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SARDAR PATEL UNIVERSITY

M.Sc Biochemistry/ Zoology, II Semester Examination (CBCS)

Monday, 20 - 03 -2019, 2.00 p.m. to 5.00 p.m.

Subject: PS 02 CBIC 22/ PS02 CZOO 22, Toxicology

Max Marks : 70

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

1. The gut bacteria and conditions in the gastrointestinal tract convert the naturally occurring compound cycasin, methylazoxymethanol glycoside, into methylazoxymethanol, which one of these compound toxic?
   (a) Methylazoxy methanol
   (b) Both, cycasin and methylazoxy methanol
   (c) methylazoxy methanol glycoside
   (d) none of the above

2. CYP enzymes are _____ specific toward their substrates
   (a) Absolutely (b) Broadly (c) Stereospecific (d) None of the above

3. Which of the following parameters are NOT considered in Dose –response relation?
   (a) Concentration of toxicant (b) Route of exposure (c) Frequency of exposure(d) both b & c

4. Which insecticide is present in Chrysenthemum?
   (a) Pyrethrum (b) Malathion (c) Pheromones (d) Carbaryl

5. Which of the following is an important gasoline additive?
   (a) Mercury chloride (b) Tetraethyl lead (c) Arsenic tetroxide (d) Cadmium

6. Ames test is used to check _____ of the substances
   (a) toxicity
   (b) teratogenicity
   (c) mutgenicity
   (d) carcinogenicity

7. Plumbism occurs due to
   (a) Chronic lead poisoning
   (b) arsenic poisoning
   (c) cadmium poisoning
   (d) mercury poisoning.

8. Living organisms can show many kinds of toxic or adverse response to exposure of toxicant, which of the following can serve as a biomarker of response
   (a) increase in enzyme activity
   (b) subcellular pathogenic changes
   (c) metabolic dysfunction
   (d) all of the above

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

1. Define toxicant and state the factors influencing toxicity of toxicants.
2. What is the necessity of toxicity testing?
3. What is first pass metabolism? Is it a part of pharmacokinetics or pharmacodynamics?
4. Give examples and explain, a toxic effect may be direct or indirect or systemic or local.
5. Write a brief note on artificial sweetners.

C.P.T.O.

6. Explain the toxic effect caused by Reactive Oxygen Species (ROS) in cells.
7. Differentiate between toxicokinetics and toxicodynamics.
8. How pheromones can be used to control insects?
9. Name a few antidotes of mercury poisoning.

Q.3 (a) What is LD_{50}? How can we determine LD_{50}? Discuss in brief why a traditional LD_{50} determination is obsolete? (06)

(b) Explain the metabolism of paracetamol and toxicity that occur due to it's over dosage. (06)

OR

(b) Explain the metabolism of methanol and its toxicity and antidote. (06)

Q.4 (a) Classify the following enzymes as Phase I or Phase II reaction enzymes and narrate their importance in brief. (06)

(i) Cytochrome P 450 oxidase (iii) Flavin monooxygenase (v) Glutathione transferase
(ii) Epoxide hydrolase (iv) UDP glucuronosyl transferase (vi) Alcohol dehydrogenase

(b) Explain the effects of simultaneous exposure of two substances in each of the following case: (06)

i. Carbon tetrachloride and ethanol together are more toxic to the liver than each separately
ii. A drug Disulphiram, which in non-toxic, causes toxicity due to intake of alcohol
iii. Vanillin, a flavor in ice-cream is non-toxic, but when paracetamol is also consumed in high dose, it causes liver damage

OR

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

Q.5 (a) Write a brief note on anticholinesterase insecticides. (06)

(b) Explain the mode of action of herbicides and fungicides. (06)

OR

(b) Explain the additives used in food industries. (06)

Q.6 (a) Explain the source and toxicity of Cadmium. (06)

(b) What are environmental effects of Sulfur oxide pollution (06)

OR

(b) Explain the Green house effects and its implications. (06)

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[130/145] SARDAR PATEL UNIVERSITY

M.Sc (III Semester) Biochemistry/Zoology Examination (CBCS)

Friday, 1st January 2021, 2:00 pm to 4:00 pm

PS03CBIC21/PS03CZOO21 – Human Physiology

TOTAL MARKS: 70

Q.1 (A) Choose the most correct answer for the following and write in your answer sheet. **(08 Marks)**

1. Most of the body's compensatory homeostatic mechanisms function by
   (a) Positive feedback system
   (b) Sensory division of PNS
   (c) Negative feedback system
   (d) CNS
2. The liver is a unique organ as it receives a dual blood supply from
   (a) Hepatic artery and hepatic duct
   (b) Hepatic artery and hepatic portal vein
   (c) Hepatic portal triad
   (d) The liver does not receive dual blood supply
3. Which of the following valve prevents gastric juices from flowing back out of the stomach into the oesophagus
   (a) Cardiac sphincter
   (b) Pharyngeal valve
   (c) Pyloric sphincter
   (d) None of these
4. In which organ of the digestive system, food is thoroughly mixed with its own digestive juices by a vigorous, to-and-fro churning motions caused by contractions of strong muscle in its wall?
   (a) small intestine (b) large intestine (c) liver (d) stomach
5. Which of the following Ion Channel is opened by neurotransmitters in the membrane of a neuron cells?
   (a) K^+ Leakage channel
   (b) A ligand-gated channel
   (c) A mechanically gated channel
   (d) A voltage gated channel
6. In the resting state of the neural membrane, diffusion due to concentration gradient, if allowed would drive,
   (a) K+ into the cell (b) K+ and Na+ out of the cell (c) Na+ into the cell (d) None
7. Angiotensinogen is a protein produced and secreted by
   (a) Liver cells
   (b) Endothelial cells
   (c) Macula Dansa cells
   (d) JuxtaGlomerular cells
8. Which of the following increases GFR?
   (a) Atrial natriuretic peptide (ANP)
   (b) Constriction of the afferent arterioles
   (c) Increased sympathetic stimulation to the afferent arterioles
   (d) ADH

Q. 1 (B) **Fill in the blanks.** **(16 marks)**

1. _____ produced by parietal cells forms a complex with Vitamin B12, which is necessary for its absorption in ileum.
2. Under normal resting conditions, _____, _____, and _____ receive excess blood because of their importance in maintaining homeostasis.

3. The products of lipid digestion are coated with proteins and transported into lymphatic capillaries called _____.
4. Action potentials has two main phases, _____ and _____.
5. Each day within the mucosa of the gastric walls in the GI tract secrete a total of about _____ of digestive juice.
6. A period of time after an action potential begins during which an excitable cell can not generate another action potential in response to a normal threshold stimulus is called the _____.
7. As food reaches the pylorus, each mixing wave periodically forces about 3 ml of chyme into the duodenum, a phenomenon known as _____.
8. Gastric emptying is slowest after a _____ meal because it stimulates cholecystokinin, which slows stomach emptying.

Q. 1 (B) **Mark the following statements as TRUE of FALSE.**

1. With increase in age, the blood supply to the digestive tract decreases.
2. Unmyelinated axons exhibit continuous conduction; whereas myelinated axons exhibit saltatory conduction of nerve impulses.
3. The pressure generated by left ventricular contraction is the driving force for the flow of blood through the entire systemic as well as pulmonary circulation.
4. Renin is a proteolytic enzyme that converts an inactive angiotensinogen, into angiotensin I.
5. The length of the GI tract is about 5 -7 meters in a living person and 7-9 meters in cadavers.
6. The histamine receptors on the parietal cells are called H2 receptors, and are different from H1 receptors involved in allergic reactions.
7. Glomerular filtrate has the same ratio of water and solute particles as blood.
8. Under normal physiological conditions, hematocrit and blood viscosity do not vary considerably within an individual.

Q.2 (A) Answer **any SEVEN** of the following questions briefly: (14 marks)

1. Human body is constantly challenged with altering external environmental conditions, how the cells and tissues in the various systems maintain internal order to function efficiently?
2. Through which type of blood capillaries and how the exchange of blood constituents takes place between blood and interstitial fluid?
3. Name major secretary cells in the stomach along with their secretion.
4. What is the significance of high and low WBC counts? Do WBCs live longer in healthy individuals or infected individuals?
5. Which pathway of blood coagulation occurs faster?
6. Narrate the functions of liver.
7. Differentiate between phagocytosis by neutrophils and phagocytosis by macrophages.
8. What is the role of ADH in urine formation?
9. Which cells form myelin sheath on axons? How?

Q.3 Describe the functions, life cycle and regulation of formation red blood cells. (08)

OR

Q.3 What is mean arterial pressure (MAP)? Discuss how cardiac output and total peripheral resistance affect MAP. (08)

Q.4 Describe the mechanical and chemical digestion in the stomach. (08)

OR

Q.4 Describe the major hormones that regulate digestive activities. (08)

Q.5 What is countercurrent multiplication? How does a kidney produce concentrated urine in summer? (08)

OR

Q.5 Describe the routes and mechanisms of tubular reabsorption and secretion. Which substances are reabsorbed most and which substance is not reabsorbed at all? (08)

Q. 6 What are the roles of FSH, LH, oestrogen and progesteron in the female reproductive system? (08)

OR

Q.6 Explain the propagation of action potential (AP). (08)

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SARDAR PATEL UNIVERSITY
M.Sc. (III Semester) Biochemistry
22nd March, 2019 (Friday)
2.00 P.M to 5.00 P.M
Paper: PS03CBIC22-Genetic Engineering

Marks: 70

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

1. RNA isolation is comparatively difficult than DNA isolation because RNA
   a) Contains Uracil b) is unstable c) is small in size d) none of these

2. Which of the following enzyme is commonly used for cutting DNA molecules?
   a) T4 Ligase b) DNA Polymerase
   c) Alkaline Phosphatase d) Restriction endonucleases

3. cDNAs are prepared from mRNAs by using
   a) Taq DNA polymerase b) DNA ligase
   c) reverse transcriptase d) all of these

4. In Sanger's DNA sequencing method, chain termination is achieved by
   a) deoxyribo nucleotides b) Dideoxyribo nucleotides
   c) ribonucleotides d) Adenine labelled with P32

5. Which of the following DNA fingerprinting methods can help in the study of co-dominanace?
   a) RFLP b) RAPD c) AFLP d) All of these

6. The most suitable method for introducing DNA into oocytes of animals is
   a) Biolistics b) Microinjection
   c) Electroporation d) Transformation

7. Single primer extension is a method commonly used for
   a) Site directed mutagenesis b) northern hybridization
   c) Southern hybridization d) real time PCR

8. The study of the entire environmental DNA from any source is known
   a) Metabolic engineering b) Metagenomics
   c) DNA isolation d) None of these

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

1. Type II restriction enzymes
2. Advantages of bacteriophage based vectors
3. Applications of genomic DNA library.

(P.T.O.)

4. Salient features of pUC19 vector
5. Basic principle of pyrosequencing
6. Limitations of RAPD
7. Role of template DNA in PCR
8. Somatic cell gene therapy
9 Limitations of metabolic engineering

Q.3 a) Explain principle and steps involved in the extraction of plasmid DNA (06)

b) Explain basic steps involved in cDNA library synthesis. What are it's advantages? (06)

OR

b) Explain the principle and advantages of blue-white screening (06)

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

II) Role of Alkaline Phosphatase

b) Explain the salient features of Ti plasmid based vectors (06)

OR

b) What are expression vectors? Explain how they differ from cloning vectors? (06)

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

b) Describe any one method for site directed mutagenesis in detail. (06)

OR

b) Explain the basic principle, advantages and applications of RFLP. (06)

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

b) Give an account of the process and applications of metagenomics (06)

OR

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

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