Explain. 07

OR

- Q.4 (a) List and discuss the factors that affect the fluidity of metals. 07
- (b) The metal contracts in volume as it cool in the mould. Discuss the stages in which the contraction of the metal takes place. 07

- Q.5 (a) Give the classification of casting defects. Explain the causes and remedies of surface defects and dimensional defects. 07
- (b) Explain the principle, application and limitations of (i) Dye penetrant testing (ii) Magnetic particle testing. 07

OR

- Q.5 (a) Explain the description, causes and prevention of the following casting defects: 07
(i) Cross-Joint (ii) Slag Inclusion (iii) Blow Holes (iv) Shrinkage (v) Core Shift
(vi) Metal Penetration (vii) Cold Cracks
- (b) Explain through sketches the techniques of radiographic testing of casting, using X-rays and γ -rays. 07
