Subject Code : P8AGE4

FUEL AND INDUSTRIAL GEOLOGY

UNIT I

Coal Geology Definition and origin of coal. Sedimentology of coal bearing strata, types of seam discontinuities and structures associated with coal seams. Chemical analysis of coal (proximate and ultimate analysis).
Coal Petrology:- Classification and optical properties of macerals and microlithotypes. Techniques and methods of coal microscopy. Application of coal petrology. Classification of coal in terms of Rank, Grade and Type. Indian classification for coking and non-coking coals. International classifications (I.S.O. and Alpern's classification). Elementary Idea about coal preparation, coal carbonization, coal gasification, coal hydrogenation, coal combustion and fertilizer form coal. Coal as a source rock in petroleum generation. Geological and geographical distribution of coal and lignite deposits in India. Coal exploration and estimation of coal reserves. Indian coal reserves and production of coal in India.

UNIT II

Petroleum Geology Petroleum – its composition. origin (Formation of source rocks-kerogen, organic maturation and thermal cracking of kerogen) and migration of petroleum. Reservoir rocks-porosity and permeability. Reservoir traps – structural, stratigraphic and combination traps. Oilfield fluids – water, oil and gas. Methods of prospecting for oil and gas (geological modeling). Elementary knowledge of drilling and logging procedures. Oil shale. An outline of oil belts of the world. Onshore and offshore petroliferous basins of India. Geology of productive oilfields of India. Oil policies of India.

UNIT III

Coalbed methane – a new energy resource. Elementary idea about generation of methane in coal beds, coal as a reservoir and coalbed methane exploration.
Atomic fuel- Mode of occurrence and association of atomic minerals in nature; atomic minerals as source of energy; methods of prospecting and productive geological horizines in India; nuclear power stations of the country and future prospects; atomic fuels and environment.

UNIT IV

Physical and chemical properties, mode of occurrence and distribution in India of the minerals required for the following industries, Refractory, Abrasive, Fertilizer, Cement, Paints, Glass and Pigments. Mineral wealth of TamilNadu.

UNIT V:

Classification of gemstones, systematic description of crystallography, physical properties, optical properties, absorption spectra, chemical properties, special

gemmological features, diagostic features and occurrences of common and less common gemstones. New instruments and techniques used to identify and testing the gemstones. Synthetic gemstones, history of synthesis, methods of manufacture, methods of differentiation between natural and synthetic stones.

Text books: Reference books

1. Chandra, D., Singh, R.M. Singh, M.P., 2000: Textbook of Coal (Indian context). Tara Book Agency, Varanasi.
2. Singh, M.P. (Ed.) 1998: Coal and organic Petrology. Hindustan Publishing Corporation, New Delhi.
3. Scott, A.C., 1987: Coal and Coal-bearing strata: Recent Advances. The geological Society of London, Publication no. 32, Blackwell scientific Publications.
4. Stach, E., Mackowsky, M-Th., Taylor, G.H., Chandra, D., Teichumullelr, M. and Teichmuller R., 1982: Stach Textbook of Coal petrology. Gebruder Borntraeger, Stuttgart.
5. Holson, G.D. and Tiratso, E.N., 1985: Introduction to Petroleum Geology. Gulf Publishing, Houston, Texas.
6. Tissot, B.P. and Welte, D.H., 1984: Petroleum Formation and Occurrence, Springer – Veralg.
7. Selley, R.C., 1998: Elements of Petroleum Geology. Academic Press.
8. Durrance, E.M. 1986: Radioactivity in Geology-principles and application. Ellis Hoorwool.
9. Dahlkamp, F.J., 1993: Uranium Ore Deposits. Springer Verlag.
10. Boyle, R.W., 1982: Geochemical prospecting for Thorium and Uranium deposits, Elsevier.
11. Taylour, G.H., Teichmuiler,M., Davis, A., Diessel, C.F.K. and others (1998) Organic Petrology
12. Durrance, E.M.(1986) Radioactivity in Geology: Principles and Applications\
13. Beginner s Guide to Gemmology by P.G. Read.
14. Practical Gemmology by R. Webstar.
15. Gem Testing by S.W.Anderson.
16. Gemstones of the world by W.Schumann.