

**Model answer of Examination of The Basement rocks of Egypt (336 G) for the
 Third level students (Special Geology & Geochemistry), Jan., 2017.**

Answer three questions only from the following.

**1- Compare between G₁ and G₂ granites according to the classification of the
 Egyptian granites by Hussein et al. (1982)? (16 Marks)**

G ₁	G ₂
All fall in the calc-alkaline field	All fall in the calc-alkaline field
Associated with island arc andesites.	Formed under compressional environment
Formed under compressional environment	
I-type magnetite series granites	S-type, ilmenite series granite
Form large intrusions	Form small plutons
Range from diorite to granites in composition	Always granitic in composition
Hornblende is always dominant over biotite	Contain biotite rather than hornblende
Muscovite is not recorded	Two micas is present
Don not contain cordierite, garnet, andalusite or silliminite but contain allanite and sphene	Accessory minerals are monazite, zircon and casseterite. Garnet may be orient and ilmenite represent the iron oxides occur.
Sio ₂ content dominantly range from 65% or less	Sio ₂ content dominantly range from 65% or above.
Molecular Al ₂ O ₃ / (nao+K ₂ O+cao) is less than 1.1.	Molecular Al ₂ O ₃ / (nao+K ₂ O+cao) is equal or more than 1.1.
Na ₂ O content is usually higher than 3.2%.	Na ₂ O content is usually lower than 3.2%.
Most of them have normative diopside; otherwise, they show less than 1% corundum.	Show normative corundum.
⁸⁷ Sr/ ⁸⁶ Sr are in range of 0.702-0.706	⁸⁷ Sr/ ⁸⁶ Sr are in range of 0.7061-0.7064
Nb content is very low, less than 10ppm	Nb content is rather high, more than 10ppm
REE content is less than 50 ppm	REE content is rather low

2- Explain the ophiolitic assemblages at Wadi Ghadir? (16 Marks)

The ophiolitic sequence of Wadi Ghadir consists from base to top serpentized peridotites, a gabbro complex, sheeted dykes and pillowed basalt. A thin unit of deeper water sediments composed mainly of cherts and carbonates caps the pillow basalts in several places. The ophiolites occur as allochthonous unit in a mélangé assemblages. The serpentized peridotite form either a huge allochthonous mountain-sized masses or boulders in the mélangé. The largest body is composed of leherzolite at the base and cumulate dunite and harzburgite at the top. Boudinage chromite lenses

form a zone separating the two peridotite. The serpentinites are transformed into talc-carbonate rocks in many places.

The gabbro complex is distinctly layered at the bottom and grades upward into coarse-grained rosette gabbro and then micro gabbro. Pockets of pegmatitic gabbro, pyroxenite cumulate, anorthosites and trondjemite are common in layered gabbro.

The sheeted dykes is formed of a series of diabase dykes in contact with each other without any foreign wall rock material.

The pillowed lava basalts are associated with the sheeted dykes they form a mass reaching 200m thickness. Individual pillows are circular or oval in shape and range in size from 20cm to 1.5m.

The mélange is a mapable rock unit characterized by the inclusion of fragments and blocks, both are exotic and native, of all sizes, which may reach several kilometers, embedded in fragmented and generally sheared matrix.

3- What is the differences between old metavolcanics (OMV) and young metavolcanics (YMG) based on the classification of Stern (1983)? (16 Marks)

OMV	YMG
Form thick mountainous of pillowed metabasalts.	Form moderately hills
The sediments interbeds are very rare	Pillow structure is nearly absent
Essentially composed of metabasalts	Mainly meta andesites
Always associated with metagabbros and serpentinites	Associated with metasediments with no genetic relation with ophiolitic metagabbros and serpentinites.
Absence of pyroclastic sediments	Associated with abundant volcanogenic metasediments
Highly deformed and metamorphosed	Less deformed and metamorphosed
Represents parts of ophiolitic assemblages.	Considered to have been evolved in an island arc tectonic setting.

4- Explain the general features of the Migif-Hafafit gneisses? (16 Marks)

The Migif-Hafafit gneisses were subdivided into six lithological units from top to bottom these are:

1. Hornblende gneisses
2. Biotite gneisses and schist
3. Psammitic gneisses
4. Biotite gneiss with intercalation of hornblende gneisses.
5. Hornblende gneisses
6. Granitic gneisses.

Good Luck