Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER I (NEW) EXAMINATION – SUMMER 2017

Subject code: 2712801 **Date:09/05/2017**

Subject Name: Advance Casting Technology

Time:02:30 p.m. to 05:00 p.m. **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 economical characteristics in the selection of Casting Process. List the specific advantages offered by casting Process.	**07**
	(b)	State the important considerations while designing a component to be manufactured by casting process with example.	**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)	Explain in detail, the requirements of good moulding sand.	**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)**	Draw a fishbone diagram indicating all factors affecting casting fluidity.	**07**
	(b)	Give a short review about the directional solidification process. Discuss how the directional solidification can be controlled.	**07**
		OR	
Q.3	**(a)**	Describe the important considerations and design steps of gating system for steel casting.	**07**
	(b)	Sketch risering and gating systems normally used for common castings like: gear wheel, bearing sleeve, valve body and bearing support.	**07**
Q.4	**(a)**	Explain Quick Casting Process with Industrial case study.	**07**
	(b)	State the basic requirements for effective function of a riser. State and explain any three commonly used methods for calculating riser size.	**07**
		OR	
Q.4	**(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)	Explain the principles of fluid flow involved in the design of sprue, runner and gating deriving the expressions.	**07**
Q.5	**(a)**	What are the operations in melting and refining steel in direct arc furnace? Describe the reactions involved in dephospherisation and desulphurisation.	**07**
	(b)	State the important considerations while designing a component to be manufactured by casting process with example.	**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**