



'समानो मन्त्रः समितिः समानी'

UNIVERSITY OF NORTH BENGAL
B.Sc. Honours 5th Semester Examination, 2021

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 syngenetic and epigenetic deposits?
 - (c) What do you understand by orthomagmatic deposit?
 - (d) Why “porphyry Cu-deposits” are called “porphyry” Cu-deposits?
 - (e) What is magmatic hydrothermal fluid?
 - (f) What do you understand by S-type and I-type granite?
 - (g) Define cut-off grade and tonnage.
 - (h) Define the term metallogenic province.

2. Answer any **three** questions: 5×3 = 15
 - (a) Using necessary sketch explain how water is dissolved in a silicate melt? Explain why a felsic magma can dissolve more water than a mafic magma. 3+2
 - (b) Why U mineralization is genetically related to felsic igneous rock whereas Cr mineralization is related to ultramafic rocks? Why Au and Cr are known as early riser whereas Sn and W are known as late bloomer? $2\frac{1}{2} + 2\frac{1}{2}$
 - (c) Using necessary sketch explain how repetitive mixing of an evolved magma with a primitive magma can produce repetitive chromitite layers. 5
 - (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) What are quartz pebble conglomerate type uranium deposits? Why such deposits are restricted in Paleoproterozoic? 2+3

3. Answer any *two* questions: 10×2 = 20
- (a) What is R factor? Using necessary sketches explain the role of R factor and partition coefficients in the formation of PGE and Ni-sulfide deposits associated with ultramafic rocks. 2+8
- (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? What are the sources of ligands in VMS systems? Using necessary sketches explain how metal zoning in VMS deposit can be explained by relative solubilities of Cu, Pb and Zn. 4+2+4
- (c) 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 leached zone and deposited in the oxidized zone and supergene enriched zone. Why Pb and Zn commonly do not form supergene enrichment? 4+4+2
- (d) Discuss how repetitive fluid ingress and zone refinement can form metal zoning in VMS deposits. “Density and salinity of the hydrothermal fluid controls whether mineralization in volcanogenic system will be proximal, tabular and high grade or distal, disseminated and low grade.” – Accept or reject the statement with reasons. Use necessary sketches in answering both the questions. 5+5

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