2018

ZOOLOGY

(Major)

Paper : 5.1

(Animal Physiology)

Full Marks : 60

Time : 3 hours

The figures in the margin indicate full marks for the questions

1. Fill in the blanks/Choose the correct answer : 1×7=7

(a) Kupffer cells occur in ——.

(b) Vitamin —— is essential for the process of blood coagulation.

(c) Muscles get fatigue due to accumulation of ——.

(d) Enteropeptidase enzyme is present in

(i) saliva

(ii) gastric juice

(iii) intestinal juice

(iv) pancreatic juice

(Turn Over

(e) Volume of air breathed in and out during effortless respiration is referred as

(i) vital volume

(ii) tidal volume

(iii) vital capacity

(iv) ideal volume

(f) The matrix of blood is known as

(i) plasma

(ii) serum

(iii) RBC and WBC

(iv) WBC and platelets

(g) Which of the following is the important function of spinal cord?

(i) Pumping blood

(ii) Transferring substances

(iii) Control of respiration

(iv) Control of reflex action

2. Answer the following : 2×4=8

(a) Differentiate between myogenic heart and neurogenic heart.

(b) Differentiate between osmoconformer and osmoregulator.

(c) Differentiate between systolic pressure and diastolic pressure.

(d) Write the role of ADH in water retention.

3. Answer any *three* questions from the following : 5×3=15

(a) Describe the renin-angiotensin mechanism.

(b) Describe briefly the initiation, conduction and regulation of heartbeat.

(c) Differentiate between Haldane and Bohr effects.

(d) What are the importances of plasma protein? Briefly discuss.

(e) What is meant by the double circulation? What is its significance?

4. What are villi? What are their location and function? Discuss briefly the mechanism of absorption. 1+2+7=10

Or

Describe the process of protein digestion. Briefly discuss the function of pancreas in protein digestion. 7+3=10

5. Define cardiac cycle and cardiac output. Draw a standard ECG and explain the different segments in it. 3+7=10

Or

Discuss the mechanism and regulation of urine formation. 6+4=10

6. Write the names of respiratory pigments. Describe the regulatory mechanism of respiration with suitable illustration. 2+8=10

Or

What is nerve impulse? Describe briefly the saltatory propagation of nerve impulse. Write the significance of acetylcholine in synaptic transmission. 2+4+4=10

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2018

ZOOLOGY

(Major)

Paper : 5.2

(Biochemistry and Bioenergetics)

Full Marks : 60

Time : 3 hours

The figures in the margin indicate full marks for the questions

1. Answer the following as directed : 1×7=7

(a) What is protein denaturation?

(b) The sugars which differ from one another only in the configuration of one carbon atom are termed as ____ of each other.

(Fill in the blank)

(c) A low value of K_M indicates

(i) high substrate concentration

(ii) high product concentration

(iii) weak enzyme-substrate binding

(iv) strong enzyme-substrate binding

(Choose the correct answer)

(Turn Over)

(d) Starch is formed by ____ bond.
(Fill in the blank)

(e) Name two simple fibrous proteins.

(f) ____ are esters of fatty acids with higher alcohols.
(Fill in the blank)

(g) What are cofactors?

2. Write very brief answer of the following (any *four*) : 2×4=8

(a) Differentiate between essential fatty acid and non-essential fatty acid with examples.

(b) How is protein associated with chromosomes?

(c) Explain Henderson-Hasselbalch equation.

(d) State the properties of enzymes.

(e) Explain entropy and enthalpy.

(f) Write the role of F_0-F_1 complex in ATP synthesis.

(Continued)

3. Answer the following briefly (any *three*) : 5×3=15

(a) Explain the second law of thermodynamics.

(b) Define buffers. State the important buffer systems of the body.

(c) State the role of high energy phosphates as 'energy currency' of the cell.

(d) Write the biological importance of lipid.

(e) Describe the ornithine cycle.

4. Answer the following (any *three*) : 10×3=30

(a) Describe β-oxidation of fatty acid. 10

(b) What are the protein and lipid constituents of plasma membrane? Write the functions of plasma membrane with special emphasis on transport through plasma membrane. 2+2+6=10

(c) Describe the mechanism of enzyme action. State the factors influencing the enzyme activity. 5+5=10

(d) Describe oxidative phosphorylation. Explain the chemiosmotic hypothesis of oxidative phosphorylation. 3+7=10

(Turn Over)

(e) Describe the structure of protein. State how the structure of protein determines biological functions. 5+5=10

(f) What is meant by enzyme kinetics? Discuss Michaelis-Menten equation with suitable explanation. 2+8=10

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2018

ZOOLOGY

(Major)

Paper : 5.3

(Endocrinology and Immunology)

Full Marks : 60

Time : 3 hours

The figures in the margin indicate full marks for the questions

1. Write True or False : 1×7=7

(a) The process of weakening a pathogen is called immunization.

(b) Segments of antigen that are recognized by antibody are epitopes.

(c) Mast cells have receptor for IgE.

(d) Secondary immune response is generated by Naive T cells.

(e) Regression of the corpus luteum is associated with the withdrawal of progesterone.

(Turn Over)

(f) Hypothalamus controls the secretion of melanophore stimulating hormone (MSH).

(g) In adult, insufficient thyroxine can lead to myxoedema.

2. Write briefly about the following : 2×4=8

(a) Natural killer cells

(b) Hypothalamo-hypophysial axis

(c) Hyperimmunity

(d) Chemical nature of hormone

3. Write short notes on any *three* of the following : 5×3=15

(a) Antigen-antibody interaction

(b) Second messenger hypothesis

(c) Cytotoxic T cell

(d) Physiological functions of endocrine pancreas

(e) Role of thyroid hormone in amphibian metamorphosis

(Continued)

4. Discuss the respective roles of parathormone and calcitonin in calcium homeostasis. 5+5=10

Or

What do you mean by tropic hormone? Discuss major tropic hormones secreted by anterior pituitary of pituitary gland. 2+8=10

5. What are the features of an effective vaccine? Give a brief account of different types of vaccine in use. 5+5=10

Or

Describe the role of MHC molecules in recognition of antigens and immune response. 10

6. Distinguish between primary and secondary immunodeficiencies. Write a brief note on the acquired immunodeficiency syndrome. 4+6=10

Or

Discuss the histology and endocrine functions of adrenal cortex. 4+6=10

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2018

ZOOLOGY

(Major)

Paper : 5.4

(Biological Techniques and Biostatistics)

Full Marks : 60

Time : 3 hours

The figures in the margin indicate full marks for the questions

1. Answer the following questions very briefly : 1×7=7

(a) What is molar extinction coefficient?

(b) Define mode.

(c) What is critical point drying?

(d) Write the definition of Pearson's chi-square test.

(e) What is immunostain?

(f) Define correlation coefficient.

(g) What is native gel electrophoresis?

2. Answer any *four* of the following questions : 2×4=8

(a) What is silver stain? Write the importance of silver stain in histological study.

(Turn Over)

(b) Distinguish between arithmetic mean and median.

(c) What is pH electrode? Write the working principle of pH electrode.

(d) Describe about the machine language of a computer.

(e) What is vibratome? Write about the use of vibratome.

(f) What is linear regression in biostatistics?

(g) Write the basic principle of centrifuge. Mention the use of ultracentrifuge in biological research.

3. Answer any *five* of the following questions : 3×5=15

(a) What is freezing microtome? Write the advantages and disadvantages of freezing microtome.

(b) What are the computer-aided techniques used in biology? Write the importance of computer-aided technique in medicine.

(c) What is ion-exchange chromatography? Write the basic principle of ion-exchange chromatography.

(Continued)

(d) What is the meaning of standard error of mean? Write the difference between standard deviation and variance.

(e) Define autoradiography. Write the importance of receptor autoradiography in biology.

(f) Establish the relation between wavelength of light and magnification.

(g) Write the characteristics of data set suitable for chi-square test.

4. What is fluorescence dye? How does a fluorescence dye work? Write the importance of fluorescence dye in biological research. 3+4+3=10

Or

Describe biological database. Write the importance of biological database for taxonomic study. 5+5=10

5. What is HPLC? Describe about the reverse phase HPLC. Mention about the uses of HPLC in different fields. 3+3+4=10

Or

Describe different sampling techniques used in biological research. 10

(Turn Over)

6. *(a)* Define cryoprotectant. Write the necessity of sperm preservation. 2+3=5

(b) What is absorption spectroscopy? Discuss the disadvantages of UV-visible spectroscopy. 2+3=5

Or

(c) What do you mean by graphical representation of data? Write the significance of pie chart. 2+3=5

(d) What is cumulative frequency curve? Draw a cumulative frequency curve from the data given below : 2+3=5

Marks Range	*Number of Students*
0–10	5
10–20	9
20–30	16
30–40	22
40–50	26
50–60	18
60–70	11
70–80	6
80–90	4
90–100	3

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