

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

CLASS: IMSc
BRANCH: CHEMISTRY

SEMESTER : VII
SESSION : MO/19

SUBJECT: SAC1011 ENVIRONMENTAL CHEMISTRY

TIME: 3:00 HOURS

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.
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- Q.1(a) Biotransformation and biodegradation of chemical compounds by the action of living organisms is one of the major processes that determines the fate of organic chemicals in aquatic and terrestrial environments. Giving suitable examples briefly describe the two processes. [6]
- Q.1(b) What do you understand by dose response relationship in toxicology? Given below is the Toxicity Rating Scale and Labelling Requirements for Pesticides. Unfortunately, the sequences have got all jumbled. Put them in their appropriate sequence : [6]

Category	Signal word required on label	LD50 mg/kg(ppm) oral
I highly toxic	CAUTION	over 500
II moderately toxic	WARNING	-----
III slightly toxic	none required	51 to 500
IV practically non-toxic	DANGER-POISON (skull and crossbones)	less than 50

- Q.2(a) Discuss the role of chlorine containing free radicals (Cl^* , ClO^*) in the Stratospheric Chemistry . [6]
- Q.2(b) With the help of a schematic diagram explain the diurnal variation of NO , NO_2 , ozone and other oxidants in a city. Explain the role of hydrocarbons in generation of secondary pollutants [6]
- Q.3(a) What are CFC's? What are the alternatives to CFC's for minimizing ozone depletion? [6]
- Q.3(b) Explain the phenomenon of Arctic and Antarctic ozone hole formation, emphasizing the reasons for the cyclical variation. [6]
- Q.4(a) Discuss the impact of oxygen demanding waste and VOC on ground and surface water. [6]
- Q.4(b) What is Oxygen sag curve? Explain its significance with the help of a graphical representation [6]
- Q.5(a) Evaluate various water resources and discuss the need for concern for this valuable resource. [6]
- Q.5(b) Discuss the role of disinfectants in municipal water treatment. Elaborate on the efficacy of some commonly used disinfectants. Graphically depict the significance of breakpoint chlorination. [6]
- Q.6(a) Discuss the role of micronutrients in soil. How do nutrients enrich water bodies? What is the anthropogenic source of these nutrients? What do you understand by limiting factor? [6]
- Q.6(b) 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.7(a) What is the impact of solid waste dumping on land? With the help of a schematic diagram explain the essential components of an idealized landfill. [6]
- Q.7(b) With reference to Love Canal Tragedy, elaborate on the statement " there is no-away in doing away with the solid waste". Explain the terms : RCRA & CERCLA. [6]