

NAME: \_\_\_\_\_ Student number: \_\_\_\_\_

Signature: \_\_\_\_\_

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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.

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Geomorphological history – series of erosion cycles.

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

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Chuniespoort Group = chemical sediment of Transvaal Supergroup

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Mainly dolomite with intercalated chert

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

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Tectonic uplift lowered the groundwater levels

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Exposed caves and solution cavities = receptacles

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Internal erosion remove soils from overburden into open cavities

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Cause sinkholes/subsidence

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**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