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SARDAR PATEL UNIVERSITY

M.Sc Biochemistry, II Semester

Wednesday, Date: 11 - 04 -2018

Time 2.00 p.m. to 5.00 p.m.

Subject /Course Code PS 02 CBIC 02

Subject/Course Title: Biochemical & Environmental Toxicology

Max Marks : 70

Q.1 Choose the most correct answer for the following questions. (08 marks)

1. The toxic effect of a toxicant is affected by
   (a) Dose of toxicant (b) frequency of exposure (c) route of exposure (d) all of the above
2. A low LD_{50} indicates
   (a) a high toxicity (c) that a compound is not harmful
   (b) a low toxicity (d) none of the above
3. Exposure to low amounts of toxicant over a long period of time is
   (a) chronic exposure (c) easier to detect
   (b) acute exposure (d) sub-acute exposure
4. Biomagnification is _____
   (a) is the increase in toxicant as one moves up the food chain
   (b) is the accumulation of toxicants in individual organisms in an ecosystem
   (c) does not occur in natural population
   (d) none of the above
5. Which is the best antidote for paracetamol toxicity?
   (a) Sodium bicarbonate (b) N-acetyl cysteine (c) Glutathione (d) Glucose
6. Cycasin (methyl azoxy methanol glycoside) is a potent carcinogen only if it is exposed by
   (a) Nasal route (b) Dermal route (c) Oral route (d) any route
7. Which of the following molecules can be used for phase II conjugation reactions
   (a) amino acids (b) glutathione (c) sulphate (d) all of the above
8. One of the following statement is not based on the assumptions of dose-response relationship:
   (a) That the toxic response is a function of the concentration of the compound at the site of action
   (b) That the concentration at the site of action is related to the dose
   (c) That the response is not causally related to the compound given
   (d) None of these

(P.T.O.)

Q.2 Answer **ANY SEVEN** of the following questions in brief: (7x2=14)

1. How can we determine NOEL and maximum toxicity of a toxicant?
2. What is first pass metabolism? Where does it occur?
3. Name the model organisms that are studied for toxicity testing and research.
4. Differentiate between toxicokinetics and toxicodynamics.
5. What is the application of finding antagonist of toxicant?
6. Which antidotes are used to treat lead poisoning?
7. What is 'risk assessment' in reference to toxicity?
8. Why is cycasin (methyl azoxymethanol glycoside) is carcinogenic only when exposed by certain route?
9. What is the significance of determining therapeutic index of drug?

Q.3 (a) Explain Dose-response relationship and its importance. (06)

(b) Explain the toxicity that occur due to overdosage of paracetamol. (06)

OR

(b) Give examples and explain acute and chronic toxicity. (06)

Q.4 (a) Explain division of different phases in toxicants' metabolism. (06)

(b) What is Ames test? Explain. (06)

OR

(b) Give suitable examples and describe phase II reactions of biotransformation of xenobiotics. (06)

Q.5 (a) Explain the environmental implications of acid rain. (06)

(b) Explain the toxicity of organophosphorous insectides with suitable examples. (06)

OR

(b) Write an explanatory note on toxicology of food additives. (06)

Q.6 (a) Write an explanatory note on common air pollutants and their effect on environment. (06)

(b) State the environmental fate of persistent xenobiotics like pesticides. (06)

OR

(b) Explain the causes and symptoms of arsenic poisoning. (06)

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SARDAR PATEL UNIVERSITY
M.Sc. II[nd]Semester Examination
Wednesday, Date: 11 -04-2018
Time 2:00 p.m. to 5:00 p.m.
Subject /Course Code PS 02 CBIC 22
Subject/Course Title: Toxicology

Max Marks : 70

Q.1 Choose the most correct answer and write in the answer sheet. **(08 marks)**

1. The biotransformation of a foreign chemical in the body is determined by
   (a) it's structure (c) its physicochemical properties
   (b) availability of enzymes (d) all of the above

2. The metabolism of toxicants in the body primarily results into
   (a) increase in its molecular weight (c) becoming more polar compound
   (b) increase in its excretion (d) all of the above

3. Which of the following effects of two substances are important in the action of antidotes
   (a) Potentiation (c) Synergism
   (b) Anatagonism (d) Coalitive effect

4. Which of the following toxicants causes rapid lethality by affecting cytochrome aa3 in the mitochondria
   (a) Paracetamol (c) Carbon monoxide
   (b) Cyanide (d) Cycasin

5. What type of specificity is shown by CYP enzymes in the SER of liver cells
   (a) Absolute (c) Steriospecific
   (b) Broad (d) none of the above

6. Accumulation of dangerously high levels of toxins inside the cells is termed as
   (a) Biomagnification (c) Persistent organic poluutant
   (b) Synergism (d) Bioaccumulation

7. Which compounds combine with the atmosphere to form acid rain
   (a) Ozone (c) Sulfur oxide
   (b) CFC (d) all of the above

8. Minamata disease is a result of chronic toxicity by one of the following heavy metals
   (a) Mercury (c) cadmium
   (b) Lead (d) arsenic

(P.T.O.)

Q.2 Answer **ANY SEVEN** of the following questions in brief: (7x2=14)

1. Differentiate between toxicokinetics and toxicodynamics.
2. Briefly explain biochemical aspects of toxicology
3. What are antidotes? Cite any two examples.
4. If nicotine has LD50 of 1 mg/kg body weight and botulinum toxin has LD50 of 0.00001, which is more toxic and how many times?
5. What is the application of Ames test?
6. Give examples of any four compounds that are used for conjugation in Phase II reactions.
7. Define the term – biological half life.
8. What is meant by Chinese restaurant syndrome?
9. Mention few uses of asbestos.

Q.3 (a)Differentiate between LD 50 and ED 50. Also explain why LD50 is largely replaced with determination of ED 50? (06)

(b) Give examples and differentiate between toxicants that cause rapid lethality against those toxicants, which have slower action. (06)

OR

(b)Explain the metabolism and chronic toxicity due to over dosage of paracetamol drug. (06)

Q.4 (a) What is first pass metabolism, is it a part of toxicokinetics or toxicodynamics? Give any two examples of Phase I and Phase II reactions each. (06)

(b) Give an account on role of Cytochrome P-450 oxidase enzymes in xenobiotic metabolism.(06)

OR

(b) What is Genotoxicity? Explain in brief any two test of genotoxicity. (06)

Q.5 (a) Write a brief account on mode of action of fungicides and herbicides. (06)

(b) Write a note on organophosphates and carbamates. (06)

OR

(b) Explain the needs of food additives. (06)

Q.6 (a) Write an account on cadmium toxicity. (06)

(b) Explain the environmental consequences of sulfur dioxide. (06)

OR

(b) Explain the adverse effects of asbestos. (06)

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SARDAR PATEL UNIVERSITY
M.Sc. (III Semester) Biochemistry
24th October, 2018 (Wednesday)
2.00 P.M to 5.00 P.M
Paper: PS03CBIC22-Genetic Engineering

Marks: 70

Q.1 Choose the most appropriate answer. **(08)**

1. Which of the following biomolecule is the most common contaminant in isolated nucleic acids?
   a) Lipids b) carbohydrates c) Proteins d) vitamins
2. Which of the following enzyme is used in RFLP?
   a) T4 Ligase b) Polymerase
   c) Alkaline Phosphatase d) Restriction endonucleases
3. Expression vectors differ from cloning vectors in having
   a) Selectable markers b) restriction sites
   c) signals for transcription and translation d) smaller size
4. Which of the following character describes lacZ gene in pUC18 vector?
   a) Encodes for antibiotic resistance b) encodes for β lactamase
   c) encodes for β galactosidase d) encodes for transferase
5. Which of the following enzymes can be used to avoid self ligation of vectors?
   a) Lipases b) Alkaline phosphatases c) endonucleases d) none
6. Which of following methods is suitable for introducing DNA into plant cells?
   a) Biolistics b) Electroporation c) Microinjection d) Transformation
7. Which of the following methods is suitable for the measurement of change in gene expression?
   a) Subtractive hybridization c) northern hybridization
   b) Southern hybridization d) none of these
8. Metagenomics is the study of
   a) Environmental DNA c) Genomes of animals
   b) Metabolic pathways d) genetics of transformants

Q.2 Answer <u>any seven</u> of the following questions in brief. **(14)**

1. .Write a brief note on Ultrasonication
2. Advantages of pUC18 over pBR322.
3. Applications of cDNA library.
4. Principle of alkaline denaturation method for plasmid DNA isolation.
5. Basics of shot gun sequencing approach.
6. Define metabolic engineering with an example
7. What is Golden rice? "Why was it developed?
8. State the salient features of primers used for PCR.
9. Write a note on ribotyping

(PTO)

Q.3 a) What is Genomic DNA? Explain principle and steps and difficulties involved in the extraction of plant Genomic DNA. (06)

b) Explain basic features of Yeast chromosomes. Describe cloning strategy and applications of YAC vectors. (06)

OR

b) Explain how blue-white screening differs from red-white screening method? (06)

Q.4 a) Write note on I) Yeast expression vectors (06)

II) Role of Restriction endonucleases

b) Describe the salient features of BAC and the strategy for cloning using this vector. (06)

OR

b) Draw a schematic diagram of λ-bacteriophage genome. Give a comparative account of insertion and replacement vectors. (06)

Q.5 a) Give an detailed account of Pyrosequencing of nucleic acids. (06)

b) Explain in detail the principle of Real Time PCR . Explain any one chemistry used in real time PCR (06)

OR

b) What are molecular markers? Explain the basic principle, advantages and applications of RAPD. (06)

Q.6 a) Describe the principle involved in "herbicide tolerant" transgenic plants. (06)

b) Describe PCR based site directed mutagenesis in detail. In what way this method is superior to single primer extension method? (06)

OR

b) Discuss in detail the regulations for release of genetically modified organisms in India. (06)

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Sardar Patel University
M.Sc. Biochemistry, 3rd Semester
External Theory Examination
Monday, 29th October 2018, 02:00 to 05:00 P.M.
PS03EBIC24: Plant Biochemistry

Total marks: 70

N.B.: (i) Answers of all the questions (including multiple choice questions) should be written in the provided answer book only.

(ii) Figures in the right indicate marks.

Q1 Select the appropriate answer for the following multiple choice questions: (08)

(i) **Indefinite growth of plants is due to the presence of**
(a) Meristemtic cells (b) Parenchyma
(c) Permanent tissue (d) Vascular tissue

(ii) **The deficiency of which of the followings can inhibits absorption of ions?**
(a) CO, (b) enzyme
(c) Oxygen (d) All

(iii) **For the process of photosynthesis all except one of the following items are essential. Point out the exception**
(a) CO_2, optimum temperature (b) Glucose and oxygen
(c) Water and minerals (d) Light and chlorophyll

(iv) **The end products of respiration in plants are**
(a) CO_2, H_2O and energy (b) Starch andO_2
(c) Sugar andO_2 (d) $H_2O$and energy

(v) **Which of the following is an alkaloid?**
(a) Morphine (b) Cocaine
(c) Atropine (d) All of these

(vi) **The plant hormone gibberellins are**
(a) Monoterpene (b) Diterpene
(c) Triterpene (d) None of these

(vii) **Okadaic acid is an inhibitor of**
(a) Nitrate reductase (b) Nitrite reductase
(c) Nitrate reductase phosphatase (d) Nitrate reductase kinase

(viii) **_____are prenylated derivatives of adenine**
(a) Auxins (b) cytokinins
(c) Brassinosteroids (d) None of these

(P. T. O.)

Q2. Answer any SEVEN of the following questions briefly: 14

(i) Giving suitable reasons, justify "Plant Biochemistry is a basic discipline which ultimately interfaces with several other subjects of plant sciences".

(ii) Give a brief description of characteristic features of meristematic cells

(iii) Differentiate between transpiration and guttation

(iv) Briefly explain the statement "many plant functions depend quite directly upon the properties of water and of substances dissolved in the water'.

(v) Explain the statement, "Respiration takes place in three stages".

(vi) Define the term 'repressor protein'.

(vii) Define Phytoalexins

(viii) Differentiate between necrotrophic and biotrophic pathogens of plants

(ix) What is the role of lectins in plant defense?

Answer the following questions in detail:

Q3. (a) Discuss the types of vacuoles and their importance in plant life. **06**

(b) With suitable illustrations explain the mechanism of opening and closing of stomata, especially with reference to the involvement of ion transport. **06**

OR

(b) Explain the mechanism of absorption of minerals from soil **06**

Q4. (a) Trace the sequence of events that take place from the time of absorption of light energy by the photosynthetic pigments of higher plants to the utilization of this energy in the production of ATP and reduced coenzyme (NADPH). **06**

(b) What do you understand by fermentation in plants? Aerobic organisms are generally much larger than anaerobic organisms. Can you suggest how this may be related to respiration? **06**

OR

(b) Describe the photorespiratory pathway. What is the relationship between photorespiration and photosynthesis? **06**

Q5. (a) Write an explanatory note on glucosinolates **06**

(b) Briefly explain the role of flavonoids in plants **06**

OR

(b) "Phenylalamine lyase is an important enzyme in plant secondary metabolism". Explain. **06**

Q6. (a) Give an overview of nitrate assimilation **06**

(b) Write an account on the role of cytokinins in plant growth **06**

OR

(b) Write an explanatory note on Brassinosteroids **06**