Roll No. | | | | | | | | | | |

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. /B.Tech / B. Arch (Full Time) - END SEMESTER EXAMINATIONS, NOV / DEC 2024

MINING ENGINEERING

MI 5603-MINERAL PROCESSING

(Regulation 2019)

Time:3hrs

Max.Marks: 100

CO1	Know the basic principles of mineral processing.
CO2	Obtain adequate knowledge for the typical process circuits used to treat aggregates and ores containing one or more valuable minerals.
CO3	Comprehend the basic concepts on various separation/concentration techniques and special methods adopted to process the minerals.
CO4	Develop processing flow sheets for the production of aggregates and mineral concentrates from raw ore material.
CO5	Identify the suitable site and adequate area for constructing the tailing dams for storing the refuse coming out of a typical processing plant.

BL – Bloom's Taxonomy Levels

(L1-Remembering, L2-Understanding, L3-Applying, L4-Analysing, L5-Evaluating, L6-Creating)

PART- A(10x2=20Marks)

(Answer all Questions)

Q.No.	Questions	Marks	CO	BL
1	Define the term 'gangue' in mineral processing unit.	2	CO1	L1
2	Elaborate the four major principles of ore sorting.	2	CO1	L2
3	Illustrate the working principles of dry grinding system.	2	CO2	L3
4	Mention the salient features of tertiary crushing unit.	2	CO2	L3
5	State the scope of applicability of trommels.	2	CO3	L3
6	Classify the mineral sampling techniques adopted in processing mills.	2	CO3	L2
7	Depict the industrial application of jigging mechanism.	2	CO4	L3
8	What do you mean by amalgamation process?	2	CO4	L2
9	Write short notes on 'cyanide process'.	2	CO5	L3
10	List out effluent management methods adopted in mineral processing unit.	2	CO5	L3

PART- B(5x 13=65Marks)

(Restrict to a maximum of 2 subdivisions)

Q.No.	Questions	Marks	CO	BL
11 (a)	Explain the salient features of flowsheet in mineral processing unit. Discuss in detail with neat flowsheet for process utilizing two-stage separation.	13	CO1	L2
	OR			
11 (b)	Explain in detail the working principles and scope of application of hand and mechanical sorting technique in mineral processing unit with neat sketches.	13	CO1	L2
12 (a)	Discuss the various theories of comminution based on properties of ore with neat expressions and graphs.	13	CO2	L3

	OR			
12 (b)	Classify the different types of crushers and discuss in detail of working and constructional features of jaw crusher with neat sketches.	**13**	CO2	L3
13 (a)	Explain the factors affecting the industrial screening performance with neat expressions and sketches.	**13**	CO3	L3
	OR			
13 (b)	Describe the principle of mechanical classifier and explain in detail the working mechanism of hydrocyclone with the neat sketches.	**13**	CO3	L3
14 (a)	Enlist the different types of separation techniques for various properties of minerals with examples. Elaborate the working principles and salient features of gravity separators.	**13**	CO4	L4
	OR			
14 (b)	Discuss in detail of Stokes' law of particle settlement with neat sketches and numerical expressions.	**13**	CO4	L4
15 (a)	Discuss in detail the design and construction components of tailing dam with neat sketches and also explain the mode of disposal and re-handling of tailing materials.	**13**	CO5	L2
	OR			
15 (b)	Explain in detail the leaching operation and its applicability in extraction of zinc metals.	**13**	CO5	L2

PART- C(1x 15=15Marks)

(Q.No.16 is compulsory)

Q.No.	Questions	Marks	CO	BL
16.	Design a comprehensive flow sheet of a typical mineral processing plant receiving the metallic ore from an open pit copper mine producing 2 million tonne of Chalcopyrite ore annually. The flow sheet should contain details of feed size, output size, capacity (in tph), and circuits of grinding unit. Assume the conditions wherever necessary giving appropriate justifications.	**15**	CO5	L5