

(4)

- (f) What is birefringence? How can the birefringence of uniaxial crystal be expressed? Which section of uniaxial crystal shows zero value of birefringence? 3
- (g) What is interference colour? Why does isotropic mineral not show interference colour? 3
- (h) What is pleochroism? Do you need analyser for observing pleochroism? Justify your answer. 3

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Ex/UG/SC/GE/GEOL/TH/04/2019

BACHELOR OF SCIENCE EXAMINATION, 2019

(Chemistry/Geography/Mathematics/Physics)

(2nd Year, 2nd Semester)

Generic Elective (GE-4)

Rocks and Minerals

Time : Two hours

Full Marks : 50

Use separate answer-scripts for each part.

PART - I (25 marks)

Answer *all* questions,.

1. Write "True" or "False" : 1x5=5
- (i) Sill is a discordant structure of intrusive igneous rock.
 - (ii) Lustre is the colour of dust of any mineral.
 - (iii) Petrology deals with the study of rock.
 - (iv) Quartz naturally shows at least one set of perfect cleavage.
 - (v) Talc is harder than gypsum.
2. Write short notes on (any *two*) : 2.5x2=5
- (i) Triple Junction,
 - (ii) Tenacity of a mineral,
 - (iii) Transform Fault.

(Turn Over)

(2)

3. Answer any **three** of the following questions : $5 \times 3 = 15$
- (a) Define rock. How do sedimentary rocks form in nature ? $1.5 + 3.5 = 3$
 - (b) What is mineral? How do you measure the relative hardness of a mineral ? $1.5 + 3.5 = 3$
 - (c) What is Euler's Pole? How do you explain plate motion using Euler's Theorem ? $2 + 3 = 5$
 - (d) Discuss the characters of convergent plate boundaries. 5
 - (e) A mineral exhibits (111) cleavage plane. How do you get (111) plane ? Why is R-R-R triple junction always stable ? $3 + 2 = 5$
 - (f) Draw the internal structure of the Earth mentioning the discontinuities. What is Benioff Zone ? $4 + 1 = 5$

PART - II (25 marks)

4. Attempt any **two** questions. $2 \times 5 = 10$
- (a) Write a short note on the mineralogical composition of upper mantle rocks. Use a suitable diagram to illustrate the compositional variation of mantle rocks. 5
 - (b) How can the composition of average oceanic and continental crust be expressed? State the broad mineralogy of both the crustal rocks. 5

(3)

- (c) What is optical indicatrix ? draw neat sketches of optic axis sections of uniaxial indicatrix. How is the uniaxial indicatrix used to distinguish positive and negative crystals ? 5
 - (d) Why does a mineral section get extinct four times during full rotation of stage when viewing under transmitted optical microscope in crossed polars ? Justify your answer with necessary sketches ? 5
5. Attempt any **five** questions : $5 \times 3 = 15$
- (a) What is optically isotropic and anisotropic behaviour of medium ? Give one example for each isotropic and anisotropic crystal. 3
 - (b) State the genetic classification of rocks. Give one example for each type of rock. 3
 - (c) What are mineralogical composition of gabbro and granite ? Write the names of volcanic equivalent of gabbro and granite. 3
 - (d) "An isotropic crystal is remained dark throughout full rotation of microscope stage when it is viewed under transmitted light microscope in crossed polars". Justify the validity of the statement with reason. 3
 - (e) What is double refraction ? Write a mineral name that shows double refraction in hand specimen. 3

(Turn Over)