

GUJARAT TECHNOLOGICAL UNIVERSITY**ME - SEMESTER-I(New course)• EXAMINATION – WINTER- 2015****Subject Code: 2712801****Date: 01/01/2016****Subject Name: Advance Casting Technology****Time: 2:30 pm to 5:00 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) Suggest steps to be taken to improve the performance of metal casting industry in our country. 07
- (b) Write the tests and procedures to find the following properties of molding and core sands: (1) Green compressive strength (2) Permeability (3) Moisture content. 07
- Q.2 (a) Give the requirements of core sands. Describe briefly the properties of clay-bonded sands, oil sands, resin sands and Co₂-sodium silicate sands. 07
- (b) How is clay content of molding sand determined in lab? Explain the effect of clay content and temper water on (i) green compressive strength (b) permeability. 07
- OR
- (b) Differentiate between: (1) Natural sand Vs Synthetic sand (2) Facing sand Vs backing sand (3) Base sand Vs mixed sand. 07
- Q.3 (a) Select suitable molding process for following components, stating proper reasons. (1) Paper Mill Rolls (2) Watch cases (3) Turbine blade (4) Large steel valve (5) Gear box casing (6) Fly wheel (7) Car engine cylinder 07
- (b) State the important considerations while designing a component to be manufactured by casting process with example. 07
- OR
- Q.3 (a) The quality requirements of core sand are much more stringent than that of molding sand. Discuss with proper reasons. 07
- (b) Sketch a common cold chamber type pressure die casting machine. State its specifications, features and applications. 07
- Q.4 (a) Describe the important considerations and design steps of gating system for non-ferrous alloys. 07
- (b) Sketch risering and gating systems normally used for common castings like: gear wheel, bearing sleeve, valve body and bearing support. 07
- OR
- Q.4 (a) State the basic requirements for effective function of a riser. State and explain any three commonly used methods for calculating riser size. 07
- (b) Describe the important considerations and design steps of gating system for steel casting. 07
- Q.5 (a) Differentiate between dendrite, nucleus and crystal grain. Suggest methods to get uniform grain size in a casting having thick and thin sections. 07
- (b) What are the operations in melting and refining steel in direct arc furnace? Describe the reactions involved in dephosphorisation and desulphurisation. 07
- OR
- Q.5 (a) Explain the principles of ultrasonic testing of casting. Compare radiography with ultrasonic testing for the internal soundness of castings. 07
- (b) List the typical tasks which can be done by computers in foundry application and explain briefly typical software used with its advantages. 07