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65690

Maximum marks 100

1A Fill in the blanks

10\*1=10

- i. Around volcanic craters the deposits of native sulphur commonly occur.
- ii. Pyrolusite is an ore of manganese.
- iii. Chlorite is formed under low grade metamorphism.
- iv. Silica is the chief glass manufacturing material.
- v. Apatite is an example of phosphate bearing mineral.
- vi. Supergene sulphide enrichment occurs below the water surface.
- vii. The diamonds in Majhgawan pipe at Panna are formed by the process of Dissemination.
- viii. In India chief lead-Zinc deposits are located in Rajasthan state.
- ix. Hydrothermal deposits, which are formed at medium temperature 200°C to 300°C and high pressure are called as mesothermal deposits.
- x. The bauxite deposits in Konkan area are formed mostly from lateritisation of basalt rock.

1B Define the following:

10\*1=10

- i. Abrasive mineral: An **abrasive** is a material, often a **mineral**, that is used to shape or finish a workpiece through rubbing which leads to part of the workpiece being worn away by friction
- ii. kimberlite : diamond bearing
- iii. epithermal deposits : Hydrothermal deposits, which are formed at medium pressure, and within the Temperature range of 50°C to 200°C
- iv. Skarn : An assemblage of high temperature metamorphic gangue minerals in contact metasomatic deposits is called
- v. False gossan
- vi. country rock : host rock
- vii. Tenor of ore : metal percent
- viii. Refractory minerals; fireclay graphite, withstand high temp, brick formation, resist cracking, non reactive
- ix. Non metallic minerals coal, limestone , gypsum
- x. Evaporites: formed by evaporation, arid climate, salt content, restricted setting, gypsum, halite, anhydrite

2 Answer any two of the following:

2\*10=20

- a) Describe how the structural features of an area control the localisation of an ore. Give an example for the same. (8 marks for description, faults, folds, joints and shear zones, + 2marks for example like singhbhum shaer zone)
- b) Write a note on the metallogenic epochs. (Precambrian, late paleozoic, late Mesozoic ; 1 definition + 3\*3 for each description)
- c) Explain in detail the genesis of mineral deposits from the process of sublimation giving appropriate examples.

(From fumaroles, volcanic emanations, etc , direct change from solid to liquid, sulphur deposits from ladakh)

d) Discuss in detail the formation of late magmatic deposits. Those which consist of minerals crystallizing from a magma towards the close of magmatic period. They are always associated with mafic igneous rocks.

The late magmatic deposits have resulted from:

- a. Variations of crystallization differentiation.
- b. Gravitative accumulation of heavy residual liquids.
- c. Liquid separation of sulfide droplets. 4 for description+ 2 each process)

3 Answer any two of the following:

2\*10=20

- a. Explain the various criterias for the identification of replacement deposits.  
(residuals of host rock, doubly terminated crystals of ore, mineral pseudomorph, iregular outlines of ores, absence of crustification , etc 1.5 marks for each point)
- b. Explain the process of formation of cavity filling deposits and its various types.  
( 1 for definition and 3 for factors for formation+ 1 each for various types fissure vein, shear zone, stock work etc)
- c. Explain the process of formation of economic deposits by the process of evaporation. Give any four non-metallic deposits of ocean water.  
Aridity, enclosed basin, high tem, salts 2marks+ limestone, gypsum, halite , phosphorites, chert, etc 2 for each
- d. Describe the conditions favouring the formation of residual deposits.  
(presence of rocks containing valuable minerals, climate, no great relief, long crustal stability, etc) 1.5 for each description

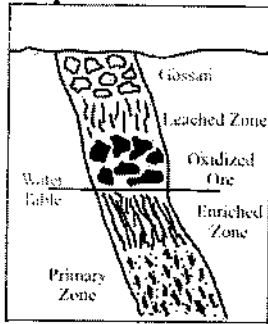
4 Answer any two of the following:

2\*10=20

- a. "supergene enrichment"  
In ore deposit geology, supergene processes or enrichment are those that occur relatively near the surface as opposed to deep hypogene processes. Supergene processes include the predominance of meteoric water circulation with concomitant oxidation and chemical weathering.  
"gossan": Gossan denotes a concretion of iron hydroxides that has formed on top of sulphide mineral vein, where it reaches the surface. It forms during the supergene sulphide ore enrichment, when weakly acid surface water percolates through the mineral deposit. ( 5 marks for each)
- b. With reference to the oxidation and supergene sulphide enrichment describe the various changes that take place in the oxidation zone with a neat diagram.  
There are two main chemical changes within the zone of oxidation:  
a) Oxidation, solution and removal of the valuable material.

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b) Transformation, in situ, of metallic minerals into oxidized compounds.



- c. Describe the primary requisites for the formation of supergene enrichment deposits  
Oxidation, suitable primary minerals, rock permeability, absence of precipitants in oxidised zone, no oxygen in sulphide deposition zone, hypogene minerals below water table (1 ½ for each description)
- d. Explain the significance of different colours of limonite in the gossan cappings in the identification of supergene sulphide deposits.  
Brown, maroon, orange signify Cu, yellow and brick red pyrite, ochreous orange galena, tan to brown sphalerite, tan to maroon molybdenite, etc 1 ½ for each correct

5 Answer any four of the following:

4\*5=20

- a. Explain the process of dissemination in Early magmatic deposits.  
Give an example of economic deposit formed by the process.
- b. Name any four minerals formed above the water table in the supergene sulphide deposits.  
malachite, azurite, chrysocolla, quartz (usually cryptocrystalline), baryte, calcite, aragonite, goethite, hematite, Lead: anglesite, cerussite, Manganese: pyrolusite, romanechite, rhodochrosite gaspeite, garnierite, etc
- c. Describe stratiform deposits giving example.  
Stratiform parallel to bedding; chromite deposit of Sukinda-Nausahi
- d. Discuss the role of the host rock on the process of ore localisation.  
The minerals present contribute to the economic deposits
- e. With reference to cavity filling deposits discuss the saddle reefs and stockwork deposits. (2 for each)  
Saddle reef: Mineralisation along the crests of anticlines  
Stockwork: An interlacing network of small ore-bearing vein lets.
- f. Differentiate between the eluvial and aeolian placer deposits  
Eluvial on hill slopes by gravity, aeolian by wind

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