



‘समानो मन्त्रः समितिः समानी’

**UNIVERSITY OF NORTH BENGAL**  
B.Sc. Honours 5th Semester Examination, 2022

## 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 cut-off grade and “enrichment factor”.
  - (b) What do you understand by stratiform and stratabound ore deposit?
  - (c) What are supergene and hypogene fluids?
  - (d) What do you understand by first boiling and second boiling in relation to magmatic-hydrothermal fluids?
  - (e) What is a skarn deposit?
  - (f) What are the main differences between Noranda and Cyprus type VMS deposits?
  - (g) Why galena-bearing ores do not commonly show supergene enrichment?
  - (h) What do you understand by syngenetic and epigenetic deposit?
2. Answer any **three** questions: 5×3 = 15
- (a) Giving suitable examples explain the differences between metamorphic and metamorphosed deposits. Why U mineralization is genetically related to felsic igneous rock whereas Cr mineralization is related to ultramafic rocks? 2½+2½
  - (b) Using necessary sketch explain what happens to water dissolved in melt when a hydrous melt is emplaced at a shallow crustal depth. “2 to 6 km crustal depth is most suitable for fracture-controlled magmatic hydrothermal mineralization.” — Accept or reject the statement with reasons. 2½+2½
  - (c) What is R-factor? Explain the role of R-factor in the formation of PGE and Ni-sulfide deposit in ultramafic rocks. 1+4
  - (d) What is Volcanogenic Massive Sulfide deposit? How does SO<sub>4</sub><sup>2-</sup>-rich alkaline seawater become H<sub>2</sub>S-rich and acidic in VMS mineralizing system? 1+4
  - (e) What are gossan and pseudo gossan? How does a gossan form? 2½+2½

- (f) “A felsic protolith is more suitable for the formation of bauxite than a mafic protolith.” — Accept or reject the statement with reasons. “Neither highly alkaline nor highly acidic solutions are suitable for the formation of bauxite.” — Accept or reject the statement with reasons. 2  $\frac{1}{2}$  + 2  $\frac{1}{2}$
3. Answer any *two* questions: 10×2 = 20
- (a) Explain how porphyritic texture is formed in porphyry deposits. “Porphyry Cu deposits are associated with I-type granites, potassic alteration and abundant pyrite whereas porphyry-Sn-W deposits are associated with S-type granites, sodic alteration and very low abundance or absence of pyrite.” — Discuss. 3+7
- (b) Discuss the possible mechanisms of formation of chromitite layers in ultramafic rock-hosted stratiform chromite deposits. How does podiform chromite deposit form in dunite in the oceanic crust? 7+3
- (c) “Quartz Pebble Conglomerate-type uranium deposits are restricted mainly in Paleoproterozoic whereas Sandstone-type uranium deposits are restricted mainly in Phanerozoic.” — Explain. Write a short note on Ni-laterite. 5+5
- (d) Using suitable diagram explain how the metal zoning (proximal Cu and distal Zn) in VMS deposit can be explained by temperature- and pH-dependent solubility of Cu and Zn in hydrothermal fluid. Briefly discuss about the possible mechanisms of formation of immiscible sulphide melt from a silicate melt. 5+5

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