

**GUJARAT TECHNOLOGICAL UNIVERSITY**
**BE - SEMESTER– IV (New) EXAMINATION – WINTER 2019**
**Subject Code: 2142102**
**Date: 13/12/2019**
**Subject Name: Principles of Extractive Metallurgy**
**Time: 10:30 AM TO 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.

		MARKS
Q.1	(a) Define Extractive metallurgy, calcinations and roasting.	03
	(b) Explain briefly sources of metals.	04
	(c) Justify the importance of Ellingham diagram for oxide system in extractive metallurgy	07
Q.2	(a) Draw a simple flow sheet for extraction of Aluminum from bauxite ore.	03
	(b) Write in detail about ion exchange process.	04
	(c) Compare pyrometallurgy and hydrometallurgy in terms of merits and demerits.	07
<b>OR</b>		
	(c) List out Pyro metallurgical processes. Differentiate between pelletizing and sintering.	07
Q.3	(a) What is percolation leaching? List out advantage of it.	03
	(b) Define smelting. Explain matte smelting process	04
	(c) Discuss briefly fluidized bed roasting process.	07
<b>OR</b>		
Q.3	(a) Explain the reason of using autoclave in pressure leaching.	03
	(b) Discuss Reduction smelting with suitable example.	04
	(c) Describe the microbial leaching. Explain the effect of bacteria on leaching rate and extent of recovery	07
Q.4	(a) Explain the Zone refining.	03
	(b) During electrolysis of $\text{CuSO}_4$ 25 gms of copper is deposited at cathode. Calculate 1) Coulombs required to deposit given amount of copper 2) Time required to deposit given amount of copper when 3 amp of steady current is maintained.	04
	(c) Write a note on fused salt electrolysis.	07
<b>OR</b>		
Q.4	(a) Draw flow sheet of extraction of Zinc.	03
	(b) List out physical method of Refining. Explain selective distillation of impurities.	04
	(c) Illustrate the kinetics of leaching with concentration profile of mineral surface.	07
Q.5	(a) Differentiate between Order of reactions and Molecularity	03
	(b) Describe theory of Absolute Reaction Rate.	04
	(c) Explain Collision Theory of reaction kinetics.	07
<b>OR</b>		
Q.5	(a) Derive Arrhenius Equation	03
	(b) Draw process flow sheet of Cu extraction with important parameters involved in the process.	04
	(c) Differentiate between electro winning and electro reeving.	07