Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII EXAMINATION – WINTER 2015

Subject Code: 172106 **Date:04/12/2015**

Subject Name: Advance Ferrous Metallurgy

Time: 10:30am to 1:00pm **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)**	(i) What are the problems of Indian Steel Plants?	**02**
		(ii) "High carbon DRI is preferred by steel makers." Why?	**02**
		(iii) "DRI has specific gravity less than 3.0 and slag has more than 3.0; still DRI is penetrated to the slag phase." Why?	**03**
	(b)	Explain the thermodynamics of the reduction of Iron ore.	**07**
Q.2	**(a)**	Enlist the zones in Blast furnace. With neat sketch of Blast furnace write the reaction in each zone.	**07**
	(b)	What are the alternative routes of Iron production? Explain Mini Blast furnace briefly.	**07**
		OR	
	(b)	Explain the mechanisms of kinetics of iron oxide reduction in Blast furnace.	**07**
Q.3	**(a)**	Why sponge iron production is necessary under India conditions? Explain Rotary Kiln process for sponge iron production.	**07**
	(b)	Explain process of reduction smelting.	**07**
		OR	
Q.3	**(a)**	List out the modern developments in Blast furnace. Explain how humidification of blast is improved performance of Blast furnace.	**07**
	(b)	Does pulverized coal injection reduce Metallurgical coke consumption? Justify your answer.	**07**
Q.4	**(a)**	Draw neat sketch of EAF and explain EAF route of steel production.	**07**
	(b)	Discuss the use of sponge iron as charge material in Electric arc furnace steel making.	**07**
		OR	
Q.4	**(a)**	Compare AOD and VOD process.	**07**
	(b)	Explain "R-H degassing" technique with a sketch.	**07**
Q.5	**(a)**	Explain continuous casting process.	**07**
	(b)	Discuss about the role of synthetic slag in iron and steel making.	**07**
		OR	
Q.5	**(a)**	Explain "Double Slag Practice" of steel making in Electric arc furnace and its advantages.	**07**
	(b)	Discuss role of various Ferro-alloys in making different types of steel.	**07**

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