

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY
BE SEM-VII Examination-Nov/Dec.-2011

Subject code: 172205

Date: 29/11/2011

Subject Name: Rock Slope Engineering

Time: 10.30 am-01.00 pm

Total marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Discuss the basic principles of rock slope engineering for the open – pit mining slope stability. Add a note on Socioeconomic consequences of slope failures. **07**
- (b) Which geological parameters are used for the site reconnaissance and planning an investigation program to collect detailed design data for the rock cuts? **07**

- Q.2** (a) Why geophysical methods are used in the reconnaissance of a site investigation program? Discuss Seismic analysis of rock slopes. **07**
- (b) Explain load and resistance factor design method for rock slopes. **07**

OR

- (b) Explain Back analysis of slope failure. **07**

- Q.3** (a) Describe rock reinforcement techniques for the stabilization of rock slopes. **07**
- (b) Write down geometrical conditions for wedge failure. Explain Wedge failure analysis. **07**

OR

- Q.3** (a) Write down geometrical conditions for plane failure. Write a note on Reinforcement with tensioned anchors. **07**
- (b) Explain Bishop's and Janbu's method of slices for detailed stability analysis of circular failures. **07**

- Q.4** (a) Explain surface monitoring methods for rock slope movement. **07**
- (b) What is production blasting? List out required parameters to achieve the optimum results of blasting under all conditions. Add a note on precautions to avoid excessive backbreak and improve the slope stability with respect to production blasting. **07**

OR

- Q.4** (a) Explain Sub-surface monitoring methods for rock slope movement. **07**
- (b) Write a note on damage from ground vibrations by blasting. **07**

Q.5 (a) Discuss slope stability analysis, slope design and operational management in the case of deep – seated deformation in a weak rock mass. **07**

(b) A 12-m high rock slope has been excavated at a face angle of 60° . The rock in which this cut has been made contains persistent bedding planes that dip at an angle of 35° into the excavation. The 4.35-m deep tension crack is 4m behind the crest, and is filled with water to a height of 3 m above the sliding surface. Assuming that a plane slope failure is the most likely type of instability, analyze the stability condition and calculate the factor of safety of the slope. **07**

Where, the strength parameters of the sliding surface are as follows:

Cohesion, $c = 25$ KPa & Friction angle, $\phi = 37^\circ$

The unit weight of the rock is 26 kN/m^3 , and the unit weight of the water is 9.81 kN/m^3 .

OR

Q.5 (a) Describe slope design in a competent rock masses. **07**

(b) Explain circular failure analysis for the stability of a china clay pit slope. **07**
