This question paper contains 2 printed pages.

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Your Roll No.....

B.Sc. (Hons.)/III **A**

GEOLOGY - Paper XII (iv)
(Rock Mechanisms and Rock Engineering)
(Admissions of 2004 and onwards)

Time : 3 hours *Maximum Marks : 45*

(Write your Roll No. on the top immediately on receipt of this question paper.)

*Attempt any **five** questions.*
***All** questions carry equal marks*

1. What do you understand by "Index Testing" of rocks? Explain any two methods available for index testing with their limitations and significance.

2. Write short notes on any two of the following:
   (i) Intact Rock.
   (ii) Shear strength of rocks.
   (iii) Computation of Tensile strength.

3. Discuss in brief the principle of rock mechanics and rock engineering.

4. What is "Rock Mass Rating"? How this concept is arrived at and what does it signify in terms of rock mass strength?

5. What do you understand by Hock-Brown Failure criterion? Explain in detail.

6. Explain briefly any two of the following,
   (i) Rock Quality Designation.
   (ii) Mohr's Circle for stress
   (iii) Standardization of sample dimensions for rock mechanical testing.

7. In how many ways the compressive strength of a rock is determined? Under what conditions triaxial compressive strength test becomes imperative?

8. (a). A tunnel is to be driven (against the dip) normal to the strike of moderately jointed (Dip amount 35^{o}) rock. The rock is hard. bedded and moderately faulted. The joint condition is good and the anticipated water inflow is nearly 1100gpm/1000ft of tunnel. Calculate its RSR and based upon this value suggest (i) the thickness of shotcreting and (ii) type of support required

(b) Joint spacing data on a 1:15 scale is given in the table. Calculate its RQD.

Joint No	Spacing from Origin (cm)	Joint No	Spacing from Origin (cm)	Joint No	Spacing from Origin (cm)
1	0.6	11	8.9	21	22.1
2	1.4	12	12.6	22	24.6
3	2.2	13	13.1	23	24.9
4	4.1	14	16.0	24	25.8
5	4.3	15	16.4	25	26.4
6	4.7	16	16.9	26	28.0
7	5.9	17	18.7	27	28.3
8	6.1	18	20.0	28	28.9
9	6.9	19	21.0	29	29.7
10	7.3	20	21.6	30	30