Note: Answer to all questions (including multiple choice questions) should be written in the provided answer book only.

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Number of Printed Pages = 2

SARDAR PATEL UNIVERSITY
M.Sc (III Semester) Examination (CBCS)
Thursday, 6th December, 2012
2:30 p.m. to 5:30 pm
Biotechnology
PS03EBIT01 – Human Physiology

TOTAL MARKS: 70

Q.1 Tick mark / select the correct answer for the following. (*Only correct option against given question number needs to be written in provided answer book*) (08 Marks)

1) The functions of tropomyosin in skeletal muscle include:
   a) Sliding on actin to produce shortening
   b) Releasing Ca^{2+} after initiation of contraction
   c) Acting as a "relaxing protein" at rest by covering up the sites where myosin binds to actin
   d) Binding myosin during contraction

2) In normal human blood
   a) The eosinophil is the most common type of white blood cell
   b) There are more lymphocytes than neutrophils
   c) The iron is mostly in hemoglobin
   d) There are more white cells than red cells

3) Which of the following is not primarily a function of blood plasma?
   a) Transport of hormones
   b) Maintenance of red cell size
   c) Transport of O_2
   d) Transport of antibodies

4) Glucose reabsorption occurs in the
   a) Loop of henle
   b) Distal tubule
   c) Proximal tubule
   d) Cortical collecting duct

5) Which of the following are incorrectly paired?
   a) Elastase: tissue rich in elastin
   b) Enteropeptididase: Fatty acids
   c) Pancreatic α – amylase: Starch
   d) Lingual lipase: digestion in the stomach

6) This hormone stimulates leydig cells to secrete testerone:
   a) GnRH
   b) LH
   c) FSH
   d) DHT

7) Which of the following enzymes is correctly matched with site of production:
   a) Amylase-Pancreas
   b) Trypsin-Salivary glands
   c) Chymotrypsin-Liver
   d) Pepsin-Liver

8) When a depolarizing graded potential makes the axon membrane depolarize to threshold
   a) Ligand-gated Ca^{+2} channels close rapidly
   b) Voltage gated Na^{+} channels open rapidly
   c) Voltage-gated Ca^{+2} channels open rapidly
   d) Ligand-gated Na^{+} channels close rapidly

Q.2 Answer **any seven** from the following: **(14 marks)**

a) What is the function of transferrin?
b) Explain: A Person with lactose intolerance can tolerate yoghurt?
c) Differentiate between action potential and graded potential
d) What factors determine the speed of propagation of an action potential
e) Name the important hormones secreted by the leydig cells and sertoli cells of the testis and by the graffin follicles and corpora lutea of the ovaries.
f) What are the functions of gastric lipase and lingual lipase in the stomach?
g) Name the three types of neurons based on the functional classification of neurons
h) What is the difference between cortical nephron and juxtamedullary nephron
i) Which hormone is detected by home pregnancy test? State the function of this hormone in the post ovulatory events in the ovary.

Q.3 A: Give a diagrammatic overview of the blood-clotting cascade and write the important features of intrinsic, extrinsic and common pathway **(6 marks)**

Q.3 B: What is erythropoiesis? Describe how erythropoiesis affect hematocrit by stepping up negative feedback system when a subject moves from a town at sea level to a high mountain village **(6 marks)**

OR

Q.3 B: Describe how Hcl is secreted by the cells in the gastric mucosa **(6 marks)**

Q.4 A: Describe the processes by which fatty acids and other lipids are absorbed from the intestine into the blood stream **(6 marks)**

Q.4 B: List the principal gastrointestinal hormones, the sites where each is secreted, and the main physiologic function of each of these hormones **(6 marks)**

OR

Q.4 B: Name the cells / glands from which estrogen and progesterone are secreted. State functions of the estrogen and progesterone. **(6 marks)**

Q.5 A: Describe how the renal tubule and collecting ducts produce dilute and concentrated urine? **(6 marks)**

Q.5 B: What is a myoneural junction? Summarize the major steps occurring in a myoneural junction leading to muscle contraction. **(6 marks)**

OR

Q.5 B: What is GFR? Explain neural and hormonal regulation of GFR? **(6 marks)**

Q.6 A: Name the phases of the female reproductive cycle and describe the events in the ovaries and uterus occurring in the menstrual phase. **(6 marks)**

Q.6 B: Explain the events of signal transmission at a chemical synapse. State the nature of post synaptic potential under the influence of (a) acetylcholine and (b) GABA **(6 marks)**

OR

Q.6 B: Describe the four types of ion channels upon which the electrical signals produced by neurons and muscle fibres rely upon? **(6 marks)**

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Sardar Patel University

M.Sc. II[nd] Semester Biotechnology

PS02CBIT03 (Genetic Engineering & Bioinformatics)

Date: **05/12/12** **Max Marks: 70**

Time: **2:30 to 5:30pm**

Q.1 Select the **most appropriate answer** from the following **1×8**

I. _____ was the first ever **cloned animal.**

a. Dolly
b. Molly
c. Kitty
d. Spike

II. Why a DNA duplex melts at a specific temperature (T_m) on heating?

a. Loss of base stacking energy
b. The double helix is intrinsically unstable
c. The single helix is more stable as compared to the double helix
d. The DNA double helix is a co-operative structure stabilized by hydrogen bonds and base pairing

III. The enzyme **reverse transcriptase** enables scientists to produce what product?

a. Restriction endonucleases
b. cDNA molecule
c. Restriction fragment length polymorphism
d. mRNA transcript

IV. In the **Sanger method of DNA sequencing**, what causes the termination of chain elongation?

a. The incorporation of a regular DNA nucleotide
b. The incorporation of a dideoxynucleotide
c. Denaturation of the double-stranded test fragments
d. When the DNA polymerase encounters a stop codon

V. All methods of **DNA fingerprinting** depend on some variation of what strategy?

a. RFLP
b. Gene therapy
c. Microarray analysis
d. Nucleic acid hybridization

VI. **Genomic libraries** are useful for obtaining what product?

a. Periodicals on genomics research
b. Collections of isolated genes
c. Instructional information on how to locate the exact site of the gene of interest
d. Information relating to primers and PCR

VII. The analysis and storage of the massive amount of data generated from **sequence maps** has led to the growth of what new disciplines?

a. Immunology and virology
b. Bioinformatics and medical microbiology
c. Genomics and genetic engineering
d. Genomics and bioinformatics

VIII. The identification of **drug** through genomic study

a. Genomics
b. Chemoinformatics
c. Pharmacogenetics
d. Pharmagenomics

Q.2		Attempt **any seven** of the following and describe in brief	2×7
	I.	**Ligation** of DNA	
	II.	**Blue white selection**	
	III.	Reverse transcriptase	
	IV.	Drawbacks of **Maxam-Gilbert's** method of DNA sequencing	
	V.	**Apyrase**	
	VI.	**Green fluorescent proteins**	
	VII.	**BLAST**	
	VIII.	**SCOPE** and **CATCH** tool	
	IX.	**DDBJ**	
Q.3	**A.**	Describe different steps in the **gene cloning.**	**06**
	B.	Discuss principle and application of **real time PCR.**	**06**
		OR	
	B.	Discuss chemical method of **transformation** and **selection** of **recombinant DNA**	**06**
Q.4	**A.**	Describe **Sanger's** method of **DNA sequencing.**	**06**
	B.	Explain **DNA finger printing** and its applications.	**06**
		OR	
	B.	Explain **site directed mutagenesis** in details and its application.	**06**
Q.5	**A.**	Describe **reporter genes**? Write down the properties of ideal reporter genes. List some commonly used reporter genes. Give detail account of any one.	**06**
	B.	What is **bio-informatics** and describe applications of bioinformatics in modern research.	**06**
		OR	
	B.	Write a note on **MSA** and how it is helpful to find **evolutionary relationship** among the species or among the genes or protein.	**06**
Q.6	**A.**	Write a note on various types of **BLAST** in details.	**06**
	B.	Describe **shotgun** approach of genome sequencing with suitable diagram.	**06**
		OR	
	B.	Describe in details various database for **3-D structure** prediction.	**06**

ALL THE BEST

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SARDAR PATEL UNIVERSITY
M.Sc (II Semester) Examination (CBCS)
Monday, 3rd December, 2012
2:30 pm to 5:30 pm
Biochemistry
PS02CBIC02 – Biochemical & Environmental Toxicology
TOTAL MARKS: 70

Q.1 Choose the correct answer for the following and write in your answer sheet (*Only correct option against given question number needs to be written in provided answer book*) **(08 Marks)**

1) The passage of a chemical through the cellular wall into the cytosol is termed as a
(a) Diffusion (b) phase I (c) Phase 0 (d) None of the above

2) Which of the following enzyme can utilize phase I reaction product as a substrate?
(a) CYP 450 Oxidase (c) Alcohol Dehydrogenase
(b) Epoxide hydrolase (e) none of the above

3) If the concentration range over which toxic effects and/or therapeutic effects are seen is narrow,
(a) TDM should be done (c) Dosage should be increased
(b) TDM is not required (d) none of the above

4) If tetraethylpyrophosphate (TEPP) has LD50 of 1mg/kg of body weight and tetrachlorodibenzodioxin (TCDD) has LD50 of 0.1mg/kg of body weight, which is more toxic?
(a) TEPP (c) both have same toxicity
(b) TCDD (d) none of the above

5) Absoption, distribution, metabolism and elimination of a toxicant in human is termed
(a) Toxicodynamics (b) Xenobiotic metabolism (c) Toxicokinetics (d) None of the above

6) Chemicals that induce structural chromosomal mutations are termed
(a) Aberrators (b) Clastogens (c) modifiers (d) none of the above

7) Estimated dose at which 5 % of the test subjects die is termed
(a) LD 95 (b) LD 5 (c) LD 50 (d) None of the above

8) Itai-Itai - skeletal deformities with severe pain is by
(a) Cadmium toxicity (c) lead toxicity
(b) Arsenic toxicity (d) Mercury toxicity

Q.II Answer any SEVEN of the following questions briefly: (14 marks)

1. Differentiate between Acute toxicity and chronic toxicity.
2. Differentiate between Toxicokinetics and Toxicodymanics
3. Differentiate between synergism and antagonism.
4. What are chemical antidotes? Cite two examples.
5. What are the sources and symptoms of lead poisoning?
6. Enlist the criteria required for therapeutic drug monitoring.
7. What is genotoxicity?
8. List toxicants that disturb calcium homeostasis.
9. What is the significance of determining Therapeutic index of drug?

Q.III. Answer the following questions in detail.

1. (a) What is dose-response curve? Illustrate determination of ED50 values using dose response curve. **(06)**

   (b) Explain division of different phases in toxicants' metabolism. **(06)**

   OR

   (b) Explain the Bruce Ames test. **(06)**

2. (a) Describe phase II reactions of biotransformation of xenobiotics with glutathione conjugation and sulfation as examples **(06)**

   (b) Give a brief account of mechanism of metal toxicity and its amelioration. **(06)**

   OR

   (b) Write a brief note on: Phase-III metabolism of xenobiotics. **(06)**

3. (a) State the environmental fate of persistent xenobiotics like pesticides. **(06)**

   (b) List toxicants that disturb calcium homeostasis. How metals like lead, cadmium, mercury, etc. and some pesticides perturb normal calcium homeostasis? **(06)**

   OR

   (b) Explain HPRT gene-mutation test. **(06)**

4. (a) Explain the chronic toxicity, metabolism and antidote for paracetamol. **(06)**

   (b) Discuss the sources and toxic effects of air pollutants. **(06)**

   OR

   (b) Describe the environmental implications of use of insecticides. **(06)**
