12. Discuss the role of composition, Cl and S content, and fO_2 of magma in the formation of porphyry Cu (Mo) and porphyry Sn (W) deposits ? 5

13. What are the factors that control the efficiency of crustal rocks as source of metals for hydrothermal fluids and how ? Using suitable reactions briefly discuss the relative potential of congruent and incongruent dissolution in releasing metals in hydrothermal solution. 3+2

14. Discuss briefly how boiling, fluid mixing and water-rock interaction help in metal precipitation. 5

15. Write short note on a) metallogenic epoch and metallogenic province, and b) different types of fluid over-pressure that drives fluid in the crust. $2^1/_2+2^1/_2$

—— X ——

Ex:/F/GEO/XII/82/2019

BACHELOR OF SCIENCE EXAMINATION, 2019

(3rd Year, 2nd Semester)

GEOLOGICAL SCIENCES

Ore Geology

Paper : XII

Time : Two hours Full Marks : 50

Use separate answer-script for each group.

GROUP - A (25 marks)

Answer any ***five*** questions.

1. 'First-order control on localization of mineral deposits is tectonic setting' – explain with examples. What is orthomagmatic process of ore formation ? 4+1

2. How do you establish the genetic relationship between magmas and mineral deposits ? Why are magma conduits important for the orthomagmatic ore formation ? 2.5+2.5

3. What is liquid immiscibility? "For an ore deposit to develop, it is clearly important that sulfide phase should form very early in crystallization history" – Explain. How do you recognize prior sulfide liquation from the parental magma of any ultramafic-mfafic rock sequence ? 1+2+2

4. What are the major ultramafic-mafic rock bodies that are important for orthomagmatic ore deposits? Write with examples. 5

5. What is cyclic unit in the layered mafic igneous complex? Why are cyclic units significant to explain the occurrence of chromitite layers in the layered mafic igneous complex? How does change in the activity of SiO_2 influence the crystallization sequence of ultramafic-mafic magma? 1+1+3

6. What are the major differences between the chromitite bodies that are present below and above the Petrologic Moho in the oceanic lithosphere? Describe the process of chromitite formation below the Petrologic Moho in the oceanic lithosphere. 2+3

7. Write the physical and geochemical differences between PPGE and IPGE. What are the major types of PGE deposits? Give examples. Explain the origin of Reef-type PGE deposits. 1+2+2

GROUP - B (25 marks)

Answer any ***five*** questions.

8. Define the terms "ore minerals", "cut-off-grade", and "enrichment factor". Briefly discuss about the factors that control "cut-off-grade" of a deposit. 3+2

9. What are the fundamental differences between 'residual enrichment" and "supergene enrichment"? Why Pb and Zn deposits do not commonly show supergene enrichment? 3+2

10. Explain why quartz-pebble-conglomerate type deposits are commonly restricted in Archaean to early Proterozoic, whereas sandstone-hosted deposits are more common in Phanerozoic. 5

11. "Metal enrichment of magma depends largely on the fraction of melt generated and the bulk paritiion coefficient of the metal between the melt and the residual rock during partial melting"-Justify the statement with necessary sketch. 5