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

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. /B. Tech / B. Arch (Full Time) - END SEMESTER EXAMINATIONS, APR / MAY 2025

MINING ENGINEERING
VI Semester
MI5601 UNDERGROUND MINING METHODS - METAL
(Regulation 2019)

Time: 3hrs Max. Marks: 100

CO1	The students will have basic concept on metal mining methods.
CO2	Enhance the knowledge on mine design, development and operations of metal mines.
CO3	The students will get basic knowledge about stoping techniques
CO4	The students will understand the concepts of methods of stoping.
CO5	They will also know about novel methods of metal mining and its applications.

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	Differentiate reserve with resource.	2	1	2
2	What basis the classification of stoping methods is formed?	2	1	1
3	How the stoping interval is fixed?	2	2	2
4	Differentiate the up-reaming and down-reaming method of raise.	2	2	2
5	List the sequence of operations carried out in stoping	2	3	1
6	Tabulate the various stoping method costs referring with set square method.	2	3	1
7	Classify the stoping methods.	2	4	1
8	State the restriction parameters for not adopting to shrinkage stoping method.	2	4	2
9	Which variation of main stoping method is called Large Blast Stope Method, explain how.	2	5	2
10	Briefly mention the Vertical Crater Retreat (VCR) method.	2	5	1

PART- B(5x 13=65Marks)
(Restrict to a maximum of 2 subdivisions)

Q. No.	Questions	Marks	CO	BL
11 (a)	Illustrate the layout of modern underground layout with terminologies associated with them and state their functionality.	13	1	3
	OR			
11 (b)	Discuss in detail pre stoping operations in step by step procedure starting initial cycle of mineral industry	13	1	3
12 (a)	Select raising method for the level interval more than 60m and highly dipping ore and justify reasons. Also explain in detail the procedure, advantages and limitations	13	2	4
	OR			
12 (b)	An underground mine having 6 of level and their level interval of 70m and reserve up to 650m. Propose the orepass parameters and their construction details and its advantages.	13	2	4

13 (a)	Discuss in detail the procure for select stoping with their technical parameters for different stoping methods	**13**	3	3
	OR			
13 (b)	Explain in detail various categories to be considered for the choice of stoping with in real-world situation.	**13**	3	3
14 (a)	A deposit is very well suited to adopt shrinkage stoping method but due to technical or economical consideration, the company want to select other stoping method. Propose the stoping methods with proper justifications. Explain in details overall operations selected stoping method with necessary sketches.	**13**	4	4
	OR			
14 (b)	A deposit is very well amenable for sublevel stoping method but due to technical or economical consideration, the company want to select other stoping method. Propose the stoping methods with proper justifications. Discuss in details overall operations selected stoping method with necessary sketches.	**13**	4	4
15 (a)	A vein deposit of highly valued metal is occurring in the depth ranging from 1500m to 3000m measure from the surface. Explain detail various problem associated with the mine and stoping method.	**13**	5	4
	OR			
15 (b)	A mining company want to develop a vertical shaft in a faster manner rather than conventional method. Discuss in detail modern shaft sinking of faster approach with necessary sketches and technical details and their operations.	**13**	5	4

PART- C(1x 15=15Marks)

(Q.No.16 is compulsory)

Q. No.	Questions	Marks	CO	BL
16.	The Deposit consists mainly of a sequence of andesite interbedded with pyroclastic rocks Formation, N 40° W strike, dipping 15° to the SW. The deposit is 450 m long and about 80 m wide. The mine reserves were calculated to be 2.68 Million tons at 1.22% of recoverable Cu the favorable lithological horizons that served as fluid conduits were strongly affected by a pervasive alteration. The lithologies have a thickness that ranges from 2 to 50 m, up to 500 m strike extension and length along dip reaching 600 m. In addition to the most common strati-form geometry, these deposits can present lenses, breccia pipes, veins, or irregular shapes, sometimes all together in the same deposit. An important geological fault separates the waste on the western side from the ore body. Propose Stope method and explain in detail all the operations of stoping. Assume any data if missing.	**15**	1,3,4	5