

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-IV(New) • EXAMINATION – WINTER 2016****Subject Code:2142102****Date:22/11/2016****Subject Name:Principles of Extractive Metallurgy****Time:02:30 PM to 05:00 PM****Total Marks: 70****Instructions:**

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

		MARKS
Q.1	Short Questions	14
	1 Process in which higher grades of ores, leached using dumps, known as _____	1
	2 Stirring is used to aid dissolution process in _____leaching.	1
	3 Example of a natural flux is _____	1
	4 Example of a oxidizing flux is _____	1
	5 What is matte?	1
	6 Define Extractive metallurgy.	1
	7 Define Refining.	1
	8 Define Converting.	1
	9 Define Drying.	1
	10 Define Calcination.	1
	11 Define Pelletizing.	1
	12 Define Sintering.	1
	13 Define Roasting.	1
	14 Define Smelting.	1
Q.2	(a) Derive Arrhenius Equation.	03
	(b) What is heterogeneous and homogenous reaction?	04
	(c) Critically compare the advantages & limitations of pyrometallurgical and Hydrometallurgical extraction processes.	07
	OR	
	(c) Discuss collision theory of reaction kinetics.	07
Q.3	(a) Differentiate between Matte smelting and Reduction smelting.	03
	(b) Explain importance of oxide free energy diagram in pyrometallurgy.	04
	(c) Discuss different steps of fluidized bed roasting process. Explain why fluidized bed roaster is more efficient than other roasters.	07
	OR	
Q.3	(a) What are Ellingham diagrams? Write their limitations?	03
	(b) Explain the process of sinter roasting.	04
	(c) Write note on different furnaces used in smelting process.	07
Q.4	(a) Explain the criteria for selection of a leaching reagent.	03
	(b) Differentiate between Order and Molecularity.	04
	(c) Define Leaching. Explain the role of oxygen in leaching operation with the help of respective Example.	07
	OR	
Q.4	(a) What is percolation leaching? List out advantage of it.	03
	(b) Explain the effect of bacteria on leaching rate and extent of recovery.	04
	(c) Write a note on solvent extraction process.	07
Q.5	(a) Explain that why pressure leaching is carried out in autoclave.	03

- (b) Draw process flow sheet of Magnesium extraction. **04**
(c) Discuss the electrochemical principle involved in electrorefining of metals using molten salts. Explain the principle with a suitable example. **07**

OR

- Q.5** (a) Describe the conditions for selection of an electrolyte in electrometallurgical processes. **03**
(b) Write a note on Electrowinning. **04**
(c) Draw process flow sheet of Cu extraction with important parameters involved in the process. **07**
