

Nalanda Open University, Patna

Course Name: M.A./M.Sc. Environmental science
Coordinator: Prof. (Dr.) Bihari Singh
Mob. No. : +91 9546452116
+91 9334331422
Email ID: bihari_singh2001@yahoo.com

E-Content II (iii)
for
Part II Examination, 2020

Short description of the suggested Topics
Theory Paper
Paper-XI
(ENVIRONMENTAL TOXICOLOGY)

1. Introduction and usefulness of the study of Toxicology to human beings:

Introduction: Definition and Elaboration of the term Toxicology

Traditional definition of Toxicology is that Toxicology is “the science of poisons”. However, with the increased understanding of how various agents can cause harm to humans and other organisms, a broader definition of Toxicology is now given as follows:

“Toxicology is the study of the adverse effects of chemicals or physical agents on living organism.”

Paracelsus who is named as the “Father of Toxicology” is often quoted for his statement “All substances are poisonous; there is none which is not a poison. The right dose differentiates a poison and a remedy.”

It is now well accepted that this statement is the central concept of science of Toxicology. The study of the relationship between dose and its effect on the exposed organisms is an essential component of the study of Toxicology.

Environmental Toxicology

A solid, liquid or gaseous substance present in the biosphere in such concentration that may be injurious to living and non-living components of the environment is termed as environmental pollution. Industrialization, population growth, urbanization, deforestation, mining, modern agricultural practices etc. have led to generation of huge and various types of waste materials, many of which are toxic/hazardous in nature. They have caused pollution of environment-air, water and soil and have adversely affected living organisms.

Environmental Toxicology is the study of causes, conditions and harmful effects of pollutants on the living beings and the biosphere. Environmental toxicology includes such specific areas as study of pollutants having toxic effects on man, pollutants disturbing the biodiversity (i.e. ecological balance of the biodiversity), pollutants degrading the aesthetics of the environments etc.

Usefulness of the study of Toxicology

Some more common usefulness of the study of Toxicology to human beings may be summarised in the following points:

- i. It is now recognised that virtually all toxic effects are caused by changes in specific cellular molecules and biochemicals. A brighter side of the study of Toxicology is that it has contributed to the development of suitable and safe chemicals used as food additives, suitable and safe pesticides and suitable drugs against any specific disease.
- ii. An understanding of the molecular level action of a toxic substance may be useful in such branches of bioscience as physiology, pharmacology, biochemistry and cytology (i.e. a branch of biology concerned with the structure and function of cells.)
- iii. It may be helpful in the antidotal therapy, in monitoring of environmental pollution and in risk assessment studies.
- iv. Toxicology is currently contributing to the field of cancer research, since some toxins can be used as drugs for killing tumor cells. One prime example of this is Ribosome inactivating proteins, tested in the treatment of leukaemia.
- v. Analytical toxicology is concerned with the experiments to test the presence or absence of different chemicals of toxic nature and quantitative estimation of these chemicals.
- vi. Study of toxicology incorporates various factors which can alter (increase or decrease) the toxicity of any toxicant.

POINT TO NOTE about short description of the suggested topics for MA/M.Sc. Environmental Science Part II Exam 2020 in Paper XI (Environmental Toxicology)

Study Learning Material for this paper has been prepared in English language as contrast to the SLM of other papers of this course which has been prepared in Hindi language. We have received repeated requests by good number of students of this course to make available answer of the suggested topics in English language. In response to the request, I have to say that the SLM of Paper XI has been prepared under my supervision. Moreover, I have authored some units of this paper.

The examinees of the Part II Exam 2020 are advised to prepare their notes on the suggested topics from the SLM book provided by N.O.U. Patna. It contains enough of standard study material. The notes may be prepared by arranging the contents provided in the SLM book as per the requirement/demand of the question to be answered.