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**Seventh Semester B.E. Degree Examination, Dec.2023/Jan.2024**  
**Open Pit Slope Analysis and Design**

Time: 3 hrs.

Max. Marks: 100

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

**Module-1**

- 1 Determine the factor of safety of the sliding block on a single discontinuity plane with a neat sketch. (20 Marks)

**OR**

- 2 a. Determine the critical depth of tension crack on the upper surface of the slope with a neat sketch considering the safety factor minimum. (12 Marks)  
b. The slope surface is cohesionless and the friction coefficient for both planes are the same. The block is defined by the angle between two planes ( $\xi = 55^\circ$ ); angle of inclination of bisection line ( $\beta = 60$ ) and dip of bisection line ( $\psi_i = 65^\circ$ ). The friction angle of the sliding surface is ( $\phi = 50^\circ$ ). (08 Marks)

**Module-2**

- 3 Explain in detail the various parameters to be considered for geotechnical investigation of slope stability. (20 Marks)

**OR**

- 4 Explain in detail the geotechnical data required for high wall slope stability studies with neat sketch. (20 Marks)

**Module-3**

- 5 a. Explain in detail the laboratory tests performed to find shear strength of intact rock with neat sketch. (12 Marks)  
b. Explain in detail Barton's criterion with neat sketches. (08 Marks)

**OR**

- 6 a. Explain in detail the filling features and conclusions made by Ladanyi and Archambault on filling discontinuities. (12 Marks)  
b. Explain in detail the triaxial test performed to find shear strength of intact rock with neat sketch. (08 Marks)

**Module-4**

- 7 a. Explain in detail with neat sketch the open standpipe piometer used for monitoring water pressure with advantages and disadvantages. (10 Marks)  
b. Explain in detail with neat sketch, the pneumatic piometer used for monitoring water pressure with advantages and disadvantages. (10 Marks)

**OR**

1 of 2

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

- 8 a. Define permeability. Describe methods of measurement of permeability in field with neat sketch. (10 Marks)
- b. Draw a groundwater flow net of an open pit slope in rainy season. What purpose does it serves. (05 Marks)
- c. Determine equivalent permeability of a planner array of parallel smooth cracks for the following data where  $e = 0.1$  cm,  $b = 100$  cm. (05 Marks)

**Module-5**

- 9 Explain : (i) Ordinary method of slices.  
(ii) Janbu's simplified method.  
(iii) Bishop's simplified method.  
(iv) Janbu's generalized method.  
(v) Bishop's rigorous method.  
(vi) Sarma's method. (20 Marks)

**OR**

- 10 Explain in detail the deformation approach for analysis of slope stability. (20 Marks)

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