

**SECOND SEMESTER P.G. DEGREE EXAMINATION, APRIL 2020**

(CCSS)

M.Sc. Human Physiology

PSG 2C 08—BIOSTATISTICS AND BIOINFORMATICS

(2019 Admissions)

Time : Three Hours

Maximum : 80 Marks

*Draw neat labeled diagrams wherever needed.***I. Long Essay. Answer any four :**

- 1 Examine the major method for collecting and representing the data with appropriate examples.
- 2 Investigate the scope and application of ANOVA in various experiments in biology with a special emphasize on various types.
- 3 Illustrate various kinds of biological databases. Extend the file format of one primary protein and nucleotide sequence database each.
- 4 Inspect the practical aspects of multiple sequence alignment with a special emphasize on the prediction of motifs and domain in functional proteins.
- 5 What do you mean by molecular phylogenetics ? Elaborate in detail various methods involved in the analysis of phylogenetic data.
- 6 Elucidate the major steps involved in the prediction of three dimensional structures of protein by comparative modeling approaches.

(4 × 10 = 40 marks)

**II. Write Short Notes on any eight :**

- 7 What are the various approaches for measuring the central tendency ? Briefly summarize with relevant mathematical formulations.
- 8 Examine the significance of Chi-square test of goodness fit.
- 9 Investigate the historical perspectives and major developments of bioinformatics.
- 10 Elaborate on various retrieval systems available for the retrieval of biological data.
- 11 Discuss the scope and applications of dynamic programming algorithms for pair wise alignment

**Turn over**

- 12 Narrate various algorithms available for BLAST search.
- 13 Summarize the applications of RASMOL and EMBOSS software in various bioinformatics exercises.
- 14 Discuss various approaches involved in the prediction of exons.
- 15 Discuss the scope and applications of GRAIL and GenScan.
- 16 What do you mean by threading ? Discuss the scope in protein modeling.

(8 × 5 = 40 marks)

**SECOND SEMESTER P.G. DEGREE EXAMINATION, APRIL 2020**

(CCSS)

M.Sc. Human Physiology

PSG 2C 07—CARDIOVASCULAR AND RESPIRATORY SYSTEM

(2019 Admissions)

Time : Three Hours

Maximum : 80 Marks

*Draw neat labelled diagrams wherever needed.***I. Long Essays. Answer any four question Each question carries 10 marks :**

- 1 Define cardiac output and discuss the factors determining cardiac output. Add note on any one invasive method of cardiac output determination.
- 2 Describe cardiovascular changes during exercise and their physiological basis.
- 3 Describe medullary and autonomic nervous system control of cardiovascular function.
- 4 Define hypoxia. Describe different types of hypoxia.
- 5 Discuss in details oxygen haemoglobin dissociation curve with a neat labelled diagram. What are the factors affecting ODC ? What are the advantages of sigmoid shape of ODC ?
- 6 Describe reflex mechanism of respiratory control.

(4 × 10 = 40 marks)

**II. Write Short Notes on any eight questions. Each question carries 5 marks :**

- 7 Draw a neat labelled diagram cardiac muscle action potential and describe its ionic basis.
- 8 A patient is being treated for hypertension with a beta blocker and patient routine ECG reveals prolonged PR interval. Explain how the removal of beta blocker might improve AV nodal conduction.
- 9 Excitation contraction coupling in cardiac muscle.
- 10 Explain why increase in cAMP in cardiac muscle increase its force of contraction whereas increase in cAMP in vascular smooth muscle diminish its force of contraction.

**Turn over**

- 11 Explain why increase in cAMP in cardiac muscle increase its force of contraction whereas increase in cAMP in vascular smooth muscle diminish its force of contraction ?
- 12 Lead system in electrocardiography.
- 13 Muscles of respiration.
- 14 Defines and describe alveolar capillary units.
- 15 Dysbarism.
- 16 A woman inspires 500 mL from a spirometer. The intrapleural pressure, determined using an oesophageal balloon, was 5 cm. H<sub>2</sub>O before the inspiratory effort and 10 cm. H<sub>2</sub>O at the end of the inspiration. What is the pulmonary compliance ?

(8 × 5 = 40 marks)

**SECOND SEMESTER P.G. DEGREE EXAMINATION, APRIL 2020**

(CCSS)

M.Sc. Human Physiology

PSG 2C 06—DIGESTIVE AND EXCRETORY SYSTEM

(2019 Admissions)

Time : Three Hours

Maximum : 80 Marks

*Draw neat labelled diagrams wherever needed.***I. Long Essays. Answer any four :**

- 1 What are the major gastro intestinal hormones ? Describe the role any three hormones in detail.
- 2 Describe the neural regulation of gastro intestinal tract.
- 3 Explain the role pancreas in the digestion of carbohydrate, protein and lipids. Add note on regulation of pancreatic secretion.
- 4 Define Glomerular filtration Rate. Explain the major factors affecting it.
- 5 Explain the role of Kidney in acid base balance. Add notes on anion gap.
- 6 Define Renal clearance. Describe in detail PAH and creatinine clearance.

(4 × 10 = 40 marks)

**II. Write Short Notes on any eight :**

- 7 Deglutition.
- 8 Absorption of fat.
- 9 Gastric mucosal barrier.
- 10 Micturition.
- 11 Renal handling of glucose.
- 12 Regulation of secretion of saliva.
- 13 Artificial kidney.
- 14 Juxta glomerular apparatus.
- 15 Functions of skin.
- 16 Compensatory mechanisms in hyperthermia.

(8 × 5 = 40 marks)

**SECOND SEMESTER P.G. DEGREE EXAMINATION, APRIL 2020**

(CCSS)

M.Sc. Human Physiology

PSG 2C 07—CARDIOVASCULAR AND RESPIRATORY SYSTEM

(2017 Admissions)

Time : Three Hours

Maximum : 80 Marks

*Draw neat labelled diagrams wherever necessary.*

## I. Long Essays. Write any four questions :

- 1 Explain the left ventricular pressure and volume changes during cardiac cycle.
- 2 Define cardiac output. Explain the principle of measurement of cardiac output.
- 3 Define BP. Explain the regulation of BP.
- 4 Explain the intra pleural and intrapulmonary pressure changes during respiratory cycle.
- 5 Explain the chemical regulation of respiration.
- 6 Explain the respiratory changes during exercise.

(4 × 10 = 40 marks)

II. Write short notes on any *eight* questions :

- 1 Draw and label normal ECG.
- 2 Conducting system of heart.
- 3 Determinants of BP.
- 4 Fetal circulation.
- 5 Circulatory shock.
- 6 Respiratory membrane.
- 7 Compliance.
- 8 Vital capacity.
- 9 ODC.
- 10 Artificial respiration.

(8 × 5 = 40 marks)

**SECOND SEMESTER P.G. DEGREE EXAMINATION, APRIL 2021**

(CCSS)

Human Physiology

PSG 2C 08—BIostatistics and Bioinformatics

(2019 Admissions)

Time : Three Hours

Maximum : 80 Marks

*Draw neat labeled diagrams wherever needed.*I. Long Essays. Answer any *four* :

- 1 Investigate various methods used for the measurement of central tendency with suitable mathematical formulations.
- 2 Prioritize the applications of various diagrammatic representations of data with suitable examples.
- 3 What are biological databases? Elaborate in detail the structural databases with suitable examples.
- 4 Illustrate the practical aspects of multiple sequence alignment (MSA). How do you predict the motifs/domain using MSA output?
- 5 Examine various steps for the construction and evaluation of phylogenetic tree. Add short notes on various bioinformatics tools and software.
- 6 Illustrate the major steps involved in the prediction of tertiary structure of the protein by homology modeling.

(4 × 10 = 40 marks)

II. Write Short Notes on any *eight* :

- 7 Discuss the applications of correlation and regression analysis.
- 8 Analyze the scope and applications of Chi-square test of goodness of fit.
- 9 Illustrate the file format of PDB flat files.
- 10 Investigate the salient features and databases resources available in ExPASy server.

**Turn over**

- 11 Summarize the salient features of Dot plot used in Pair wise alignment. Extend a short note of various bioinformatics tools used for dot-plot analysis.
- 12 Elaborate various types of BLAST programs.
- 13 Differentiate rooted and unrooted trees. Add short note on Molecular clock hypothesis.
- 14 Investigate various bioinformatics tools and software used for the prediction of secondary structure of proteins.
- 15 Critically discuss the application and scope of energy minimization in protein modeling.
- 16 Elaborate in detail on *ab initio* prediction of protein structures with relevant bioinformatics software.

(8 × 5 = 40 marks)



**SECOND SEMESTER P.G. DEGREE EXAMINATION, APRIL 2021**

(CCSS)

Human Physiology

PSG 2C 07—CARDIOVASCULAR AND RESPIRATORY SYSTEM

(2019 Admissions)

Time : Three Hours

Maximum : 80 Marks

*Draw neat labelled diagrams wherever needed.*I. Long Essay. Answer any *four* questions. Each question carries 10 marks :

- 1 Describe in details different events that take place during the cardiac cycle.
- 2 Define blood pressure. Discuss in detail different type of short term regulation of blood pressure. Add note on hypertension.
- 3 Discuss in detail the electrical and mechanical properties of cardiac muscle. Add a note why cardia muscle cannot be tetanized.
- 4 Discuss in details carbon dioxide transport, add note why apnoea followed by hyperventilation.
- 5 With help of neat labelled diagram describe different lung volume and capacities. Add notes clinical importance of timed vital capacity.
- 6 How would each of the following conditions or circumstances be expected to affect the diffusing capacity (DL) of the lungs ? Explain your answers.
  - (a) Changing from the supine to the upright position.
  - (b) Exercise.
  - (c) Valsalva maneuver.
  - (d) Anemia.
  - (e) Low cardiac output due to blood loss.
  - (f) Diffuse interstitial fibrosis of the lungs.
  - (g) Emphysema.

(4 × 10 = 40 marks)

**Turn over**

II. Write Short Notes on any *eight* questions. Each question carries 5 marks :

- 7 Bipolar ECG leads.
- 8 Venous return.
- 9 Describe special features of coronary circulation.
- 10 Cardiovascular compensatory mechanism during haemorrhage.
- 11 Pressure volume changes during cardiac cycle.
- 12 Jugular venous pulse tracing.
- 13 Hyaline membrane disease.
- 14 Lists the components of the chest wall and relates the functions of the muscles of respiration to the movement of air into and out of the alveoli.
- 15 Compares and contrasts the pulmonary circulation and the systemic circulation.
- 16 Describes the diffusion of oxygen from the alveoli into the blood.

(8 × 5 = 40 marks)

**SECOND SEMESTER P.G. DEGREE EXAMINATION, APRIL 2021**

(CCSS)

Human Physiology

PSG 2C 06—DIGESTIVE AND EXCRETORY SYSTEM

(2019 Admissions)

Time : Three Hours

Maximum : 80 Marks

*Draw neat labelled diagrams wherever needed.***I. Long Essay. Answer any four :**

- 1 Describe the characteristics gastro intestinal wall and electrical activities of gastro intestinal tract.
- 2 List composition, functions and regulation of secretion of bile.
- 3 Explain the mechanism of secretion of gastric acid and its regulation. Add note on peptic ulcer.
- 4 Define Glomerular filtration Rate. Explain in detail sodium and glucose reabsorption in renal tubules.
- 5 Explain the mechanism of the concentration of urine.
- 6 Role of kidney in acid base balance.

(4 × 10 = 40 marks)

**II. Write Short Notes on any eight :**

- 7 Functions of saliva.
- 8 Absorption of carbohydrate from small intestine.
- 9 Movements of small intestine.
- 10 Gall bladder.
- 11 Glomerular filtrating membrane.
- 12 Regulation of secretion of pancreatic juice.
- 13 Dialysis.
- 14 Diabetic insipidus.
- 15 Functions of skin.
- 16 Compensatory mechanisms in hypothermia.

(8 × 5 = 40 marks)