SOIL, WATER AND ENVIRONMENT SCIENCE

(POST RELATED)
Subject Code: 621
Total Marks-200

Part-I
Marks- 100

Soil formation: Soil forming materials–rocks and minerals primary and secondary minerals; silicate and non minerals; clay minerals – their formation and importance weathering of rocks and minerals; soil profiles and pedons; formation of soil horizons; master horizons and diagnostic horizons; factors of soil formation; important soil forming processes; major soil groups of the world.

Physical properties of soil: Soil as a three – phase disperse system; mass and volume relationship of soil constituents; soil texture; soil structure – classification, evaluation, management and importance; soil water – energy state of soil water, soil water potential; retention and movement of water in soil; concepts of available water; soil air and soil temperature.

Irrigation and drainage: Sources and quality of irrigation water; methods of irrigation; irrigation requirements of major crops of Bangladesh; irrigation projects in Bangladesh; drainage – types and benefits.

Soil survey and soil classification: Different types of soil survey; techniques of soil survey; agricultural and non agricultural uses of soil survey data; soil Taxonomy; properties and uses of soil orders.

Land evaluation: Concept of land evaluation; techniques and importance of land evaluation; land use planning.

Soil of Bangladesh: General condition of soil formation in Bangladesh; nature of soil forming factors; dominant soil forming processes; characteristics of major soil groups; agro ecological zones of Bangladesh.

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Part-II
Marks- 100

Chemical properties of soil: Chemical composition of inorganic components of soil; humus – its characteristics and importance; soil solution – composition and importance; ion exchange in soil – origin of ion exchange properties, ion exchange capacities of various soil constituents, importance; soil reaction – measurement of soil acidity, importance of soil pH; liming of acid soil; non – biological fixation of N, P, and K in soil.

Biological properties of soil: Macro microorganisms in soil – their morphology, structure and classification; factors affecting microbial growth in soil; nitrogen and sulphur transformation in soil; biological N2- fixation; bio-fertilizer.

Soil fertility and plant nutrition: Concepts of soil fertility and soil productivity; essential nutrient elements – macro – and micronutrients; physiological function of N,P and K; fertilizers – sources, types and grades; fertilizer law; diagnosis of fertilizer needs in soil; methods of fertilizer application; residual effects of fertilizer; manures and compost; nutrient status and fertilizer needs of different AEZ of Bangladesh.

Soil pollution: Sources of pollutants in soil; effects of soil pollution on ecosystem and food quality; permissible limits of heavy metals in soil, plants, sewage sludge, city wastes, irrigation water, industrial wastes and effluents; waste management.

Soil degradation and conservation: Types and processes of soil degradation; assessment of soil degradation; soil quality – concept and assessment; soil conservation and reclamation – principles of soil conservation; agronomic and mechanical practices of soil conservation.