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63/2(SEM-3) BIT-304

2022

(Held in 2023)

BIOTECHNOLOGY

(Theory Paper)

Paper Code : BIT-304

(Toxicology)

Full Marks - 80

Pass Marks - 32

Time - Three hours

The figures in the margin indicate full marks
for the questions.

1. Choose the correct answers from the following :
1×6=6

(a) The most deleterious effects of modern
cosmetics are

(i) Retinotoxicity

(ii) Agranulocytosis

(iii) Allergic reactions and contact dermatitis

(iv) Chemical carcinogens

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(b) Food allergies are

- (i) adverse reaction to a food in which the body's immune system is not involved
- (ii) an immunologic reaction resulting from the ingestion, contact or inhalation of food or food additives.
- (iii) a metabolic food disorder when food borne substances interfere with normal metabolic processes.

(iv) All of the above

(c) DDT is a

- (i) Organophosphate (ii) Carbamates
- (iii) Organochlorine (iv) Pyrethroid

(d) The level of ocular toxicity can be evaluated by

- (i) Ames test
- (ii) Draize test
- (iii) Teratogenesis test
- (iv) LD₅₀ test

(e) Which one of the following toxicants can cause DNA damage ?

- (i) Snake venom (ii) Nicotine
- (iii) CO (iv) Carcinogens

(f) Abuse of which of the following drugs can cause hallucination ?

- (i) Heroin
- (ii) Lysergic acid diethylamide (LSD)
- (iii) Caffeine
- (iv) Nicotine.

2. Answer the following questions in brief :
2×5=10

- (a) What are food additives and food contaminants ?
- (b) Briefly describe therapeutic drugs and their uses.
- (c) What are reversible and irreversible toxic effects ?
- (d) What is Margin of Safety? How is it expressed ?
- (e) What type of toxicity is caused due to occupational exposure? Cite an example.

3. Answer any *six* from the following questions :

5×6=30

- (a) Define dose-response relationship. What is a dose response curve ?
- (b) The antibiotic tigecycline is available as a IV drip stock solution at 25 milligrams per ml concentration. The safe, effective dose for children is 1500 micrograms per kg body mass. How many ml of the stock solution must you administer to a 31.5kg child ? (1 milligram = 1000 micrograms)
- (c) Elaborate in brief to explain the difference between toxicity and potency.
- (d) Write short notes on forensic and clinical toxicology.
- (e) What are the sources of lead contamination ? Cite its effects.
- (f) A patient was hospitalized as he took intravenous injection of toxicant Z. In this scenario what kind of molecular biology approach will you perform to confirm presence of toxicant Z in the patient ? Describe the experimental approach.

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(4)

(g) Write a brief notes on any two classes of agriculture pesticides.

(h) Which segment of a dose response curve is most important in defining the acute toxicity of a chemical and why ? Explain.

(i) Describe the mechanism of action of pyrethroids poisoning.

4. Answer any *two* questions from the following :
10×2=20

(a) Write short notes on :

(i) Hypersensitivity and Allergy

(ii) Carcinogenic and mutagenic action of toxicants.

(b) What is teratogenesis ? Describe the characteristics and mechanism of teratogenesis.

(c) Toxicant X was found to kill liver cells by inducing the expression of gene A. In this scenario, what molecular biology technique would you perform to check the toxicity of toxicant X. Describe the experimental approach in details.

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5. Answer any *one* from the following questions :

14×1=14

- (a) Explain the toxic effects caused by blockade in the oxygen transport machinery and through interference in the synthesis and functions of nucleic acids and proteins.
- (b) What is meant by 'Vectorial transport' with respect to the elimination of toxicants from the body ? Explain the mechanism of renal and hepatic elimination of toxicants.