

Mining syllabus

Every examinable topic area in WAEC Mining, in one place — with how the papers are structured and answers to common questions. Compiled by waeccbt.com; not an official WAEC document.

How the papers work: Two papers, both compulsory, taken as a composite paper at one sitting lasting 2 hours 45 minutes. Paper 1: 40 multiple-choice objective questions, 40 minutes, 40 marks. Paper 2: Section A — 10 short structured questions covering the whole syllabus, all compulsory, 40 minutes, 40 marks; Section B — five essay questions of which candidates answer three, 1 hour 25 minutes, 60 marks. Field work (excursions to mines, quarries, refineries, tailings sites) is assessed in school and counts for 40 per cent of the continuous assessment forwarded to WAEC. This bank practises Paper 1 and the knowledge behind Paper 2.

1. Introduction to mining

- Meaning and branches of mining; mining terminology
- Classification and importance of minerals; distribution of minerals in Nigeria
- History of mining and mining activities in Nigeria; importance of minerals to man and the national economy
- Mineral markets and cartels; mine accounting and sources of finance for mining ventures
- Nigerian Minerals and Mining Act 2007; acquisition of mining titles (reconnaissance permit, exploration licence, small-scale mining lease, mining lease, quarry lease)

2. Basic geology

- Definition and scope of geology; relationship between geology and mining
- Structure of the Earth: crust, mantle, core; relative abundance of elements in the crust
- Economic mineral potentials of Nigeria
- Rocks and rock types: igneous, sedimentary, metamorphic; rock-forming minerals and their physical and chemical properties
- Rock cycle; weathering
- Geological map and mineral map of Nigeria; collection of geological data; interpretation of topographical and geological maps; simple geological cross-sections

3. Stages of development in mining

- Classification of mining methods: surface and underground; reasons for choice of method; comparison and justification
- Prospecting stage: geological, geophysical, geochemical and remote-sensing techniques
- Exploration stage and classification of exploration techniques
- Feasibility study; financial analysis in mining
- Mine development, mineral processing design, mill design, exploitation; unit operations in mining (drilling, blasting, loading, hauling)
- Need for and benefits of mineral processing; unit operations in mineral processing
- Metal extraction: pyrometallurgy (smelting), hydrometallurgy and electrometallurgy

4. Mining methods

- Surface mining: open pit (features, minerals mined), open cast, quarrying and dimension stone production (products, uses, unit operations, flow sheet), alluvial mining
- Underground mining: features of an underground mine; room-and-pillar, longwall, square setting, cut-and-fill, shrinkage, sub-level, long-hole, block caving
- Sea-floor mining; moon and asteroid mining
- Materials handling equipment: conveyor belt, trucks, pay-loaders

5. Introduction to mineral processing

- Meaning of mineral processing; comminution, concentration and mill accounting terms
- Properties used in separation: specific gravity, magnetism, surface properties, colour, electrical conductivity
- Main operations: comminution (crushing, grinding) and concentration (gravity, magnetic, flotation)
- Products: concentrate, tailings, middlings; dewatering; auxiliary operations; tailings disposal

6. Gemology and lapidary

- Meaning of gemology and lapidary
- Machines and tools: faceting, grinding and polishing machines
- Properties and types of gemstones by shape, colour, size and refractive index
- Identification and quality of gemstones; unit of measurement (carat); pricing and marketing

7. Health, safety and environment

- Health hazards in mining; common diseases (silicosis, pneumoconiosis, noise-induced hearing loss)
- Safety requirements and measures; personal protective equipment
- Impacts of mining on the environment; steps for environmental control; accident reporting guidelines; simple first aid
- National policy on mineral development; mining laws and regulations; environmental protection laws; national policy on the environment

Frequently asked questions

How is WAEC Mining examined?

Two compulsory papers at one sitting lasting 2 hours 45 minutes in all. Paper 1 is 40 objective questions in 40 minutes (40 marks). Paper 2 has Section A with 10 compulsory short structured questions in 40 minutes (40 marks) and Section B with five essay questions of which you answer three in 1 hour 25 minutes (60 marks).

Is there a practical paper?

No written practical. Field work through excursions to mines, quarries, refineries and tailings sites is assessed in school and forms 40 per cent of the continuous assessment score sent to WAEC.

Which mining methods must I know?

Surface methods — open pit, open cast, quarrying and dimension stone, alluvial mining — and underground methods — room-and-pillar, longwall, cut-and-fill, shrinkage, sub-level, square setting, long-hole and block caving — plus sea-floor and space mining in outline.

What geology is included?

Structure of the Earth, abundance of elements in the crust, the three rock types, rock-forming minerals and their properties, the rock cycle, weathering, Nigeria's geological and mineral maps, and reading topographical and geological maps and cross-sections.

What does mineral processing cover?

Comminution (crushing and grinding), concentration using specific gravity, magnetism and flotation, the products (concentrate, tailings, middlings), dewatering and tailings disposal, plus metal extraction by smelting, hydrometallurgy and electrometallurgy.

Which Nigerian law is examined?

The Nigerian Minerals and Mining Act 2007 and the mining titles it creates (reconnaissance permit, exploration licence, small-scale mining lease, mining lease, quarry lease), together with national policy on mineral development and environmental protection laws.

What calculations come up?

Grade and recovery in mineral processing, specific gravity, stripping ratio, tonnage from volume and density, carat weights of gemstones, and simple mine accounting such as revenue, cost and profit.

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