Subject Code : P8AGE2

GEOLOGICAL, GEOPHYSICAL AND GEOCHEMICAL PROSPECTING

UNIT –1:

Geological Exploration: Criteria controlling the choice of sites for geological prospecting- Marginal information of topo sheets and study of field equipment. Field documentation and basic field procedures. Pitting, trenching, drilling and exploratory mining. Mineralogical, structural, stratigraphical and geomophological guides to ore search. Ore reserve estimation techniques.

UNIT – 2:

Geophysical Exploration: A concise account of limitations and applications of various geophysical exploration methods; The problem of ambiguity in geophysical interpretations; The principle, types, origin, instruments, field procedure and interpretations of self potential method. The principles involved, instruments used, field procedures adopted and interpretations applied in electrical resistivity methods. The principle, types, origin, field procedure and interpretation of induced polarization method. A brief account of electromagnetic, telluric, AFMAG techniques. A brief study of electrical well logging techniques.

UNIT – 3:

Geodesy of the earth. Newton's law and its application. The earth's gravitational field. Gravity corrections. The gravity measuring instruments. Density of rocks and the methods of density measurements. Gravitational effects over subsurface bodies of different shapes. Gravity survey at land and sea. Interpretation of gravity data and depth problems. Brief account of density logging. Elastic properties of the earth materials. Types of seismic waves, their propagation and characteristics. Geophones, types of shooting methods, seismic energy source. Principle of refraction – interpretation of - horizontal two layer, multilayer and dipping layers. Principle of reflection seismic survey. Problems in seismic survey. Brief outline of sonic logging.

UNIT – 4:

Basic concepts and principles of magnetic prospecting. Magnetism of the earth and palaeomagnetism. Magnetic susceptibility of rocks. Magnetic effects from buried magnetic bodies. Instruments employed in magnetic prospecting. Magnetic survey on land and sea. Air-borne magnetic survey. Corrections and interpretation of magnetic data. Principles of radioactive prospecting. Radioactive decay, radioactivity of rocks and minerals. Instruments, field procedure and interpretations employed in radioactive survey.

UNIT – 5:

Geochemical Exploration: Origin and abundance of elements in the earth's crust. Mobility of elements; factors controlling mobility; mobility in surficial

and deepseated environment; geochemical dispersion; recognition of surficial and deep seated dispersion pattern; geochemical anomaly; background and threshold values; recognition of anomaly; significant and non significant anamolies; bedrock and soil geochemical surveys. Geochemical explorations for gold, copper and base metals. Application of geochemistry in: Mineral exploration, Oil prospecting, Ground water targeting, Soil studies, Atmospheric pollution studies. Outline of biogeochemical exploration.

Text Books:

1. McKinstry H.E. (1960) - Mining Geology: Asia Publishing House
2. Mathur S.M. (2001) – Guide to Field Geology: Prentice Hall of India.
3. Ramachandra Rao M.B.(1975) – Outlines of Geophysical Prospecting - A manual for Geologist: University of Mysore.
4. Dohr.G. (1984): Applied Geophysics- English Book Depot.
5. Lowire. W. (1997) - Fundamentals of Geophysics. Cambridge Low price Editions.
6. Dobrin M.B.(1981) Introduction to Geophysical prospecting. McGraw – Hill International Book Company.
7. Kearey.P and Brooks.M (1984) An Introduction to Geophysical Exploration-ELBS.
8. Hawkes H.E. and Webb. U.S - (1962)- Geochemistry in mineral Exploration. Harer & Row.
9. Mason.B (1966); Principles of Geochemistry – Willey Toppan.

References:

1. Burger. H.R. (1992)- Exploration Geophysics of the Shallow Subsurface: Prentice Hall
2. Robinson. E.S. and Coruh.C. (2002)- Basic Exploration Geophysics– John Wiley.
3. Gunter Faure. (1998) – Principles and applications of Geochemistry–prentice Hall.
4. Krauskope.B.K.- (1988) ;Introduction to Geochemistry.