



‘সমানো মন্ত্র: সমিতি: সমানী’

UNIVERSITY OF NORTH BENGAL

B.Sc. Honours 5th Semester Examination, 2023

CC11-GEOLOGY

ECONOMIC GEOLOGY

Time Allotted: 2 Hours

Full Marks: 40

The figures in the margin indicate full marks.

1. Answer any **five** questions: 1×5 = 5
 - (a) Define the terms ore mineral and ore.
 - (b) What do you understand by orthomagmatic deposit?
 - (c) Why “porphyry Cu-deposits” are called “porphyry” Cu-deposits?
 - (d) What is a magmatic hydrothermal fluid?
 - (e) What do you understand by S-type and I-type granite?
 - (f) What is metamorphic deposit? Give example.
 - (g) What is the relation between Clarke value, cut-off grade, and enrichment factor?
 - (h) What is volcanogenic massive sulphide deposit?

2. Answer any **three** questions: 5×3 = 15
 - (a) What are quartz pebble conglomerate type uranium deposits? Why such deposits are generally restricted in rocks older than 2200 Ma? 2+3
 - (b) Using necessary sketch explain how contamination of a mafic magma by a silicic rock can produce chromitite layers? “Orthomagmatic deposit formed by gravitative settling is common in mafic/ultramafic igneous rock but not in felsic igneous rock”. Why? 3+2
 - (c) Using necessary sketch explain how water is dissolved in a silicate melt? “A felsic melt can dissolve more water than a mafic melt”—accept or reject the statement with reason. 3+2
 - (d) What are connate water and metamorphic water? Compare and explain the differences in the release of connate water during the burial of sand-dominated and clay-dominated sediments. 2+3
 - (e) Briefly discuss the factors which control the efficiency of crustal rocks as source of metals for hydrothermal fluids. What do you understand by congruent dissolution?

3. Answer any *two* questions: 10×2 = 20
- (a) Briefly discuss the mechanisms of formation of sulphide melt from a silicate melt. What is R factor? Using necessary sketches explain the role of R factor in the formation of PGE-rich and Ni-rich deposits associated with ultramafic rocks. 4+2+4
- (b) How does the alkaline, Mg-rich and SO_4^{2-} dominated seawater become acidic, Mg-poor and H_2S -rich (and SO_4^{2-} poor) as it percolates down the oceanic crust in the mid oceanic ridges? Using necessary sketches explain how metal zoning in VMS deposit can be explained by relative solubility of Cu and Zn. 6+4
- (c) Why bi-sulfidecomplexing is not an efficient mechanism of metal transport in most hydrothermal fluids? “Chlorinity of hydrothermal fluid plays an important role in the formation of Fe-rich or Al-rich minerals in skarn deposit”—accept the statement with reasons. Use necessary sketches in answering the above questions. 5+5
- (d) Describe the different zones formed in a well-developed profile of supergene enrichment. Using suitable reactions discuss how metals are dissolved in the gossan and deposited in the supergene enriched zone. Why Pb and Zn deposits rarely form supergene enrichment? 4+4+2

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