PART – II (20 Marks)

Answer any **two** questions.

All questions carry equal marks.

1. A pyroxene grain shows exsolution in two crystallographic directions. Can the pyroxenes in the host and lamellae show monoclinic symmetry? Justify your answer.

    "All types of euhedral pyroxene species develop basal (001) plane" — accept or reject the statement with reason.

2. What is BSE image? How is this image formed? Does a polished section of a Banded Iron Formation require carbon (or any other conductive) coating for the generation of a good BSE image? Justify your answer.

3. What triggers the polymorphic transformation of olivine? At what depth this polymorphic transformation occurs?

    Why does olivine commonly show euhedral crystal whereas quartz shows anhedral crystal in most of the natural rocks?

M. Sc. Applied Geology Examination, 2023

(1st Year, 1st Semester)

Mineralogy

Paper – CORE/TH/01

Time : Two hours   Full Marks : 40

(Use a separate Answer script for each Part)

PART – I (20 Marks)

Answer any **two** questions. $2 \times 10 = 20$

Use appropriate diagrams.

1. What is oxygen fugacity? Explain the petrologic importance of oxygen fugacity. $2 + 8 = 10$

2. Explain the spinel structure. What is inverse spinel? Give examples. Describe the effects of high pressure on wüstite. Write briefly about the sulfide mineralogy of the mantle xenoliths. $3 + 2 + 2 + 3 = 10$

3. Elaborate the equilibrium phase relations in the FeO-Fe_2O_3-TiO_2 join of the Fe-Ti-O system at different temperatures. What is trellis texture? $8 + 2 = 10$

4. Elaborate the equilibrium phase relations in the Fe-Ni-S system at different temperatures. What are the major phases that are stable in the Cu-Fe-S system at 600°C and 300°C? $7 + 3 = 10$

[Turn over