SUBJECT A 1 : GEOLOGY

1. Introduction:

Why study Geology?
Local geological structures: faults (loss and gain), thrusts; sedimentology: coal beds, gold-bearing conglomerates; unconformities: reefs pinching out or not present at all (HW-FW conditions); channels, value distribution and determination; ore reserve evaluation; exploration, rock strengths and stabilities etc.

2. South African major economic deposits

Gold, platinum, coal and diamonds: review of each type of deposit – indicate economic significance, reserves known, value to the GDP, people employed, effect on/to the local community; change in significance of each commodity (gold decreasing as platinum increases); future prospects for each commodity etc.

3. The formation and occurrence of the "Big Four"

a) Gold: primary and secondary (detrital), associated rock types, localities where exploited – presently and in the future; by-products etc.

b) Platinum: PGM's; the Bushveld Complex, by-products, localities where exploited.

c) Coal: origin of the coal deposits; variation in types of coals; rank; fuel ratio etc.; localities where exploited.

d) Diamonds: different types of deposits: pipes, fissures, alluvial (beach, rivers), marine; host rock type: properties, characteristics; diamond varieties: gem and rough quality, localities where exploited etc.

4. Associated petrology and mineralogy

Identification of associated rock types with/for each commodity's deposit (quartzites, shales, kimberlites, dolerites, lavas, oxides and sulphides etc.)

5. Structural geology

Basic/common geological structures: faults, fractures, fissures, folds etc. with resultant mining problems; rock engineering: rock strengths, stability; rock falls and collapses; strike and dip: measurements (true and apparent); sub-outcrops etc.

6. Geological maps

Surface and underground maps; value contour plans; delineation of payshoots; structure plans and overlays: symbols, cross sections etc.; interpretation of these maps; reliability of information on these maps; need for constant updating of these plans.

7. Role of the geologist on a mine

Mapping; planning and evaluating the deposit; sorting of problems; keeping the mine in cover (from water and methane); liaison with survey, rock mechanics etc.; accident investigations and reporting; frequency of underground visits; conditions of employment (no production bonus).

8. Action to be taken with geological problems

Procedures to be implemented: samples, face sketches, peg distances etc.; reporting of problems; planning meetings; stope scrutinies etc.

9. Suggested reading

"South African Geology for Mining et al." Lurie, J.