Sl. No. of Q.P. : 1596
Unique Paper Code : 2231401
Name of the Paper : Physiology : Life Sustaining Systems
Name of the course : B.Sc. (Hons) Zoology
Semester : IV

Duration : 3 Hours Maximum Marks : 75

(Write your Roll No on the top immediately on receipt of the question paper)

Attempt *five* questions in all

Question No. 1 is compulsory

Q1. (a) Define the following:
(i) Anatomical Dead Space
(ii) Deglutition
(iii) Bohr's effect
(iv) Pericardium
(v) Thrombus (5)

(b) Expand the following:
(i) PCT
(ii) ERV
(iii) ADH
(iv) ESR
(v) LDL
(vi) JGA (3)

(c) Differentiate between the following:
(i) Tidal Volume and Vital Capacity
(ii) SA node and AV node
(iii) Cortical nephron and Juxtamedullary nephron
(iv) Myogenic heart and Neurogenic Heart
(v) Renin and Rennin (10)

(d) State the location and function of the following:
(i) Parietal cells
(ii) Kupffer cells
(iii) Macula densa (6)

(e) Fill in the blanks:
(i) Heart wall is made up of epicardium, myocardium and _____
(ii) _____enzyme in RBC helps in transportation of CO_2
(iii) The capillary network supplying the loop of Henle is _____ (3)

Q.2 (a) Describe the digestion of carbohydrates in the gastro intestinal tract. (9)

(b) Give a brief account of control of salivary secretions. (3)

Q.3 (a) Discuss the transport of CO_2 in blood at pulmonary and tissue level. (9)

(b) What is carbon monoxide poisoning? (3)

Q.4 (a) Explain the mechanism of urine formation. (9)

(b) What is Renin-Angiotensin System? (3)

Q.5 Draw a well labelled histological diagram of the following :

(a) T.S. Liver

(b) T.S. Lung

(c) T.S. Kidney (4 x 3)

Q.6 (a) Describe the events of the cardiac cycle. (9)

(b) What is the significance of Sphygmomanometer? (3)

Q.7 Write short notes on any *three* of the following

(a) Spirogram

(b) Pancreas

(c) Valves of the heart

(d) Ultrafiltration (3x4)

Sl. No. 07 Q.P.: 1597 Set ~~A~~ (18) 18/5/17

Unique Paper Code	:	**2231402**
Name of the Paper	:	**Comparative Anatomy of Vertebrates**
Name of the Course	:	**B. Sc. (H) Zoology, ~~Erstwhile FYUP~~**
Semester	:	**IV**
Duration	:	**3 Hours**
Maximum Marks	:	**75 Marks**

Instruction for Candidates: Attempt any Five Questions in all. Q. No. 1 is compulsory.

Q1. (a) Differentiate between the following:

(i) Placoid and ctenoid scales
(ii) Crop and Gizzard
(iii) Holobranch and Hemibranch gills
(iv) Larynx and Syrinx
(v) True Horn and Antlers 10

(b) Give the location and function of the following:

(i) Meibomian glands
(ii) Acetabulum
(iii) Islet of Langerhans
(iv) Vibrissae
(v) Red gland
(vi) Pecten 12

(c) Define:

(i) Incus
(ii) Proprioreceptors
(iii) Arbor vitae
(iv) Sudorific Glands
(v) Diastema 05

Q2. (a) Compare the Aortic arches in fishes, amphibians and mammals. 08
(b) Describe the accessory respiratory organs in fishes. 04

Q3. (a) Draw a well labelled diagram of the mammalian integument and give an account of its epidermal derivatives. 9

(b) Classify the receptors based on their function. 03

Q4. Discuss the succession of kidney in vertebrates with labelled diagrams. 12

Briefly discuss different

Q5. (a) ~~Describe~~ types of Uteri in mammals. 4

(b) Describe the evolution of male and female urinogenital system in reptiles and mammals. 8

The (a)

Q6. ~~(a)~~ Draw a well labelled diagram of mammalian ear 3x4

(b) ~~Draw well labelled diagram of~~ Brain of bird.

(c) Types of centrum.

Q7. Write short notes on any three: 3 x 4

(a) Jaw suspensorium in vertebrates
(b) Ruminant stomach
(c) Dentition in mammals
(d) Visceral arches

Sl. No. 07 Q.P. : 1608

19

Unique Paper Code	:	[2232601]
Name of the Paper	:	Evolutionary Biology (Zoology)
Name of the Course	:	B.Sc. (H) Allied Course
Semester	:	IV
Duration	:	3 Hours
Maximum Marks	:	75

Instructions for Candidates:

1. Attempt Five Questions including Question No. 1 which is Compulsory.
2. Completely attempt all parts of a question before answering the next one.

Q.1 (a) Define the following terms:

(i) Adaptation
(ii) Petrifaction
(iii) Heterosis
(iv) Panmixis
(v) Parallelism (5)

(b) Differentiate between the following:

(i) Continuous variation and Discontinuous variation
(ii) Convergent evolution and Divergent evolution
(iii) Coacervates and Microspheres
(iv) Transition and Transversion
(v) Allopatric speciation and Sympatric speciation (10)

(c) State the contribution(s) of the following scientists:

(i) Mary Leaky
(ii) Stanley Miller
(iii) Motoo Kimura
(iv) Alfred Russell Wallace (4)

(d) Complete the following sentences:

(i) Heterozygote advantage is also referred to as:
(ii) *Australopithecus afarensis* is also known as:
(iii) Another term for Genetic drift:
(iv) A group of organisms which do not resemble one another but can interbreed: (4)

(e) Justify the following statements:

(i) Genetic drift can alter allelic frequencies in a population.
(ii) Homologous characteristics help in inferring phylogenies. (4)

Q. 2 (a) Explain the Endosymbiotic theory. (6)
(b) Explain the significance of mutations in evolution. (6)

Q.3 Write an account of the Darwin's observations on the Galapagos islands which led him to describe the origin of species. (12)

Q.4 (a) State the pre-requisites for Hardy-Weinberg equilibrium to hold true. Write the Hardy-Weinberg equation explaining the notations used. (8)
(b) Sickle cell anemia occurs with a frequency of 1 in 10,000 in a population. How many carriers will be present in this population with 100,000 individuals? (4)

Q. 5 (a) Write an account of the skeletal modifications during the transition of ape-like human ancestors to modern man. (8)
(b) Explain Directional selection with the help of a suitable example. (4)

Q. 6 (a) What do you understand by isolating mechanisms? Discuss the role of reproductive isolating mechanisms leading to speciation. **(8)**

(b) State the advantages and limitations of the Biological species concept. **(4)**

Q.7 Write short notes on ***Any Three*** of the following:

a) K-T extinction
b) Three-toed horses
c) Globin gene family
d) Neo-Darwinism
e) Natural selection

(12)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 675 G

Unique Paper Code : 107481

Name of the Paper : Cell Biology-II (CBHT-402)

Name of the Course : **B.Sc. (Hons.) (Botany/ Biochemistry/Microbiology/ Anthropology/Zoology)**

Semester : IV

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates:

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Answer Five questions in all, including, Q. No. 1, which is compulsory. Illustrate your answers with appropriate diagrams wherever necessary.

1. (a) Expand the following terms (any **five**) (1×5=5)

   (i) JAK

   (ii) cdc

   (iii) GAG

P.T.O.

(iv) LDL

(v) GPl

(vi) NAM

(vii) ECM

(b) Match the followings : (1×5=5)

(i) Unit membrane	(a) SV40
(ii) BC1 - 2 family	(b) Robertson
(iii) Fibronectin	(c) Peptide Signal Molecule
(iv) Insulin	(d) Central regulator of apoptosis
(v) Tumour Virus	(e) Principal adhesion protein of connective tissue

(c) Fill in the blanks (1x5=5)

(i) Cancer of connective tissue is calld _____.

(ii) A zipper like protein structure called _____, is formed along the length of paired chromosomes during meiosis.

(iii) The normal cell genes from which the retroviral oncogenes originated are called _____.

(iv) _____ is a calcium binding protein affecting the Ca^{2+} concentration.

(v) _____ is the principal component of cell wall of algae and higher plants.

2. Differentiate between (any **five**) : (3×5=15)

(i) Tight junctions and Gap junctions

(ii) Carrier proteins and Channel proteins

(iii) Programmed Cell Death and Necrosis

(iv) Malignant and Benign tumour

(v) Autocrine and Paracrine signalling

(vi) Anaphase of Mitosis and Anaphase I of Meiosis

3. (a) Describe the programmed cell death in *C. elegans*. (8)

(b) Discuss the different types of cancer. (7)

4. Describe G-protein coupled receptor and regulation of G-proteins with the help of well labelled diagrams. (15)

5. (a) Give a diagrammatic representation of the Fluid Mosaic Model. (6)

(b) Briefly discuss the various polysaccharides of the cell wall. (6)

(c) How does cholesterol affect membrane fluidity? (3)

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

(a) cGMP pathway in intracellular signaling.

(b) Properties of cancer cell

(c) Somatic cell nuclear transfer

(d) Facilitated diffusion

(e) Pachytene of Meiosis

This question paper contains 4 printed pages] 2017

Roll No. | | | | | | | | | | |

S. No. of Question Paper : **676**

Unique Paper Code : **107485** **G**

Name of the Paper : **Molecular Biology-II**

Name of the Course : **B.Sc. (H) (Botany/Zoology/Biochemistry/ Bio-Medical/Microbiology/Anthropology)**

Semester : **IV**

Duration : **3 Hours** Maximum Marks : **75**

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt *five* questions in all, including

Question No. **1** which is compulsory.

Draw well-labelled diagrams wherever necessary.

1. (*a*) Define the following : 5

(*i*) Transcription bubble

(*ii*) Trans-esterification

(*iii*) ORF

(*iv*) Catabolite repression

(*v*) Ribozyme.

P.T.O.

(*b*) State true/false : 5

(*i*) RNA polymerase does not need a primer for transcription initiation.

(*ii*) Dicer and Drosha recognize and cleave RNAs on the basis of sequence of their substrates.

(*iii*) Each aminoacyl-*t*RNA synthetase attaches a single amino acid to one or more *t*RNAs.

(*iv*) Group I introns release a lariat rather than a linear intron.

(*v*) Apo-repressors can bind directly to the operator site of the gene.

(*c*) Expand the following : 5

(*i*) TAF

(*ii*) RBS

(*iii*) Xist

(*iv*) STAT

(*v*) CAP.

2. (*a*) Explain transcription initiation by RNA polymerase II. Illustrate your answer. 7

(*b*) Explain, with the help of suitable diagrams, the working of the *lac* operon in the following conditions : 8

(*i*) When only lactose is present

(*ii*) When only glucose is present

(*iii*) When both lactose and glucose are present

(*iv*) When both lactose and glucose are absent

3. Differentiate between the following (any *three*) : 3×5=15

(*a*) Spliceosome and ribosome

(*b*) *m*RNA and *t*RNA

(*c*) Alternative splicing and exon shuffling

(*d*) Translation initiation in prokaryotes and eukaryotes.

4. What is the role/significance of the following ? 3×5=15

(*a*) RRF

(*b*) Sigma factor in transcription

(*c*) rut sites

(*d*) tmRNA

(*e*) Leucine zipper domain.

5. (*a*) How are mRNAs that are incomplete or have a premature stop codon targeted and destroyed in eukaryotes ? 8

(*b*) Explain the spliceosome-mediated splicing reaction with the help of a well-labelled diagram only. 7

6. (*a*) Explain the various ways by which transcription is terminated in prokaryotes. 7

(*b*) Discuss the various ways in which eukaryotic repressors regulate transcription. 8

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

(*a*) RNA editing

(*b*) Combinatorial control

(*c*) Riboswitches

(*d*) RNA interference

(*e*) Attenuation.

This question paper contains 4 printed pages] (3) 09/5/17

Roll No. | | | | | | | | | | | |

S. No. of Question Paper : **898**

Unique Paper Code : **223401** **G**

Name of the Paper : **Animal Physiology and Functional Histology-II**

Name of the Course : **B.Sc. (H) Zoology**

Semester : **IV**

Duration : **3 Hours** Maximum Marks : **75**

(Write your Roll No. on the top immediately on receipt of this question paper.)

Answer *five* questions in all.

Q. No. **1** is compulsory.

1. (*a*) Define the following : 5

(*i*) Anatomic dead space

(*ii*) Deglutition

(*iii*) Erythropoiesis

(*iv*) Stroke volume

(*v*) Diuresis.

P.T.O.

(*b*) Differentiate between the following : 10

(*i*) Micelles and Chylomicrons

(*ii*) Haemoglobin and Myoglobin

(*iii*) Tidal volume and Vital capacity

(*iv*) Facultative and obligatory water reabsorption

(*v*) Neurogenic and myogenic heart.

(*c*) Fill in the blanks : 5

(*i*) ..... is a mixture of phospholipids and lipoproteins which lowers the surface tension of alveolar fluid.

(*ii*) The kidneys produce a hormone named ..... which stimulates the production of red blood cells.

(*iii*) ..... cells in blood are rich in histamine

(*iv*) QRS wave in an electrocardiogram is a result of ..... depolarization.

(*v*) The centro-acinar cells in the pancreas secrete ..... ions.

(*d*) Give the exact location and function of the following : 5

(*i*) Brunner's glands

(*ii*) Clara cells

(*iii*) Mesangial cells

(*iv*) Chief cells

(*v*) Semi-lunar valves.

(*e*) Expand the following terms : 2

(*i*) CCK

(*ii*) PCT.

2. Explain how respiratory gases, oxygen and carbon dioxide, are transported by blood. 12

3. Elucidate the processes involved in the formation of urine in a nephron. 12

4. (*a*) Illustrate diagrammatically the histological details of the stomach in relation to its functional aspects. 6

(*b*) Describe the process of digestion of proteins in the gastro-intestinal tract. 6

5 (*a*) Explain the process of blood clot formation and clot retraction. 8

b) Write a note on acid-base balance. 4

6. Discuss the origin and conduction of heart beat. 12

7. Write short notes on any *three* of the following : 4,4,4

(*a*) Renin-Angiotensin-Aldosterone system

(*b*) Hering-Breuer reflex

(*c*) Electrocardiogram

(*d*) Hormonal regulation of digestion

(*e*) Composition of blood.

This question paper contains 4 printed pages] (4) May 2017

Roll No. | | | | | | | | | | | |

S. No. of Question Paper : **899**

Unique Paper Code : **223403** **G**

Name of the Paper : **Biochemistry**

Name of the Course : **B.Sc. (Hons) Zoology**

Semester : **IV**

Duration : **3 Hours** Maximum Marks : **75**

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt *five* questions in all.

Question No. **1** is compulsory.

1. (*i*) Define the following : 6

(*a*) Stereoisomerism

(*b*) Hemiacetal

(*c*) Holoenzyme

(*d*) Ketosis

(*e*) Apolipoprotein

(*f*) Zwitterions

P.T.O.

(*ii*) Differentiate between : 8

(*a*) Epimer and Anomer

(*b*) Glucogenic and Ketogenic amino acid

(*c*) Oxidative phosphorylation and Substrate level phosphorylation

(*d*) Glycosidic bond and Peptide bond.

(*iii*) Give chemicals reaction catalysed by following enzymes along with their substrates and products (with structural formulae) : 6

(*a*) HMG Co A lyase

(*b*) Alanine Transaminase

(*c*) Glycerol kinase.

(*iv*) Expand the following : 3

(*a*) EMP

(*b*) NADPH

(*c*) DHAP

(*d*) HDL

(*e*) GAG

(*f*) AST.

(*v*) Give structural formulae for the following : 4

(*a*) N-Acetyl Glucosamine

(*b*) Tricylglycerol

(*c*) Histidine

(*d*) β-hydroxybutyrate

2. (*a*) Describe the *three* thermodynamic barriers of glycolysis that need to be overcome by different enzymes and reactions in gluconeogenesis. 8

(*b*) Describe the Malate-Aspartate shuttle. 4

3. (*a*) Give detailed pathway of Tricarboxylic acid cycle along with the structural formulae. How many ATPs are produced per cycle. 8

(*b*) Show by a flow chart (using structural formulae) non-oxidative phase of PPP. 4

4. (*a*) Describe Urea cycle in detail clearly indicating which reactions take place in mitochondria and in cytosol. 8

(*b*) Describe oxidative deamination. 4

5. (*a*) What are allosteric enzymes. Discuss different types of enzyme inhibitions. 8

(*b*) Describe phospholipids of physiological significance. 4

6. Discuss the activation and transport of Palmitic acid across mitochondria when one molecule of Palmitic acid is to be oxidized with total energetic of the reactions involved. 12

7. Write short notes on any *three* of the following : 3×4

(*a*) Glycogenesis

(*b*) Cori cycle

(*c*) Induced fit theory

(*d*) Four levels of protein structure.

[This question paper contains 4 printed pages.] (5)

11/5/17

Your Roll No.....

Sr. No. of Question Paper : 2829 **GC-4**

Unique Paper Code : 32231401

Name of the Paper : Comparative Anatomy of Vertebrates

Name of the Course : **B.Sc. (Hons.) ZOOLOGY**

Semester : IV

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Answer **Five** questions in all, including Q. No. **1** which is compulsory.

1. (a) Define the following terms **(any five)** :

(i) Axial skeleton

(ii) Mesobronchus

(iii) Unguis

(iv) Phonoreceptor

(v) Ductus caroticus

(vi) Dermatocranium (5)

P.T.O.

(b) Give the exact location and function of the following **(any five)** :

(i) Gill raker

(ii) Parietal cell

(iii) Fovea centralis

(iv) Vitro dentine

(v) Spiral valve

(vi) Macula (5)

(c) Fill in the blanks :

(i) First cranial nerve of vertebrates is called _____ .

(ii) One half of pelvic girdle is called _____ .

(iii) _____ is the structural and functional unit of kidney.

(iv) _____ is the horny plate in the oral cavity of whales.

(v) Branched horn of Antelope is called _____ .

(5)

(d) Distinguish between the following **(any six)** :

(i) Heterocoelous and Procoelous vertebrae

(ii) Contour feathers and Down feathers

(iii) Bicornuate and Bipartite uteri

(iv) Acetabulum and Glenoid cavity

(v) Rod and cone cells

(vi) Physostomous and physoclistous air bladder (12)

2. Discuss the changes in anatomical details of heart of vertebrates with the suitable diagrams. Differentiate between single circuit and double circuit circulation. (10,2)

3. (a) Explain the structure of gills of cartilaginous and bony fishes.

(b) Tabulate the fate of visceral arches in vertebrates. (5,7)

4. Discuss in detail the succession of kidneys in vertebrates. (12)

5. (a) Describe the different types of jaw suspensorium in gnathostomes.

(b) Compare the brain of mammal with that of a reptile. (7,5)

6. (a) Draw a well labelled diagram of mammalian skin.

(b) Explain different types of integumentary glands in chordates. (3,9)

7. Write short notes on any **three** of the following :

(a) Scales of fishes

(b) Ruminant stomach

(c) Swim bladder

(d) Classification of receptors (4,4,4)

[This question paper contains 4 printed pages.] (6) 15/5/17

Your Roll No.....

Sr. No. of Question Paper : 2830 **GC-4**

Unique Paper Code : 32231402

Name of the Paper : Animal Physiology : Life Sustaining Systems

Name of the Course : **B.Sc. (Hons.) Zoology**

Semester : IV

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **five** questions in all.
3. Question number **1** is compulsory.
4. Draw suitable well labelled diagrams wherever necessary.

1. (a) Define the terms given below :

   (i) Serum

   (ii) Coronary Sinus

   (iii) Anatomic Dead Space

   (iv) Peyer's Patches

   (v) T_m (Transport Maximum) (5)

(b) Differentiate between :

(i) HbA and HbF

(ii) Bronchus and Bronchiole

(iii) Cortical Nephron and Juxtamedullary Nephron

(iv) Gastrin and Secretin (8)

(c) Expand the following :

(i) PDGF

(ii) MMC

(iii) BCOP

(iv) FRC (4)

(d) Write the location and function of the following :

(i) AV Node

(ii) Ampulla of Vater

(iii) Mesangial cells

(iv) Pneumotaxic area (4)

(e) Give reason for :

(i) Delay of Action Potential at AV Node

(ii) Filtration through glomeruli is larger than other capillaries

(iii) Alveoli don't collapse after forceful expiration

(iv) The initial change in pH of gastric juice as the food enters the stomach (4)

(f) Calculate the end systolic volume if cardiac output is 5.0 L/min, heart rate is 75 beats/min and end diastolic volume is 145 ml/min. (2)

2. (a) Explain the three processes involved in production of urine. (9)

(b) Add a note on autoregulation of glomerular filtration rate. (3)

3. (a) Correlate the various events of Cardiac Cycle with ECG. (6)

(b) Describe the phases of action potential in ventricular cardiac muscle fiber. (6)

4. (a) Describe the process of digestion and absorption of lipids. (8)

(b) Write a note on gastrointestinal hormones. (4)

5. (a) Describe in detail the various events which occur during hemostasis. (9)

(b) Depict the life cycle of RBC with the help of a flowchart. (3)

6. (a) Explain how CO_2 is transported in blood. (6)

(b) Comment on the factors affecting oxygen dissociation curve. (6)

7. Write short notes on any **three** of the following :

(a) Acid-Base balance

(b) Heart conduction system

(c) Formed elements of blood

(d) Pulmonary ventilation

(e) Phases of digestion (4,4,4)