INTRODUCTION

The Canadian Engineering Qualifications Board of Engineers Canada issues the Examination Syllabus that includes a continually increasing number of engineering disciplines.

Each discipline examination syllabus is divided into two examination categories: compulsory and elective. A full set of Mining and Mineral Processing Engineering examinations consists of nine, three-hour examination papers. Candidates will be assigned examinations based on an assessment of their academic background. Examinations from discipline syllabi other than those specific to the candidates’ discipline may be assigned at the discretion of the constituent association.

Before writing the discipline examinations, candidates must have passed, or have been exempted from, the Basic Studies Examinations.

Information on examination scheduling, textbooks, materials provided or required, and whether the examinations are open or closed book, will be supplied by the constituent association.

MINING AND MINERAL PROCESSING ENGINEERING EXAMINATIONS

GROUP A

COMPULSORY EXAMINATIONS (SIX REQUIRED)

18-MMP-A1 General Geology and Exploration

Mineralogy, determination and identification of minerals, with emphasis on ore minerals, Structures and forms of orebodies; processes for the formation of ores; classification of ores; definition of reserves and resources Petrology. Structural geology. Internal and external geologic processes. Structure and strategy of exploration programmes, exploration geochemistry, devising drilling/trenching programmes, surveying techniques and remote sensing.

18-MMP-A2 Underground Mining Methods and Design

Description and usage of the following underground mining methods: room and pillar, long-hole, longwall, open stoping, shrinkage, cut and fill sub-level stoping, timbered stoping, top slicing, underhand and overhand stoping, block caving, sublevel caving, and vertical crater retreat. Requirements for development and services including: shafts, hoists, ramp and multi-level access design. Design of pumping, ventilation, compressed air and power facilities. Underground design including: stope development, haulage systems, backfill, equipment selection, and scheduling of development and operations. Capital and operating cost estimation associated with underground mining activities.

18-MMP-A3 Mineral Processing

Material balances. Measures of efficiency of mineral separations. Sampling systems and sampling errors, use of Gy's equation. Particle size measurement and presentation of results. Mineral liberation by crushing, grinding, screening, and classification. Mineral concentration using gravity, dense medium, magnetic and high-tension separators. Froth flotation and flotation circuits. Use of reagents — collectors, frothers, depressants, and activators. Dewatering techniques — thickening, filtering, drying, flocculants,
and filter aids. Flowsheet analysis emphasizing Canadian mineral processing plants.

18-MMP-A4  Mine Valuation and Mineral Resource Estimation

Aspects of geological conditions and control relating to mineral resource estimation. Principles of mineral resource estimation using conventional and geostatistical methods. Aspects of mine valuation - assessment of market conditions, capital and operating cost estimation, estimation of revenue including smelter contracts, taxation, cash flow, sensitivity and risk analyses, and economic optimisation of mine development and extraction variables including cut-off grade, installed capacity utilisation and sequencing.

18-MMP-A5  Surface Mining Methods and Design

Cyclic and continuous surface mining methods including strip mining, open pit mining, (dragline, bucketwheel excavators, truck and shovel and dozer methods), hydraulic mining and dredging. Design criteria for surface mines including scheduling, material removal and capacity-rated equipment-sizing, availability and utilization calculations, slope design, stripping ratio, materials handling, pit ramp and waste dump design, pit dewatering and land reclamation. Capital and operating cost estimation associated with surface mining activities.

18-MMP-A6  Mining and the Environment

Overall understanding of environmental practices in mining including; waste rock and tailings disposal systems; prediction/prevention/treatment/control of acid rock drainage; control of dust/noise/gaseous emissions; environmental impact assessment (EIA) processes; environmental effects monitoring (surface water and groundwater); reclamation and decommissioning; government regulations relating to environmental protection in design/operation/closure of mines; sustainable development principles and application to mining; risk assessment and management principles with respect to the environment.
GROUP B

ELECTIVE EXAMINATIONS (THREE REQUIRED)

18-MMP-B1 Applied Rock Mechanics


18-MMP-B2 Rock Fragmentation

Principles and technologies of cutting, drilling, boring, and blasting, including vibration and shock effects. Explosives, including properties and classification, selection of chemical explosives and explosive mixtures, regulations and approved procedures for handling, storing, loading, and detonating. Blasting design, including detonators, delay systems, control blasting methods. Vibrations monitoring and blasting methods for vibrations control.

18-MMP-B3 Material Handling


18-MMP-B4 Occupational Health, Safety and Loss Management

Control and detection of hazards in surface and underground mines: rock falls, slope failures, radiation, heat, noise, dust and gas. Ventilation requirements for underground mines, air flow through mine openings, air quality and control. Workplace health and safety. Industrial hygiene in mining environment. Risk analysis, risk management, loss prevention and control.

18-MMP-B5 Mill Design and Operations


18-MMP-B6 Mill Process Control

Basic process control and analysis: PID (Proportional-Integral-Derivative) loops, feedback, feed forward, cascade, interacting control systems, data acquisition, control loop monitoring and control network technology (fieldbus, wireless, security). Controller settings — analytical and loop-tuning techniques. Computer control: modelling, adaptive, and supervisory. On-stream analysis and sampling for control; strategies for control of crushing, grinding, flotation, and dewatering circuits. Instrumentation for bin and
sump level sensing, solids and slurry flow rates, pulp density, power draw, reagent addition, pH measurement. Alarm and interlock systems, sequencing problems. Benefits and justification of automatic control.

18-MMP-B7   Extractive Metallurgy (16-Chem-B7 Extractive Metallurgy)


18-MMP-B8   Mine Management and Systems Analysis


18-MMP-B9   Rock Slope Engineering