

NAME: _____ Student number: _____

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Department of Geology
University of Pretoria

ENGINEERING GEOLOGY GLY 363

SEMESTER TEST

May 2008

Question 1 [75]

Complete the attached table.

Question 2 [5]

List and discuss in short one effect of the Post-Gondwana geomorphological history of the South African subcontinent on the engineering geological characteristics of the Chuniespoort Group.

Geomorphological history – series of erosion cycles.

Each erosion cycle started with tectonic uplift and then a long period of weathering and erosion

Chuniespoort Group = chemical sediment of Transvaal Supergroup

Mainly dolomite with intercalated chert

Chemical weathering result in dissolution and create cave systems below groundwater level

Tectonic uplift lowered the groundwater levels

Exposed caves and solution cavities = receptacles

Internal erosion remove soils from overburden into open cavities

Cause sinkholes/subsidence

TOTAL [80]

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Stratigraphic Unit	Occurrence in SA [2ea]	Petrology [4ea]	Nature of material (bedrock and residuum) [4ea]	Anticipated engineering geological properties [5ea]
1. Strubenkop Formation	Pretoria Group Area surrounding Bushveld	Shale Fine-grained Fissile Clay and quartz	Bedding & intercalated sandstone Dip towards BIC Clayey soil – thin N < 5 to N >5	Expansive Slope instability Low permeability Flooring – indurated Road construction
2. Johannesburg Granite Dome	Midrand Between Pretoria and Johannesburg	Quartz Feldspar (orthoclase) Biotite & amphibole Coarse grained	Sandy soil Jointed – corestones Variable bedrock surface N < 5	Leached – collapsible Corestone – excavation Construction material Good foundation (shallow rock) Perched groundwater
3. Giyani Greenstone Belt	Limpopo Province Giyani Between Louis Trichardt and Kruger Park	Amphibolite (greenstone) Schists Mafic – amphibole, biotite, chlorite	Clay anisotropic variable weathering depths foliated N < 5	Foliation Slope instability Shallow soils Expansive clay Strength anisotropic
4. Central Rand Group	Johannesburg CBD Witwatersrand Supergroup	Quartzite (sandstone) Quartz (recrystallized) Cement Intercalated mudrock	Thin sandy soil/ sometimes deep Shallow competent rock Bedding planes (dipping) Economic importance N < 5	Good foundation Strong rock, low shrinkage Concrete/roads – pyrite! Mining subsidence Seismicity/pollution
5. Prieska Copper Mines Member	Northwestern Cape Prieska Southeast of Upington	Quartz Feldspar (orthoclase) Biotite & amphibole Coarse grained	This sandy gravel Corestones Jointed N > 5	Shallow soil good foundation Good construction material Excavation difficulty