SC

(93 & 96) Seat No._____ No. of Printed Pages : 2

SARDAR PATEL UNIVERSITY
M. Sc. (III Semester) (under CBCS) Examination
Thursday, 9th November 2017
Time: 10.00 am to 1.00 pm
Paper: PS 03 C BIC03/PS03 EBIT 01 (Human Physiology)
Total Marks: 70

Q1. Give the correct answers for the following questions: (08)

1. The type of white blood cell that often arrives at the site of infection first, is
   (a) Basophil (b) Eosinophil (c) Neutrophil (d) Macrophage

2. Which of the following is not a function of a liver?
   (a) Storing food (c) Manufacturing Insulin
   (b) Producing digestive juices (d) Self-healing upon damage

3. The main functions of the digestive system are
   (a) ingestion and digestion (c) absorption and elimination
   (b) propulsion and secretion (d) all of the above

4. Angiotensinogen is a protein produced and secreted by
   (a) Liver cells (c) Macula Dansa cells
   (b) Endothelial cells (d) JuxtaGlomerular cells

5. Filtering of blood takes place in
   (a) Ureters (b) intestines (c) nephrons (d) red blood cells

6. Concentration of urine depends upon which organ?
   (a) Bowman's capsule (c) length of Henle's loop
   (b) PCT (d) network of capillaries arising from glomerulus

7. A dendrite conducts nerve impulses _____ the cell body.
   (a) away from (b) toward (c) both toward and away from (d) around

8. During muscular contraction
   (a) actin and myosin filaments slide past each other.
   (b) ATP supplies energy.
   (c) calcium ions (Ca++) are involved.
   (d) all of the above

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

1. What is hematocrit? What is the importance of normal and abnormal hematocrit?
2. 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?
3. List any four functions of kidneys.
4. What is the role of Androgen binding protein (ABP) in the lumen of seminiferous tubule?
5. Differentiate between leukocytosis and leucopenia.
6. Which hormone prepares the endometrium of the uterus for implantation of a fertilized ovum?
7. Differentiate between action potentials and graded potentials.
8. Why acid secreted by parietal cells do not affect themselves as well as other cells in stomach?
9. Which vitamin is required for blood coagulation? What is its exact function?

Q.3 (a) Describe the regulation of formation red blood cells. (06)

(b) Explain the physiology of vascular spasm, platelet plug formation and blood clotting.(06)

OR

Q.3 (b) What is anemia? Describe the causes and symptoms of different types of anemia. (06)

Q.4 (a) Explain the adaptation of mucosa and submucosa of the small intestine for digestion and absorption. (06)

(b) Explain the major hormones that regulate digestive activities. (06)

OR

Q.4 (b) Describe the location and functions of pancreas. Also explain the duct system connecting the pancreas to the duodenum. (06)

Q.5 (a) Describe the routes and mechanisms of tubular reabsorption and secretion. Which substances are reabsorbed most and which substance is not reabsorbed at all? (06)

(b) What is the size of the endothelial fenestrations and filtration slits in filtration membrane of glomerulus. Explain the structure of a filtration membrane in detail. (06)

OR

Q.5 (b) Where is juxtaglomerular apparatus (JGA) located and what is its function? (06)

Q.6 (a) Describe the organization of the nervous system. (06)

(b) Classify muscle cells and give their functions. (06)

OR

Q.6 (b) What are the roles of FSH, LH, oestrogen and progesteron in the female reproductive system? (06)

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SEAT No._____ [623]

No. of Printed Pages : 02

SC

SARDAR PATEL UNIVERSITY
M. Sc. (III Semester) Biochemistry Examination
Wednesday, 1st November 2017
Time: 2. 00 p. m. to 5.00 p. m.
Paper: PS03CBIC01 (rDNA technology)

Total Marks: 70

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1. Choose the most appropriate answer: **(8x1 = 8 marks)**

i) The role of Chloroform in DNA isolation is to
   a) denature proteins
   b) separate the organic and aqueous phases
   b) denature RNA
   d) remove the phenol

ii) Recognition sequences of type II restriction enzymes in general have
   a) Higher GC content
   b) Occurrence of RR/YY nucleotides
   c) palindromic sequences
   d) all of the above

iii) Secondary structure formation in DNA probes used in nucleic acid hybridization can be avoided by the use of
   a) Alcohols b) detergents c) BSA d) None of these

iv) When a DNA probe is used to detect a specific mRNA blotted on a membrane the technique is known as
   a) Colony hybridization b) Northern blotting c) Southern blotting d) Western blotting

v) Which of the gene transfer techniques requires the use of a tiny needle for introducing DNA into a cell?
   a) Electroporation b) biolistics c) Microinjection d) transformation

vi) Taq polymerase enzyme is highly suitable for PCR since it does not
   a) require primers
   b) require Mg2+
   c) require template
   d) get denatured at high temperature

vii) All the following statements on RFLP and RAPD are correct except _____
   a) RAPD is easy to perform and requires less time
   b) RFLP is more reliable and reproducible than RAPD
   c) Specific, complimentary primers are required for RAPD
   d) A labeled probe is required for RFLP

viii) A scientist has designed a new expression vector. Which of the following tools of IPR will protect the product?
   a) Trade mark b) copy right c) patent d) trade secret

2. Answer in brief any seven of the following: **(7 x 2 = 14 marks)**

a) Write the principle of alkali lysis method of plasmid DNA isolation.
b) Explain insertional inactivation with an example.
c) What is a phagemid? Give one example.
d) Describe homopolymer tailing.
e) Outline the significance of annealing temperature in PCR.
f) Write any two limitations of Maxam-Gilbert's method of DNA sequencing.
g) Write a brief note on TK/HAT system.

h) Describe the role of standard RNA in real time PCR
i) Explain Reverse Transcriptase PCR

3. a) Explain the principle and method for the isolation of genomic DNA isolation from bacteria. Explain how quality of DNA is estimated? (6 marks)
b) Describe the scheme for cloning in a YAC vector with a diagram. What are the limitations of this vector? (6 marks)

OR

b) Explain the principle, advantages and limitations of electroporation. (6 marks)

4. a) Describe the properties of T4 DNA ligase. What are the important reaction parameters that control ligation? Explain. (6 marks)
b) Describe subtractive hybridization in detail. What are the applications of this technique? (6 marks)

OR

b) Write notes on:
i) GFP reporter system ii) Bacterial expression vectors

5. a) Explain the principle, advantages and disadvantages of RFLP. (6 marks)
b) What are the advantages of cDNA library over genomic DNA library? Explain any one method for cDNA library synthesis. (6 marks)

OR

b) Write notes on:
i) SCAR analysis ii) Applications of Genomic DNA library (6 marks)

6. a) Explain the principle and advantages of pyrosequencing. (6 marks)
b) Outline the limitations of primer extension method for site directed mutagenesis. Explain any one modified method of primer extension technique. (6 marks)

OR

b) What is Intellectual Property Right? Explain the process for patenting in detail. (6 marks)

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SEAT No._____

No. of Printed Pages : 02

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Sardar Patel University
M. Sc. (III Semester) Examination
Friday, 3rd November, 2017
2.00 p. m. to 5.00 p. m.
Biochemistry
PS03CBIC02 – Immunology

Total marks: 70

Q.1 Select the right/most appropriate answer for the following: (08 marks)

A. The ROS are generated in the phagocytic cells by the enzyme complex
   a. NADPH reductase
   b. NADPH oxidase
   c. NADPH hydrolase
   d. NADP dehydrogenase

B. The antigens present n blood are presented to B cells in
   a. Lymph nodes
   b. Thymus
   c. Spleen
   d. MALT

C. Anti-isotypic antibodies will be produced against human antibody if injected as antigen in
   a. Another human being
   b. A Horse
   c. A twin
   d. All of the above

D. A non peptide lipid antigen will be presented on antigen presenting cells by
   a. MHC class I molecule
   b. MHC class II molecule
   c. non classical Class I CD1 molecule
   d. None of these

E. When cytokine acts on the nearby cell the action is called
   a. Autocrine
   b. Endocrine
   c. Synergistic
   d. Paracrine

F. Signal sequence for Ig gene segment recombination is having:
   a. A conserved nonamer and heptamer
   b. Either 12 or 23 base pairs as spacer between conserved region
   c. Both a and b
   d. None of the above

G. Who was awarded Nobel prize for the work on anaphylaxis?
   a. Charles Richet
   b. Jules Bordet
   c. Susumu Tonegawa
   d. Peter Doherty

H. Enzyme TdT generated during Ig gene rearrangement is responsible for
   a. Junctional flexibility
   b. N region nucleotide
   c. P region nucleotide
   d. T region nucleotide

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

a) Explain passive acquired immunity.
b) Explain allelic exclusion during Ig gene rearrangement.
c) Explain central tolerance.
d) What is SCID? Discuss specific defects leading to SCID.
e) How malignant tumors are subdivided on the basis of their tissue of origin?
f) What are superantigens? Explain their action and role.
g) Draw and label TCR complex.
h) Explain tuberculin reaction.
i) What are chemokines?

Q.3 A. Discuss signs of inflammation and steps involved in generation of inflammation at the site of infection. (06 marks)

B. Discuss role of various membrane receptors and soluble proteins in innate immune system. (06 marks)

OR

B. Discuss formation of C5 convertase enzyme complex through different pathways of complement activation. (06 marks)

Q.4 A. Discuss the mechanisms for generation of diversity in antibody variable regions. (06 marks)

B. Give an account of different types of ELISA. (06 marks)

OR

B. Discuss biological activities and effector functions of different Ig molecules. (06 marks)

Q.5 A. What is self MHC restriction? Explain experiments which revealed self MHC restriction of T_H and T_C cells. (06 marks)

B. Explain killing of target cells by Tc cells. (06 marks)

OR

B. Discuss cytosolic pathway for antigen processing and presentation of antigenic peptides. (06 marks)

Q.6 A. Discuss Type II hypersensitivity reaction. (06 marks)

B. Giving two examples discuss organ specific autoimmune diseases with the mechanism and the clinical symptoms. (06 marks)

OR

B. Discuss various primary immunodeficiency diseases. (06 marks)

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(141) SEAT No._____ No. of Printed Pages : 2 SC

Sardar Patel University

M.Sc. Biochemistry, 3rd Semester

External Theory Examination

Tuesday, 07th November 2017, 02:00 P.M. to 05:00 P.M.

PS03EBIC01: PLANT BIOCHEMISTRY

Total marks: 70

Note: 1) Figures to right indicate marks.

2) Draw neat and labelled diagram wherever necessary.

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

(i) When water enters the cell, one of the pressures is exerted on cell wall

(a) Turgor pressure (c) Osmotic pressure

(b) Suction pressure (d) Root pressure

(ii) The pathway in which water moves through cell wall without crossing any membrane

(a) Symplast pathway (c) Vaculoar pathway

(b) Apoplast pathway (d) Transmembrane pathway

(iii) Transpiration is regulated by the movement of

(a) Epidermal cells of the leaves (c) Guard cells of the stomata

(b) Subsidiary cells of the leaves (d) Mesophyll tissue cells

(iv) The role of chlorophyll in photosynthesis is the

(a) Absorption of light

(b) Absorption of water

(c) Absorption of carbon dioxide

(d) Absorption of light and photochemical decomposition of water

(v) Apical dominance is due to

(a) Abscisic acid (c) Auxin

(b) Gibberelic acid (d) Cytokinin

(vi) .....will only flower when the light period is longer than a critical number of hours.

(a) Long-day plants (c) short-day plant

(b) Day-neutral plants (d) None of them

(vii) A seed which is just waiting for favourable environmental condition to germinate is called

(a) Dormant seed (c) Non-viable seed

(b) Quiescent seed (d) Dead seed

(viii) Which pigment is essential for nitrogen fixation by leguminous plants

(a) Phycocyanin (c) Myoglobin

(b) Phycoerythrine (d) Leghaemoglobin

(Contd....2)

Q2. Answer any SEVEN of the following questions in brief: (14)

(i) Present your view/s on the importance and scope of studying Plant Biochemistry in the present scenario of Plant Sciences research.

(ii) "Water deficiency is a principal limiting factor in crop production worldwide" Comment.

(iii) Explain why photosynthesis is considered the most important process in biosphere.

(iv) Differentiate between evaporation and transpiration

(v) Why is abscisic acid also known as stress hormone?

(vi) Comment upon 'Phytochromes A and B have contrasting effects'

(vii) Explain the phenomenon of Circardian rhythms in plants.

(viii) What are phytoalexins?

(ix) Define 'hypersensitive response'.

Q3 (a) Presenting a brief account of how the phenomenon of diffusion is involved in the water relations of plants, trace the path of water from the soil, through the root, stem and leaf of a plant into the atmosphere (6)

(b) Presenting the classification of plant mineral nutrients, explain how the essentiality of nutrients is determined. (6)

OR

(c) Explain in detail different techniques for growing plants in nutritional studies. (6)

Q4 (a) Discuss the following in brief: (6)

(i) Dark fixation of CO_2 in CAM plants and the significance of CAM

(ii) Mechanism of source-sink transport of organic compounds

(b) Give an account of mechanism of CO_2 fixation, explaining major steps and the end product in Photosynthesis. (6)

OR

(b) Discuss the physiology of flowering with special reference to photoperiodism (6)

Q5 (a) Which phytohormone helps in ripening of fruits? Explain the detailed biochemical mechanism of this ripening hormone. (6)

(b) Discuss in brief the role of light and temperature in plant growth and reproduction (6)

OR

(b) Give an over view of nitrate assimilation in roots. (6)

Q6 (a) Discuss the physiology of flowering with special reference to photoperiodism. (6)

(b) Briefly discuss the senescence and abscission processes and their significance in plants. (6)

OR

(b) What are secondary metabolites? Explain how secondary metabolites contribute in plant defense. (6)

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