

FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA
SCHOOL OF PHYSICAL SCIENCES
DEPARTMENT OF GEOLOGY

SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BTECH (GEOLOGY), 2016/2017 SESSION
COURSE: GEL222 (OPTICAL MINERALOGY) **UNIT:** 3
DATE: 19TH OCTOBER, 2017 **TIME ALLOWED:** 2 Hours

Instructions: Answer question 1 and any other three questions of your choice. All questions carry equal marks.

- 1a. Define the term light.
 - b. Draw a good diagram to illustrate the process of refraction of light between two media and use your diagram in (1bi) above to define the following terms:
 - (i) Refracted ray
 - (ii) Incident ray
 - (iii) Angle of incidence
 - (iv) Angle of refraction
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- 2a (i) What is a petrological microscope?
 - (ii) Why is the microscope used in the Department of Biology not suitable for use in the Department of Geology.
 - b. Briefly explain how to observe the optical properties of minerals under plane and crossed polarised lights.
 - c. Explain the behaviour of white light on galena and olivine in thin section under the microscope.
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- 3a (i) Define a thin section.
 - (ii) Name any three materials/equipment and their functions in thin section preparation.
 - (iii) What is the required thickness of a mineral thin section?
 - b. (i) What is the reason for observing rock thin sections under the microscope?
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- 4a(i) What do you understand by birefringence?
 - (ii) Explain why quartz will show birefringence while fluorite will not show.
 - b. The velocities of light transmitted in a certain mineral are 5.25m/s^2 and 4.75m/s^2 respectively. If the velocity of light in air is 7m/s^2 , determine the birefringence of the mineral.
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5. Write short notes on the following types of twinning:
 - (i) Contact
 - (ii) Polysynthetic
 - (iii) Penetration
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6. Write an essay on optical indicatrix.