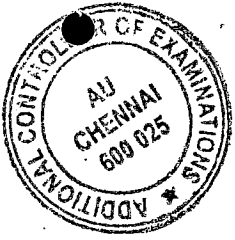


06/12/2024 (FN)



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ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

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

MINING ENGINEERING

Seventh Semester

MI5702 MINE PLANNING AND DESIGN

(Regulation 2019)

Time: 3hrs

Max. Marks: 100

CO1	To gain knowledge on concept of mine planning process is required for the student for developing surface as well as underground metal mining project.
CO2	To understand different methods of extraction applicable to different types of mineral
CO3	To select proper types of equipment for improving the productivity in surface mining operations,
CO4	To optimize the production capacities in surface mining operations covering different types of mineral deposits
CO5	To understand project implementation and monitoring methods adopted in the mineral industry

BL – Bloom's Taxonomy Levels

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

**PART- A (10x2=20 Marks)**

(Answer all Questions)

1. What is a conceptual mine plan and Feasibility report?
2. What are all the various important contents of a Feasibility Report?
3. Explain about Geological, Mineable and Extractable Reserves?
4. What you understand about IRR ? what are all the impact of high and low percentage of IRR ?
5. How coal is extracted using blasting gallery method ?
6. Explain about Earning, Margin, Return on Equity ?
7. What are all economic information required for a Mine planning process ?
8. What are all different geological information required for a Mine planning ?
9. Explain various equipment associated with a Longwall mining method ?
10. Brief about CTO (Concern to Operate) and CTE (Concern to Establish) ?

**PART- B (5x 13=65 Marks)**

(Restrict to a maximum of 2 subdivisions)

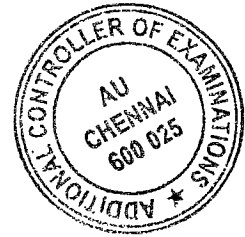
1. Answer the following:

- a. Describe the stages of Project Evolution from Exploration stage upto approval by Board of Directors?
- b. Describe about Capital cost and impact in the project costing ?

(OR)

Answer the following:

- a. Explain approval process of a project of worth more than 500 Cr by Govt ?
- b. Explain about Operating Cost with examples in Project budgeting ?



2. Answer the following:

- a. Explain 4 different mine planning ranges ?
- b. What are the different pre-requisites of Mine planning.

(OR)

Answer the following:

- a. Explain influence of direct factors in a Mine planning process from conceptual to Long range mine plan ?
  - b. What are all different components of Costing of a project or financial inputs?
3. What are suitable geo-mining parameters and conditions for introducing continuous miner technology, Longwall technology and Blasting gallery method?

(OR)

What is Mine closure plan? How it is being executed in a opencast mine? What are all its implications and impact in mine planning process ?

4. Explain about financial viability of a green field project with details of various statements? Explain in details about 3 critical ratios ?

(OR)

Explain about project management in general and why it is important in mine planning process?

5. Explain about Water fall and Agile method of project management and how they makes difference in project execution. How can we implement these process for planning of a new mining project ?

(OR)

What are all various approvals and clearances which are to be acquired for any green field projects in India?

### **PART- C (1x 15=15 Marks)**

(Q.No.16 is compulsory)

A green field coal project is planned for mining as below:

1. Coal seams:
  - 5 coal seams with thickness of seam-I is 9m , Seam-II is 5.5m, Seam-III is 1.2m, Seam-IV is 4.5m and seam V is 3.5m
2. Gradient
  - Gradient of all seams is varying between is 1 in 6 to 1 in 8 .
3. Overburden and inter-burden (Partition) :

Surface to Seam-I	65m
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Seam-I to Seam-II	25m
Seam-II to Seam-III	15m
Seam-III to Seam-IV	18m
Seam-IV to Seam-V	50m

4. GEOLOGICAL AND GEOTECHNICAL Information:

- Property is having minor faults ranging between 1 to 2.5m
- Expected RMR is 55 of Sandstone roof
- Roof is a mix of fine and coarse grained sand stone.
- Floor is medium grained sandstone
- Roof assumed to be easy to moderately cavable

5. Other critical information:

- Owner obtained mining lease for the area 4 km strike length and 2 Km Dipping distance (Total 8 Sq.KM)
- EMP and Forest clearances obtained.
- The owner acquired entire land in the mining area and looking for another 2000 Ha land @ Rs.2.5 Lakhs per acre for dumping of overburden in case Mine planner suggest Open pit mining.
- No Forest land involved in the mining area.
- Sale price of coal per tonne is Rs. 4500

Being a Mine planner suggest the following:

1. Suitable method of mining ?
2. Mine ventilation, Roof supporting, Men transport system ?
3. Coal evacuation system ?
4. Equipment planning for coal excavation or depillaring ?
5. Life of mine with Annual rate of production ?
6. Project costing ?
7. Project viability ?

