

Name:

Enrolment No:



UPES

END Semester Examination, May 2023

Programme Name: B.Sc., Hons in Geology

Semester : VI

Course Name : Engineering Geology

Time : 03 hrs.

Course Code : PEGS-3033

Max. Marks: 100

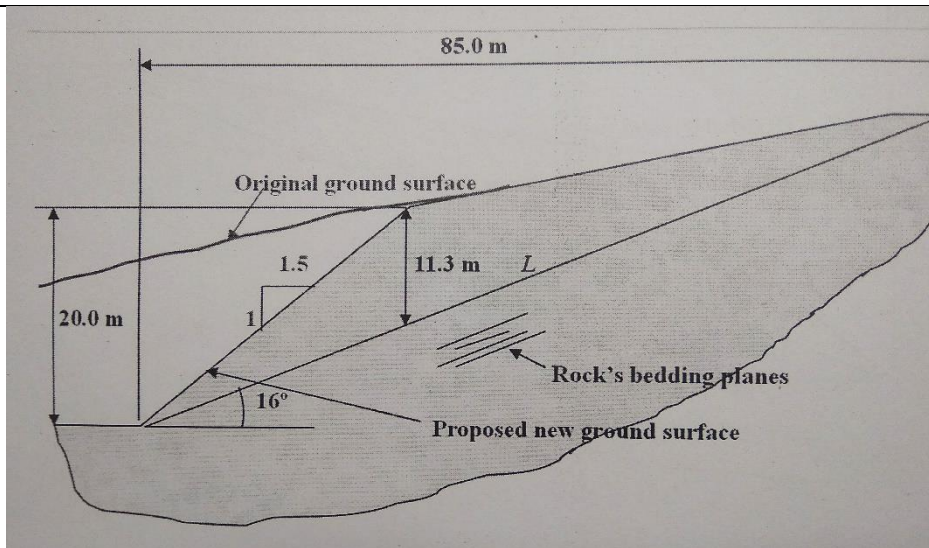
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Instructions: In section A all the questions are compulsory and In section B and C internal choice in Q.9 a OR b, Q.10 i OR ii, iii and Q.11 a OR b, c, d

SECTION A = 20 Marks

S. No.		Marks	CO
Q 1	Distinguish between the following terms: a) Bulk density and Submerged density b) Effective porosity and Total porosity	4	CO2
Q 2	Read the statement carefully and tick the correct answer (T or F)	4	CO1
	1 The upstream face of a gravity dam is always vertical. T F		
	2 The Z shape is the shape of valley usually preferred for a reservoir. T F		
	3 The class A earthquakes are most destructive. T F		
	4 The removal of overburden in soil causes expansion. T F		
Q 3	Discuss in brief the role and significance of following terms in engineering geology. A) Permeability B) Porosity.	4	CO2
Q.4	Fill in the blanks with a suitable answer. I. The branch of geology which deals with study of uppermost layers of earth's crust is known as..... II. Large magnitude or sudden events that modify the pre-existing landscapes is known as..... III. The Surface is the character of the surface of shear in hard, brittle and coherent mass. IV. The.....Earthquakes originating due to volcanic eruptions or landslides.	4	CO2
Q 5	Choose and tick the correct answer for the following MCQ	4	CO1
	1 The fracture interference is a unique function ofshear a) Normal stress b) Shear stress c) Both A & B		
	2 The shear strength of rock is a function of..... a) Cohesion b) Dilatancy c) Both A & B		
	3 The propagation of shear wave velocity in rock increase with.....pressure a) Increase b) Decrease c) Constant		
	4 The grouting activity is carried out for decreasing..... a) Seepage pressure b) Temperature c) None of these		

SECTION B = 40 Marks			
Q 6	Justify the role of Terzaghi classification of rocks in context with geotechnical engineering.	10	CO3
Q 7	Discuss in brief the various types of strength in context with advantage and disadvantage in geotechnical engineering.	10	CO3
Q.8	Describe the following term's role and significance in context with geotechnical engineering. i) Stress ii) Strain iii) Bearing capacity.	10	CO4
Q 9	a) Justify the classification of shallow foundation and their limitation and significance during foundation engineering. OR b) Critical view on classification of deep foundation and their merits and demerits in foundation engineering.	10	CO4
SECTION-C = 40 Marks			
Q 10	i) Analyze the following terms very essential during different geotechnical design and construction. a) Soil stabilization b) Retaining walls c) Settlements d) Waterproofing OR ii) Three boreholes are sunk at SW, SE, & NW corner of square level ground; the each side of corner is 500 mts long. The boreholes are A, B & C respectively. The bore hole at 50 mts, Y at 150 mts and Z at 200 mts meet the coal seam respectively. Determine the attitude of the coal seams and fourth borehole P is proposed at NE corner of the square level ground, determine at what depth the borehole P encounters the coal seam. Scale 1: cm 100m and 1:cm to 1 unit (Gradient) iii) The given strike and true dip of N 60° E, 42° SE . Find the apparent dip in vertical section trending S65°E . (Both numerical and Graphical methods).	20	CO5
Q.11	a) Describe and evaluate the role of following rock mass analysis in context with geotechnical engineering. A) RMR b) RQD c) Q system d) RSR OR b) Determine the factor of slope safety for proposed plan shown in the figure. Slope cut= 1:5 H:1V	20	CO6



Apparent dip is 16°

Acceptable FS= around 2

Unit weight = 20.1 KN/m^3

$C = 22 \text{ kpa}$

Friction angle = 30°

- c) A strip footing of width of 3m with depth at 2m below the ground surface in a (C-0) soil shows Friction and cohesion is 35° and 30 KN/M^3 . The water depth of 5m below the ground and moist unit weight of soil is 17.25 KN/M^3 with factor of safety 3. Determine the following Ultimate bearing capacity, Net bearing capacity and Net allowable bearing capacity. Assume $N_c=57.8$, $N_q=41.4$ and $N_\gamma=42.4$.
- d) The sandstone column is measured 4m long and 0.5m diameter, it carries a load of 80MN. Given the modulus elasticity is 300GPA. Calculate the compressive stress - strain and how much the column of sandstone is compressed.