

[A-82]

Number of Printed Pages = 2

SARDAR PATEL UNIVERSITY
M.Sc (III Semester) Examination (Under CBCS)
Monday, 27th April, 2015
2:30 pm to 5:30 pm
Biochemistry
PS03CBIC03 – Human Physiology

TOTAL MARKS: 70

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

- 1) This plexus is located between the longitudinal and circular smooth muscle layers of the muscularis.
 - a) ENS
 - b) Myenteric plexus
 - c) Submucosal plexus
 - d) Digestive plexus
- 2) This is smooth dense irregular connective tissue that is continuous with the outer coat of the ureter?
 - a) adipose capsule
 - b) renal capsule
 - c) renal hilus
 - d) renal cortex
- 3) This is a test to measure kidney function.
 - a) Plasma creatinine
 - b) Renal study
 - c) Kidney assay
 - d) Dialysis
- 4) This is the ovarian phase between the end of menstruation and beginning of ovulation.
 - a) Menstrual phase
 - b) Preovulatory phase
 - c) Proliferative phase
 - d) Follicular phase
- 5) If a neurotransmitter depolarizes the postsynaptic membrane it is referred to as:
 - a) Spatial
 - b) Inhibitory
 - c) Excitatory
 - d) Temporal
- 6) Which of the following reduces blood loss?
 - a) Platelet
 - b) Erythrocyte
 - c) Lymphocyte
 - d) Basophil
- 7) Which of the following is an anticoagulant?
 - a) Fibrinogen
 - b) Protease
 - c) Prostacyclin
 - d) Heparin
- 8) Which of the following is not a type of channel used in production of electrical signals in neurons?
 - a) Voltage-gated channel
 - b) Ligand-gated channel
 - c) Mechanically gated channel
 - d) Ion-gated channel

- Q.2** Answer **any seven** from the following: **14**
- a) List and describe any four functions of blood
 - b) Draw the structure of a typical neuron and write any two function of nervous system.
 - c) What are the functions of gastric lipase and lingual lipase in the stomach?
 - d) What is the function of transferrin?
 - e) Why does damaged endothelium present an increased risk of blood clotting?
 - f) Name some substances that are absorbed into the blood from stomach?
 - g) What factors determine the speed of propagation of action potential?
 - h) Why is menstruation inhibited in pregnancy?
 - i) Distinguish between (Excitatory post synaptic potential) EPSP and inhibitory post synaptic potential (IPSP).
-
- Q.3** (A) Describe the structure and functions of different types of white blood cells. **6**
- (B) What is erythropoiesis? Explain the negative feedback regulation of erythropoiesis. **6**
- OR**
- (B) Describe the formation and destruction of RBC. **6**
-
- Q.4** (A) Describe the end products of chemical digestion of carbohydrates, proteins and lipids during the absorption of digested nutrients across the small intestine. **6**
- (B) Describe the structure and function of four basic tissue layers of the GI tract that are commonly found from stomach to the anus. **6**
- OR**
- (B) What is defecation? Describe the physiology of absorption, feces formation and feces elimination in the large intestine. **6**
-
- Q.5** (A) What is GFR? Briefly explain the physiological role of 'myogenic mechanism', 'tubuloglomerular feedback' and significance of atrial natriuretic peptide (ANP) in regulation of GFR. **6**
- (B) List and name the forces that contribute to net filtration pressure (NFP) and explain how NFP is calculated. Describe the three main ways angiotensin II affects renal physiology. Include the role of Aldosterone. **6**
- OR**
- (B) Describe features of the endothelial-capsular membrane that allow it to act as a filter. **6**
-
- Q.6** (A) Explain the sequence of events that allow an action potential on an axon to be transmitted into a graded potential on a postsynaptic membrane in a chemical synapse. **6**
- (B) Describe the hormonal changes during menstrual cycle. **6**
- OR**
- (B) Which are the three major components of the nervous system. Give a flow chart of the organization of nervous system and explain its three basic functions. **6**

[A-83]

Number of Printed Pages = 2

SARDAR PATEL UNIVERSITY
M.Sc (III Semester) Examination (Under CBCS)
Monday, 27th April, 2015
2:30 pm to 5:30 pm
Biotechnology
PS03EBIT01 – Human Physiology

TOTAL MARKS: 70

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

- 1) Which of the following pancreatic enzymes digests lipids?
 - a) Trypsin
 - b) Elastase
 - c) Lipase
 - d) Pepsin
- 2) This term means the return of substances into the blood stream from the filtrate.
 - a) Secretion
 - b) Filtration
 - c) Reabsorption
 - d) Excretion
- 3) Na⁺/K⁺-ATPases are considered to be electrogenic pumps because
 - a) They contribute to the negativity of the resting membrane potential
 - b) Because the sodium ions are negatively charged
 - c) Because they exhibit low permeability
 - d) Both a and b
- 4) When a depolarizing graded potential makes the axon membrane depolarize to threshold
 - a) Voltage gated Na⁺ channels open rapidly
 - b) Voltage-gated Ca²⁺ channels open rapidly
 - c) Ligand-gated Na⁺ channels close rapidly
 - d) Voltage gated Ca²⁺ channels close rapidly
- 5) Which of the following reduces blood loss?
 - a) Erythrocyte
 - b) Platelet
 - c) Lymphocyte
 - d) Basophil
- 6) Which of the following is not an agranular leukocyte?
 - a) Monocytes
 - b) Basophil
 - c) Lymphocyte
 - d) Macrophage
- 7) _____ hormone secreted by the _____ controls the ovarian and uterine cycles.
 - a) FSH, anterior pituitary
 - b) LH, anterior pituitary
 - c) HGH, hypothalamus
 - d) GnRH, hypothalamus
- 8) Which is the correct order of filtrate flow?
 - a) loop of Henle, glomerular capsule, PCT, DCT, collecting duct
 - b) ascending limb of loop, PCT, DCT, collecting duct
 - c) collecting duct, DCT, PCT, collecting duct, glomerular capsule
 - d) glomerular capsule, proximal convoluted tubule (PCT), loop of Henle, distal convoluted tubule (DCT), collecting duct

- Q.2** Answer **any seven** from the following: **14**
- a) Which cells remove worn out (dead) red blood cells from circulation? What happens of the hemoglobin?
 - b) Draw a neat labeled diagram of a nephron and add a note on any two function of kidney.
 - c) How does filtered glucose enter and leave proximal convoluted tubule.
 - d) Give a list of all the enzymes secreted in the pancreatic juice.
 - e) What is hemostasis? List the three mechanisms that contribute to hemostasis.
 - f) Which two enzymes contribute to chemical digestion in the mouth? Explain the action of those enzymes on the ingested food.
 - g) Briefly describe what causes depolarizing phase.
 - h) State four function of estrogen.
 - i) What is the difference between inhibitory post synaptic potential (IPSP) and excitatory post synaptic potential (EPSP)
-
- Q.3** (A) What is erythropoiesis? Which factors speed up or slow down erythropoiesis? **6**
- (B) Explain the formation and destruction of red blood cells, and recycling of hemoglobin components with the help of a diagram. Add a note on the consequences of iron buildup in the plasma. **6**
- OR**
- (B) Describe the structure and function of different types of white blood cells. **6**
-
- Q.4** (A) Describe the structure and function of four basic tissue layers of the GI tract that are commonly found from stomach to the anus. **6**
- (B) What is defecation? Describe the physiology of absorption, feces formation and feces elimination in the large intestine. **6**
- OR**
- (B) Describe the mechanism of absorption of carbohydrates and lipids in the small intestine. **6**
-
- Q.5** (A) What is net filtration pressure? Write the equation and calculate NPF. **6**
- (B) Explain the structure of filtration membrane and size of molecules being filtered by it in the glomerular capsule. **6**
- OR**
- (B) Which cells secrete the enzyme renin? Describe the three main ways angiotensin II affects renal physiology. Include the role of Aldosterone. **6**
-
- Q.6** (A) Explain the events of signal transmission at a chemical synapse. **6**
- (B) Enlist the various phases of menstrual cycle and give a graphical overview of changes in concentration of anterior pituitary and ovarian hormones during the course of female reproductive cycle. **6**
- OR**
- (B) What is resting membrane potential? Explain the three major factors that contribute to the resting membrane potential. **6**

—X—



[A-33]

SARDAR PATEL UNIVERSITY
M.Sc (IV Semester) Examination (Under CBCS)
Saturday, 25th April, 2015
10:30 am to 1:30 pm
Microbiology
PS04EMIC07 – Human Physiology

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

- 1) This is a nephron process that results in a substance in blood entering the already formed filtrate:
 - a) Reabsorption
 - b) Filtration
 - c) Secretion
 - d) Excretion
- 2) Maintenance of balanced state in the body's internal environment by hormonal and other regulatory systems is called.
 - a) Equilibrium
 - b) Hemostasis
 - c) Homeostasis
 - d) Endocrinology
- 3) Filtering of blood takes place in
 - a) Nephrons
 - b) Ureters
 - c) Intestines
 - d) Red blood cells
- 4) Action potentials are conducted more rapidly in:
 - a) It is faster in large-diameter axons than in small-diameter ones
 - b) It is faster for a strong stimulus than for a weak one
 - c) It is faster in myelinated nerve fibres than in non-myelinated ones.
 - d) Both a and c
- 5) A dendrite conducts nerve impulses _____ the cell body:
 - a) Away from
 - b) toward
 - c) both toward and away from
 - d) around
- 6) This structure regulates the flow of material into the colon:
 - a) Pyloric sphincter
 - b) Ileocecal sphincter
 - c) Appendix
 - d) Sigmoid colon
- 7) _____ hormone secreted by the _____ controls the ovarian and uterine cycles.
 - a) FSH, anterior pituitary
 - b) LH, anterior pituitary
 - c) HGH, hypothalamus
 - d) GnRH, hypothalamus
- 8) A megakaryoblast will develop into?
 - a) red blood cell.
 - b) a white blood cell.
 - c) a platelet.
 - d) none of these choices.

- Q.2** Answer **any seven** from the following: **14**
- a) What is polycythemia?
 - b) What are the basic differences between cortical and juxtamedullary nephrons?
 - c) What is the normal RBC count in male? Why the number of RBC is more in male than female.
 - d) Describe the duct system connecting the pancreas, liver and duodenum.
 - e) What are anticoagulants? Give at least four examples.
 - f) List the two hormones of posterior pituitary and state their functions.
 - g) List the factors that affect the speed of propagation of impulse.
 - h) Write any four functions of testosterone.
 - i) What are neuroglial cells? List the neuroglial cells of CNS and PNS.
-
- Q.3** (A) Explain the formation and destruction of red blood cells, and recycling of hemoglobin components with the help of a diagram. **6**
- (B) Explain the extrinsic and intrinsic pathways of blood clotting. **6**
- OR**
- (B) What is anemia? List and describe briefly various types of anemia. **6**
-
- Q.4** (A) Describe how HCl is secreted in gastric mucosa. **6**
- (B) Explain how digestion of fat occurs in the gastrointestinal tract. **6**
- OR**
- (B) Describe the major hormones that regulate digestive activities. **6**
-
- Q.5** (A) List and name the forces that contribute to net filtration pressure (NFP) and explain how NFP is calculated. Describe the three main ways angiotensin II affects renal physiology. Include the role of Aldosterone. **6**
- (B) Explain the counter current mechanism occurring in the nephrons. **6**
- OR**
- (B) Describe the reabsorption and secretion in the proximal convoluted tubule. **6**
-
- Q.6** (A) Describe the organization of nervous system with a flow chart and indicate the paths of afferent and efferent information. **6**
- (B) Draw a graphical representation of different phases of menstrual cycle. Explain the role of anterior pituitary and ovarian hormones during normal female reproductive cycle. **6**
- OR**
- (B) Describe various types of ion channels used for nerve impulse transmission. **6**

50

(A-46)

No. of Printed Pages: 02

SARDAR PATEL UNIVERSITY
M. Sc. Microbiology IVth Semester Examination
PS04CMIC01: r-DNA Technology
Tuesday, 21/04/2015

Time: 10: 30 a.m. to 1:30 p.m.

Max. Marks: 70

Note: Figures on the right indicate marks.

- Q.1 Choose the most appropriate answer (08)
- i Poly-A tail is characteristic feature of
 - a) Fatty acid
 - b) mRNA
 - c) rRNA
 - d) DNA
 - ii Screening of clones by gene abundancy means
 - a) selection of clone due to presence of multiple copies of gene
 - b) selection of clone is based on cDNA library hybridization due to high rate transcription of cloned gene
 - c) selection is based on high rate translation of cloned gene
 - d) none of the above
 - iii In the Sanger's method of DNA sequencing each reaction mixture contains
 - a) all four normal dNTPs and one ddNTP
 - b) all four normal dNTPs and all four ddNTPs
 - c) three normal dNTPs and fourth ddNTP
 - d) three ddNTPs and fourth dNTP
 - iv RNA can be converted to complementary DNA by
 - a) RNA polymerase II
 - b) Reverse transcriptase
 - c) Terminal nucleotidyl transferase
 - d) Klenow fragment
 - v Restriction endonucleases from different sources but recognize the same target site and cleave identically at same position within target site are termed as
 - a) heteroschizomers
 - b) Isocaudomers
 - c) Isoschizomers
 - d) neoschizomers
 - vi Which of the following enzymes are used in RFLP analysis?
 - a) Alkaline phosphatase
 - b) T₄ DNA ligase
 - c) restriction endonucleases
 - d) Exonuclease I
 - vii Which of the following strategy is commonly employed in selection of recombinants when λ -replacement vectors are used as a cloning system?
 - a) blue-white selection
 - b) red-white selection
 - c) selection based on spi^- phenotype
 - d) resistance to ampicillin
 - viii Which of the following consist of ARS, centromere and telomeres?
 - a) BACs
 - b) PACs
 - c) YACs
 - d) Fosmids

- Q.2 Answer any SEVEN of the following: (14)
- Explain S1 mapping
 - What is transcriptome? What is its significance?
 - How does one purify mRNA from other cellular RNAs present in a eukaryotic cell?
 - Briefly explain about reporter gene.
 - Draw well labeled map of Ti-plasmid
 - What is difference between phagemid and phasmid?
 - What is significance of *lon*⁻ host in expression of recombinant gene?
 - What is nested PCR?
 - What are translational fusion vectors?
- Q.3 a. Explain the process of Southern blotting and Southern hybridization indicating the importance of each step. (06)
- b. Describe Maxam and Gilbert method of DNA sequencing and point out its limitation in the current scenario. (06)
- OR
- b. Write a note on PFGE and explain its variants pointing out their significance. (06)
- Q.4 a. Explain with suitable examples the use of strong and regulatable promoters in expression of eukaryotic gene in prokaryotic system. (06)
- b. Write a brief note on: Molecular markers. (06)
- OR
- b. Write a note on: (06)
- Chromosome walking
 - Restriction mapping
- Q.5 a. Write a note on Cosmids (06)
- b. Write a note on: In vitro packaging of λ DNA. (06)
- OR
- b. Discuss the possible problems that may be encountered while expressing a mammalian gene in *E. coli* and how they can be resolved? (06)
- Q.6 a. i) How can DNA polymerase I be converted to Klenow fragment? Describe major applications of Klenow fragment? (03)
- ii) Enlist salient features of T4 DNA polymerase and describe its applications in genetic engineering. (03)
- b. Write notes on: (06)
- Salient features of PCR primers
 - 'Plateau effect in PCR amplification'
- OR
- b. Write note on: Selectable marker genes employed in yeast cloning vectors (06)
- X-X-X-X-X-X-X-

32

No. of Printed Pages: 02

(A-75) SARDAR PATEL UNIVERSITY
M.Sc (III Semester) EXAMINATIONS
18th April, 2015
2.30 p.m to 4.30 p.m
PS03CBIC01 – rDNA technology

Maximum marks: 70

I. Choose the most appropriate answer:

(8x1 = 8 marks)

1. A PCR reaction requires all of these except:
(a) Primers b) dNTPs. c) Template DNA d) SDS
2. Which of the following enzyme is most preferred in recombinant DNA work to cut DNA?
a) Restriction endonuclease I c) Restriction endonuclease III
b) Restriction endonuclease II d) none of these
3. Which of the following type of vector would be most suitable for introducing DNA into a bacterial cell?
(a) Plasmid (b) YAC vector (c) Ti plasmid (d) Adenovirus
4. Green Fluorescent protein (GFP) is used in identification of recombinant clones as
a) a promoter c) a reporter
b) a vector d) an insert
5. Polymerase chain reaction (PCR) was invented by
a) Kary Mullis b) Frederick Sanger c) Maxam-Gilbert d) Messing
6. DNA sequencing by Sanger's method involves the use of
a) dideoxynucleotide c) fluorodinitrobenzene
b) ribonucleotide d) Microarray
7. The method of introducing recombinant DNA directly into a host cell by micro projectiles is known as
a) Biolistics b) microinjection c) transfection d) transduction
8. RNA dependant DNA polymerase is also known as
a) DNA polymerase b) RNA polymerase c) reverse transcriptase d) DNA ligase

II. Write briefly on any seven:

(7 x 2 = 14)

- a. pUC vectors
- b. Cosmids
- c. Southern blotting
- d. Insertional inactivation
- e. Disadvantages of electroporation
- f. Basic principle of RFLP
- g. Role of Vir A and G in Agrobacterium infection
- h. Types of microprojectiles used in Biolistics
- i. Primer annealing in PCR

III. Answer the following:

(4 x 12 = 48)

1. a) Describe the principle and the procedure of any one method for the isolation of plasmid DNA. (6)
- b) List the various methods for fragmentation of DNA. What are the advantages of using type II restriction enzymes for cutting DNA molecules. (6)

OR

- b) Write notes on
 - i) YAC vector (6)
 - ii) baculovirus vectors (6)
2. a) Outline any one strategy adopted for ligation of non-compatible ends of DNA with an example. (6)
- b) Explain the basic principle of Polymerase Chain Reaction. (6)

OR

- b) Outline the salient features of lambda ZAP II system in detail. (6)
3. a) Write notes on:
 - i) Protoplast fusion (6)
 - ii) Liposome mediated DNA delivery (6)
- b) Explain the principle and applications of subtractive hybridization (6)

OR

- b) Write notes on:
 - i) Colony hybridization (6)
 - ii) Microsatellite markers (6)
4. a) Outline the properties and advantages of Green Fluorescent Protein (GFP). (6)
- b) Explain the basic principle and advantages, disadvantages of AFLP. (6)

OR

- b) Explain the advantages and uses of site directed mutagenesis in detail. (6)

XXXXXXXXXX

[58]

Sc
No. of Printed Pages: 2

SARDAR PATEL UNIVERSITY

M.Sc (II Semester) Examination (CBCS)

Thursday, 23rd April, 2015, 2:30 pm to 5:30 pm

Biochemistry

PS02CBIC02 – Biochemical & Environmental Toxicology

TOTAL MARKS: 70

1. Choose the correct answer

1x8=8

- (i) Which of the following enzyme can utilize phase I reaction product as a substrate?
(a) CYP 450 Oxidase (c) Alcohol Dehydrogenase
(b) Epoxide hydrolase (d) none of the above
- (ii) Absorption, distribution, metabolism and elimination of a toxicant in human is termed
(a) Toxicodynamics (c) Xenobiotic metabolism
(b) Toxicokinetics (d) None of the above
- (iii) 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
- (iv) Itai-Itai - skeletal deformities with severe pain is by
(a) Cadmium toxicity (c) lead toxicity
(b) Arsenic toxicity (d) Mercury toxicity
- (v) A toxicant that over activates the immune system causing an immune response when one is not necessary is known as
(a) Neurotoxin (b) allergen (c) endocrine disruptor (d) none of the above
- (vi) A chemical or a type of radiation that causes cancer.
(a) Carcinogen (b) Teratogen (c) toxicant (d) all the above
- (vii) The buildup of toxicants in the tissue of an animal
(a) Bioaccumulation (b) Biomagnification (c) chronic toxicity (d) none of the above
- (viii) Acid rain is caused by
(a) CO and CO₂ (b) SO₂ and O₂ (c) SO₂ and NO₂ (d) NO₂ and O₂

2. Answer **any seven** of the following questions **briefly**: (14)

- (a) What are teratogens?
- (b) Differentiate between synergism and antagonism
- (c) Differentiate between toxicokinetics and toxicodynamics.
- (d) What is genotoxicity?
- (e) Give few reasons for the need of food additives.
- (f) What is meant by 'broad spectrum characteristics'?
- (g) Define: Green house effect.
- (h) Differentiate metals and metalloids.
- (i) What is meant by 'plumbism'?

3. (a) Write a note on scope and environmental significance of toxicology. (06)

(b) Write a note on paracetamol toxicity. (06)

OR

(b) What is dose response curve? Illustrate determination of ED50 values using dose response curve. (06)

4. (a) Explain Bruce Ames test. (06)

(b) Explain Phase I reactions.

OR

(b) Write a note on mammalian mutation tests. (06)

5. (a) What are environmental consequences of pesticide toxicity? (06)

(b) Write brief note on mode of action of fungicides and herbicides. (06)

OR

(b) Write an account on food additives and their toxicity. (06)

6. (a) Write a note on mercury toxicity. (06)

(b) Write a note on effect of SO₂ on environment. (06)

OR

(b) Write a brief account on uses and toxic effects of asbestos. (06)

+++++