

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: IMSC/PRE-PHD
BRANCH: CHEMISTRY

SEMESTER : VII/NA
SESSION : MO/18

SUBJECT: SAC1011 ENVIRONMENTAL CHEMISTRY

TIME: 3 HRS.

FULL MARKS: 60

INSTRUCTIONS:

1. The question paper contains 7 questions each of 12 marks and total 84 marks.
 2. Candidates may attempt any 5 questions maximum of 60 marks.
 3. The missing data, if any, may be assumed suitably.
 4. Before attempting the question paper, be sure that you have got the correct question paper.
 5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
-

- Q.1(a) Compare and contrast: a) carcinogens b) teratogens c) mutagens. Give example of each class [6]
- Q.1(b) The release of pollutants into the environment may be followed by a very complex series of events which can transport the pollutant through the air or water, into the ground or even into living organisms. The most important route of distribution and the extent of distribution will be different for each pollutant. What are the characteristic traits that determine the transfer and transport of pollutants through the various components of environment Identify the situations that can pose concern and suggest measures that can be used to minimize the detrimental effects. Explain environmental transformation and degradation processes, giving appropriate examples in each case. [6]
- Q.2(a) What are the commonly used pesticides and how do they impact our environment. Taking DDT as an example explain the term bioaccumulation and its impact. [6]
- Q.2(b) Justify the statement: Use of excessive fertilizers leads to eutrophication of water bodies. What do you understand by limiting factor? [6]
- Q.3(a) Give the sequence of events leading to formation & dissociation of ozone in the stratosphere using "Chapman's oxygen only chemistry," emphasizing the role of each species in absorption of UV radiations in the range of 280-315 nm & <280 nm. [6]
- Q.3(b) With the help of a schematic diagram explain the diurnal variation of NO, NO₂, ozone and other oxidants in a city. Explain the role of hydrocarbons in generation of secondary pollutants. [6]
- Q.4(a) Explain with the help of a graphical representation, the temperature altitude profile of atmosphere, emphasizing the reasons for the changing temperature profile, the significance of atmospheric stability/instability, wherever applicable and the nature/role of the chemical species present in each segment of the atmosphere [6]
- Q.4(b) Distinguish between photochemical smog and sulfurous smog. [6]
- Q.5(a) Discuss the various water resources. Comment on the physical, chemical and biological quality of water obtained from various sources. What is the MCL for phenol, iron, fluoride and arsenic in drinking water as per the WHO norms. [6]
- Q.5(b) Give a schematic representation of municipal supply water. What is the difference between slow sand filtration and rapid sand filtration. What do you understand by Schumtzdecke layer. What is its function. What is the role of coagulants in water treatment. Explain giving suitable examples. [6]
- Q.6(a) Discuss the chemical composition of soil in terms of micro and micronutrients present in it. What is the significance of C-N ratio? [6]
- Q.6(b) What problems are associated with the long term containment of nuclear waste? What is the current status of the disposal situation? [6]
- Q.7(a) What according to you would be a more appropriate method of disposal of hazardous hospital waste: Landfills or incinerators? Justify your answer. [6]
- Q.7(b) Enumerate major sources of radiation. What is the unit of radiation? Discuss suitable methods of disposal of nuclear waste. [6]