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THE OPEN UNIVERSITY OF SRI LANKA
Department of Civil Engineering
Bachelor of Technology (Civil) - Level 5

CEX5232 – Engineering Geology

FINAL EXAMINATION – 2010/2011

Time Allowed: Three (03) Hours

Date: 2011 - 03 - 01 (Tuesday) Time: 0930 - 1230 hrs.

Answer Five (05) questions out of Eight (08) questions. Answers should be illustrated with sketches and diagrams with assumptions stated, clearly and neatly

(Q1) Majority of the Sri Lankan crust are composed of metamorphic rocks. As Civil Engineers, we should be well aware of the characteristics and its engineering properties.

(i) Explain briefly the 'agents of Metamorphism'.
(ii) Classify the types of metamorphism and explain briefly three (03) types.
(iii) How do you explain the 'texture of a metamorphic rock' and write down the chages in textures with increasing the temperature of metamorphism, giving examples of each four (04) categories .

(Q2) Weathering phenomenon not only causes the change of physical properties but also it largely alters the engineering properties of rocks.

(i) Name three (03) types of chemical weathering processes and provide at least one (01) example for each type.
(ii) Write down four (04) factors that govern the formation of soils.
(iii) Differential weathering is caused by different mechanical properties of bed rock.State and briefly explain the three (03) types of weathering features that can be observed in bedrock attacked by the weathering process

(Q3) When carrying out large scale construction projects, the structural features, their behaviour under different loading conditions and possible effects to these by the construction process plays very important role.

(i) Briefly explain meaning 'folds' in structural geology
(ii) Name the main components of a fold with the help of neatly sketched diagram.
(iii) Briefly explain meaning 'fault' in structural geology and name the main components of a fault with the help of neatly sketched diagram.

(Q4) Write short accounts on the following,

(i) Shale
(ii) Marble
(iii) Domes and Basins
(iv) Transmissibility
(v) 'Q' system of rock mass classification.

(Q5) Thorough understanding about the groundwater flow is essential in determining the geotechnical behaviour of subsurface.

(i) State and briefly describe about Four (04) sources of groundwater.
(ii) What is an aquifer? What type of rock would make a good aquifer?
(iii) Differentiate the characteristics between 'confined aquifers' and 'unconfined aquifers'
(iv) Draw a simple sketch that shows how artesian conditions form in an aquifer

(Q6) As civil Engineers, it is highly desirable to have a proper understanding about the subsurface engineering geological conditions before carrying out any construction on rocks.

(i) State five (05) engineering geological conditions that would be considered in carrying out a construction on a rock formation.
(ii) Briefly discuss about the effects of dip the founding rock of a dam with the help of neatly sketched diagrams.
(iii) Briefly discuss about the effects of dip of the underlying rock of a cut-slope in road construction with the help of neatly sketched diagrams

(Q7) Planning of Geotechnical Investigations is essential in order to obtain the required geotechnical data in an economical manner.

(i) State and briefly describe about the main stages of any geotechnical investigation program.
(ii) State Five (05) factors that govern the geotechnical investigation plan.
(iii) State three (03) factors that determine the depth of the investigations that will proceed into the subsurface.

(Q8) Subsurface exploration is one of the direct method of obtaining subsurface geotechnical information parameters.

(i) State and briefly describe about three (03) excavation methods of exploration.
(ii) Write a short account on the method of 'Wash Boring' employed in geotechnical investigation work
(iii) State Five (05) factors that determine the employment of specific boring method for geotechnical investigation work.