

SUBJECT B 1 : MINING TECHNOLOGIES (MINING I)

(Separate papers for metal & coal - priorities determine)

A. Setting up a mine

1. Surface structures and their location - shafts, offices, hostels, stores, compressors, magazines, treatment plant, fans, dumps, etc.
2. Infrastructure - water, housing, roads etc.

B. Mining operations and practices

1. Elements of mining - producing a saleable product
2. Access to ore bodies - shafts, shaft design, shaft sinking (economics), adits main development layout and design (various types of ore body). Service excavations e.g. pump chambers, settlers.
3. Exploitation of an ore body - various *general* approaches for different types of ore body (tabular, wide seam, massive, deep, shallow, surface, flat, steep).
Mining methods and layouts
Mine design
4. Rock breaking (also covered in rock mechanics).
Explosives - all types, application and use (including surface and coal).
Explosives terminology
Drilling and drills including pneumatic, electric, hydraulic, diamond
Mechanical breaking, various machinery in *standard* use
Tunnel boring and raise boring - techniques and application
Ore accounting
Costing of – stoping, development, services (traming/hoisting), infrastructure (capital), IRR, NPV'S.
5. Support - general interrelationship of support methods with mining method (*NB - detail as covered in rock mechanics*).
6. Transport methods for men, material and mineral - primary and secondary - alternatives in *current* use applied to various methods.
Factors affecting cost effectiveness and selection of various methods in normal use (Underground), shafts, surface).
Safety aspects of transport and especially in shafts (application of legal requirements).
Shaft station layouts as well as shafts bottom and skip loading
General view of shaft sinking and equipment.
7. General rules of thumb statistics for mining and mine design
Efficiencies, production, records, etc. especially gold mining.
8. Design, construction use and maintenance of slimes dams
Pollution aspects
9. Opencast mining

C. Suggested reference literature

Selected technical literature e.g. Mine managers, SAIMM publications.

NOTE: *Safety will be an integral part and candidates will be expected to incorporate elements of safety in their answers.*