

SECTION B

ANSWER ALL THE QUESTIONS IN A SEPARATE ANSWER BOOK/BEANTWOORD AL DIE VRAE IN 'N APARTE ANTWOORDBOEK

QUESTION 8 [25]

- 8.1 Provide a definition for a rock mass (5)
 8.2 Discuss the main types of discontinuities that occur in rock masses based on their geological origin. Explain why the origin of discontinuities may be important in rock mechanics. (15)
 8.3 Explain the difference between residual friction angle and basic friction angle. (5)

QUESTION 9 [25]

List the ten typical rock mass parameters that are described during a joint line survey and explain the importance of each parameter and also why accurate description of these parameters are of vital importance.

QUESTION 10 [25]

Joint line surveys for a new mine revealed three joint sets in the mining area:

Set 1	82/151
Set 2	67/035
Set 3	50/261

(Data presented as Dip/DDir)

Joint cohesion is estimated as 10 kPa and the joint friction angle at 20° for all joint sets. Rock unit weight is 25 kN/m³.

The mine proposes to establish three working faces as follows:

	DDIR	DIP
• Face A	326	20
◦ Face B	092	46
◦ Face C	248	64

Overall height 108 m.

Analyse the proposed layout for each type of failure and comment on the resulting factor of safety for each.

QUESTION 11 [25]

A joint set in a rock mass has the following properties:

Area of 100 m²

JRC = 10

Waviness = 9°

True cohesion = 120 kPa

Basic friction angle of rock material = 35°

Wall strength is 45 MPa. JCS

Calculate the force required to induce shear failure along the plane by means of the Barton & Chouby as well as Mohr-Coulomb equations at normal stresses of i) 10 kPa and ii) 5 MPa.

Compare the results obtained by the two methods and give reasons for possible differences if any.

- Barton → gives high values due to addition of waviness

σ_n low is rough
 σ_n med is waviness
 σ high ϕ_b

P_c
 K
 M
 G