

PAPER: ENVIRONMENTAL SCIENCE (100 MARKS)**I. History of Environmental Thought**

Environment and Sustainable Development, History of Environmental Movements, Industrial and Agriculture Revolution, United Nations Conference on Human Environment 1972, Our Common Future 1987, Rio Summit 1992, Agenda 21, World Summit on Sustainable Development 2002, Rio Summit-II, 2012, Millennium Development Goals.

II. Sustainable Development Issues

Population growth, Poverty, Biodiversity loss and its Conservation, Energy security (energy conservation and alternative energy resources), Urbanization and sustainable cities, Carrying capacity and ecological footprint. Food security and sustainable agriculture. Ecological restoration.

III. Interdisciplinary nature of Environmental Science

Orientation on convergence of various social and natural sciences to evolve a new discipline of environmental science: Environmental Biology, Environmental Chemistry, Environmental Physics, Environmental Microbiology, Environmental Toxicology, Environmental Economics, Environmental Geology, Environmental Geography, Environmental Biotechnology, Environmental Sociology.

IV. Environmental Pollution

Air Pollution, Water Pollution, Soil Pollution, Noise Pollution, Solid Waste, Water Logging & Salinity, Deforestation, Desertification, Eutrophication, Global and regional air pollution problems (Greenhouse effect, Global Warming/Climate Change, Ozone Depletion, Acid Rain).

V. Climate Change

Climate Pattern at local, regional and global scale. Different types of climate including tropical and mid latitude climate, polar climates. Climate change processes, Drivers and Indicators of Climate Change, Effects of Climate Change on natural and societal systems. Carbon foot print. Climate change adaptation and mitigation, Clean Development Mechanism (CDM), REDD+. Global environmental politics on climate change: role of India, China and USA (Copenhagen Accord 2009).

VI. Environmental Governance

Policy, legal and institutional frameworks for governance of environment in Pakistan: National Conservation Strategy of 1992, National Environmental Policy Act of Pakistan 2005, Environmental Protection Act of 1997, Pak-EPA (Review of IEE/EIA) Regulations 2000, Hospital Waste Management Rules 2005, Pollution Charge Rules, Sample Rules, Solid Waste Management Plan 2005, Hazardous Substances Rules 2005, National Drinking Water Policy 2009, Sanitation Policy, National Climate Change Policy 2012.

VII. Global initiatives

Brief on some of the Multilateral Environmental Agreements ratified by Pakistan, Convention on Biological Diversity (CBD), Cartagena Protocol on Bio-safety, Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention), Convention on the Conservation of Migratory Species (CMS), United Nations Framework Convention on Climate Change (UNFCCC), Kyoto Protocol to UNFCCC, Montreal Protocol on Substances that deplete the Ozone Layer, United Nations Convention to Combat Desertification (UNCCD).

VIII. Environmental Assessment and Management

Environmental Impact Assessment, Strategic Environmental Assessment, Environmental Management Systems (ISO 14000), Occupational Health & Safety management systems (OHSAS 18000), Participatory Approaches to Environmental Management, Technological Approaches to Environmental Management, Approaches to Solid Waste Management, Disaster Risk Management, Pollution Control Technologies, Geographic Information System & Remote Sensing, Natural Resources Management.

SUGGESTED READINGS

| S.No. | Title | Author |
|--------------|----------------------------------------------------------------------|--------------------------------------------------------------------|
| 1. | Environmental Economics in Theory and Practice. | Hanley, N. Shorgen,J,White,B |
| 2. | Industrial Safety Health and Environmental Management | Jain R.K. Rao S.S |
| 3. | Environmental Science: Earth as a living Planet, 9 th ed. | Botkin, D. Keller, E. 2014 |
| 4. | Environmental Geology Facing the Challenges of Our Changing Earth | Erickson, J |
| 5. | Environmental Geology. | Keller A.Edward |
| 6. | Earth Science. | Tarbuck. J. Edward Lutgens K. Friederick |
| 7. | Environmental Science: A Study of Interrelationship | Enger ED, Smith, B.F |
| 8. | Basics of Forestry and Applied Sciences, Concepts and Theory | Masood A.A Qureshi |
| 9. | Environmental Science: Working with Earth | Miller. T.G |
| 10 | Disaster Management: A Disaster Manager's Handbook | Carter N.W |
| 11 | Disasters and Development | Cuny, F.C. |
| 12 | Disaster Management: Warning Response and Community Relocation | Perry R.W. Mushkatel, A.H. |
| 13 | Energy: Crisis or Opportunity, An Introduction to Energy Studies | Diana Schumacher |
| 14 | Environmental Geology | Carla W. Montgomery |
| 15 | Environmental Health; Ecological Perspective | Kathryn Hilgenkamp |
| 16 | Official Website of Govt. of Pakistan | www.environment.gov.pk |
| 17 | Official Website of UN Environment Programme. | www.unep.org |