

Mak-32.317 APPLIED ROCK MECHANICS FOR HARD ROCK MINING
Examination 18.10.2004, 9:00 - 12:00, Hall V1

Part 1, questions without course material

1. In Nicholas mining method selection, a value of -49 indicates a characteristic which will almost completely eliminate consideration of a method. For thick orebody (30 - 100 m), a value of -49 is defined for Room and Pillar Mining. Explain the reasons for this low ranking. (12 p)

2. a) Explain the three modes of support of mine backfill. (9 p)

- b) Why it is advantageous to fill the stopes as completely as possible? (3 p)

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Part 2, questions with course material

3. A stope with rectangular cross-section, with vertical walls and horizontal roof is planned in the depth of 400 m. The stope width is 18 m, height 27 m and length 60 m. The rock is gabbro-type, coarse grained with density of 3300 kg/m^3 . The in-situ horizontal/vertical stress ratio is 2 and the longitudinal axis of the stope is to the north. There are three joint sets (dip direction/dip):
- 250/55
 - 80/45
 - 350/20

Joint surfaces are planar, rough and slightly altered. Joint spacing is about 0.5 m and length is 1-2 m. Only minor local groundwater inflow has been observed. The RQD is 92%. The UCS for intact rock samples is 70 MPa.

- a) Estimate the stability of roof and sidewalls with Stability Graph -method. In this case, you can omit the short endwalls of the stope. (18 p)
- b) Design the cablebolting for the roof and sidewalls, if needed. (6 p)
- c) Calculate the modulus of elasticity, Poisson's ratio, uniaxial compressive and tensile strength, cohesion and friction angle of the rock mass. (12 p)