10/12/2012

DOON UNIVERSITY, DEHRADUN

Final Exam, 2012, Third Semester, 2012

School of Environment & Natural Resources

M.Sc. (Environmental Studies)

Course: EES – 518 :Environmental Toxicology

Time Allowed: Three Hours *Maximum Marks: 50*

Note: Attempt Questions from All Sections: A, B, C

SECTION: A (Answer limit – 25 words). Attempt ALL Questions. **(Marks: 1 x10 = 10)**

1. Define LD50, LC50, EC50 and IC50.
2. What are the chemical structures of a PCB and PCDD compound?
3. What is OECD guideline 420 and 425?
4. Define bioconcentration and also write formula to calculate bioconcentration factor (BCF).
5. Define heavy metal and also give example of four heavy metals of toxicity interest.
6. Define biomarkers of toxicity. Also write four examples of toxicity biomarkers in organisms.
7. What are the major chemical constituents of metallothioneins.
8. Define microcosm and also write about its utility in environmental toxicity assessment.
9. Who is the author of famous book "Silent Spring"?
10. Write about Sandoz Calamity.

SECTION: B (Answer limit – 250 words). Attempt ALL Questions. **(Marks: 6 x 4= 24)**

1. Describe the origin, chemical properties and ecotoxicological impact of PCBs and PCDDs with suitable example.
2. What is Partition Coefficient? How it is important in uptake and transportation of any xenobiotic in environment.
3. What is bioaccumulation? Describe the different consequences of bioaccumulation in organisms with discussing a model of the processes governing bioaccumulation in aquatic organisms.
4. Draw a diagram of following types of dose-response curves:
   (a). Typical dose-response curve
   (b). Two xenobiotic with difference sensitivity levels at low and high doses, but similar LD50 value.
   (c) Two xenobiotics with similar sensitivity level at low and high doses, but different LD50 values

5. What is the advantage and disadvantages of classical toxicity screening methodology? Also write the criteria for choosing a test species for toxicity test.

6. What are the metallothioneins (MTs)? Describe its chemical and molecular properties with classification. Also write major functions of MTs.

SECTION: C (Answer limit – 750 words). Attempt ALL Questions **(Marks: 2x 8 = 16)**

1. Describe the Cytochrome P-450 dependent monooxygenase system under following titles: (2+2+2+2 =8)

(a) Major reactions involved in Phase-I and Phase-II processes of detoxifications.

(b) Cyclic reaction of a Cytochrome P-450 (Cyt P-450) monooxygenase with heme iron system

(c) Nonmicrosomal oxidation system

(d) Distribution of Cyt-P 450

2. Describe biomarkers under following titles: (2+2+2+2 =8)

(a) Classification of biomarkers

(b) Specificity of biomarkers

(c) Criteria for evaluating biomarkers

(d) Ecological applications of biomarkers