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3 (Sem-4/CBCS) ZOO HC 1

2022

ZOOLOGY

(Honours)

Paper : ZOO-HC-4016

(Comparative Anatomy of Vertebrates)

Full Marks : 60

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Answer **any seven** of the following : $1 \times 7 = 7$

(a) The layer that separates the skin from deeper tissues is

- (i) cuticle
- (ii) epidermis
- (iii) dermis
- (iv) hypodermis

Contd.

(b) The connective tissue beneath the epidermis is known as

- (i) cuticle
- (ii) dermis
- (iii) hypodermis
- (iv) epidermis

(c) The structure that is a part of the skeletal system but are not bones is called

- (i) teeth
- (ii) hairs
- (iii) nails
- (iv) hooves

(d) The total number of bones in an adult human is

- (i) 208
- (ii) 206
- (iii) 350
- (iv) 260

(e) Saliva helps in digestion of

(i) starch

(ii) fiber

(iii) proteins

(iv) fats

(f) The longest organ of digestive system in human is

(i) pancreatic duct

(ii) small intestine

(iii) large intestine

(iv) esophagus

(g) The tiny air sacs present in human lungs are called

(i) alveoli

(ii) bronchus

(iii) bronchioles

(iv) All of the above

(h) Pulmonary vein carries

- (i) impure blood from lungs
- (ii) impure blood from heart
- (iii) pure blood from lungs
- (iv) pure blood from heart

(i) The nerves that transmit the impulse to the central nervous system is called

- (i) sensory neuron
- (ii) motor neuron
- (iii) sympathetic system
- (iv) parasympathetic system

(j) In human eye, the image of an object is found in

- (i) cornea
- (ii) iris
- (iii) pupil
- (iv) retina

2. Write short notes of the following :
(any four) $2 \times 4 = 8$

(a) Structure of Weberian ossicles

(b) Meckel's cartilage in tetrapods

(c) Taste buds

(d) Gill arch

(e) Alveoli

(f) Ductus caroticus

(g) Pacinian corpuscle

(h) Urinogenital duct

3. Answer **any three** of the following :
 $5 \times 3 = 15$

(a) Describe the structure of avian epidermis.

(b) Write briefly the structure of axial skeleton.

(c) Describe different types of teeth found in vertebrates.

(d) Write a note on the structure and functions of swim bladder.

- (e) Give an account of the ultrastructure of a nephron.
- (f) Describe briefly the components of sensory organ.
- (g) Afferent branchial arteries in bony fishes

4. Answer **any three** of the following :

$$10 \times 3 = 30$$

- (a) Describe the structure and functions of mammalian skin. $7+3=10$

- (b) Give an account of jaw suspension in vertebrates.

- (c) Give a comparative account of digestive system in birds and mammals with diagram. $5+5=10$

- (d) Give the comparative study of heart in reptiles and birds with diagram. $5+5=10$

- (e) Describe briefly about the urogenital system of mammals.

- (f) Give a detailed account of mammalian brain with diagram. Mention its advancements over reptilian brain.

7+3=10

- (g) Give a brief account of visual receptors in man.

- (h) What is accessory respiratory organ? Describe the structure and functions of accessory respiratory organs in fishes.

2+(5+3)=10

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3 (Sem-4/CBCS) ZOO HC 2

2022

ZOOLOGY

(Honours)

Paper : ZOO-HC-4026

(Animal Physiology; Life Sustaining System)

Full Marks : 60

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Fill in the blanks : **(any seven)** $1 \times 7 = 7$
- (a) _____ hormone regulates the concentration of urine.
 - (b) The matrix of blood is known as _____.
 - (c) _____ prevents clotting of blood in blood vessels.
 - (d) Collagen, a major constituent of meat is digested by _____ enzyme of stomach.

Contd.

- (e) Lungs consists of numerous small air sacs called _____.
- (f) _____ is the functional unit of kidney.
- (g) Blood pressure is measured in millimetre of _____.
- (h) Crypts of Lieberkuhn found in intestine secretes _____.
- (i) Vitamin _____ is essential for blood clotting.
- (j) _____ discovered the ABO system.

2. Answer very briefly : **(any four)** $2 \times 4 = 8$

- (a) What is chloride shift ?
- (b) Why sinus node is called pacemaker of the heart ?
- (c) Explain briefly the role of liver is digestion.
- (d) Emulsification of fats
- (e) What is haemostasis ?
- (f) How the hormone angiotensin II regulates blood pressure ?
- (g) What is tidal volume ?
- (h) Structure of haemoglobin A.

3. Answer the following: (*any three*) $5 \times 3 = 15$

(a) Write a short note on carbon monoxide poisoning.

(b) Define cardiac output. Describe briefly how cardiac output is regulated by Frank-Starling mechanism of the heart.
 $1+4=5$

(c) Briefly describe how pneumotaxic centre of the respiratory center controls respiration.

(d) What are the different types of pancreatic enzymes? Explain with their functions.
 $3+2=5$

(e) Write a brief note on hormonal regulation of gastric acid secretion in gastrointestinal tract.

(f) Write a short note on fibrinolytic system.

(g) Describe the structure of mammalian heart.

(h) Write a note on haemopoiesis.

4. Answer *any three* from the following questions : $10 \times 3 = 30$

(a) What is a nephron? Briefly describe the countercurrent mechanism of urine formation.
 $2+8=10$

- (b) What is erythroblastosis fetalis ? Discuss briefly how a Rh-negative mother can affect a foetus with Rh-positive blood. 2+8=10
- (c) Briefly describe oxygen-haemoglobin dissociation curve. What are the different factors which influence the oxygen dissociation curve ? 5+5=10
- (d) Write a note on digestion and absorption of carbohydrate in human body. 5+5=10
- (e) What are clotting factors ? Describe in detail the mechanism of blood coagulation ? 2+8=10
- (f) Define cardiac impulse. Explain how a cardiac impulse is originated and generated through the heart ? 2+8=10
- (g) Write a detail account on the transport of carbon di oxide in blood.
- (h) Define antibodies. Describe the different blood groups found in human. 2+8=10
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3 (Sem-4/CBCS) ZOO HC 3

2022

ZOOLOGY

(Honours)

Paper : ZOO-HC-4036

(Biochemistry of Metabolic Processes)

Full Marks : 60

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Fill in the blanks : **(any seven)** 1×7=7
- (a) The net result of the glycolytic breakdown of a molecule of glucose is _____ moles of ATP.
- (b) The formation of glucose from non-carbohydrate sources is known as _____.
- (c) The final common pathway for the oxidation of carbohydrates, fat and protein is _____.

Contd.

- (d) _____ proposed that fatty acids are degraded by the sequential removal of two carbon units from the COOH end of the molecule.
- (e) Urea is produced in animals by a cyclic process known as the _____.
- (f) Per molecule of glucose under anaerobic conditions yields _____ moles of ATP.
- (g) The process of conversion of glucose into pyruvate is known as _____.
- (h) _____ is a chemical reaction that transfers an amino group to a ketoacid to form new amino acids.
- (i) _____ links the urea cycle and the citric acid cycle.
- (j) The compound in urine responsible for the color reactions was identified as _____.

2. Answer the following briefly : **(any four)**

2×4=8

- (a) What is the fundamental distinction between NADPH and NADH ?
- (b) Differentiate between saturated and unsaturated fatty acids with examples.
- (c) Write the structure of adenosine triphosphate (ATP) molecule.

- (d) What do you understand by "redox" reactions ?
- (e) State the significance of citric acid cycle.
- (f) What are the causes and consequences of ketosis ?
- (g) State the physiological role of glycogen.
- (h) Write a note on Sir Hans Krebs.

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

- (a) Describe Cori's cycle along with its significance. 3+2=5
- (b) ATP is called the "energy currency of the cell". Explain.
- (c) Explain the role of triacylglycerols as a major storage of metabolic energy.
- (d) What is deamination ? Describe the glucogenic and ketogenic aminoacids and their deamination. 2+3=5
- (e) Discuss essential and non-essential type of aminoacids with examples.
- (f) Discuss the process of gluconeogenesis and glycogenesis. 2½+2½=5
- (g) Discuss the role of liver in the aminoacids metabolism.
- (h) What is phenylketonuria ? How it affects in the body metabolism ? 2+3=5

4. Answer the following : **(any three)**

10×3=30

- (a) Explain and illustrate the different steps involved in the glycolytic pathway.
- (b) Give an account of β -oxidation of saturated carbon fatty acids (Palmitic acid) along with its energetics.
- (c) Describe the detoxification of ammonia by urea cycle.
- (d) Define Electron-transport system (ETS) or respiratory chain system. Discuss the various steps involved in the system. 2+8=10
- (e) Describe the general sequence of events in the citric acid cycle. Add a note on its "Amphibolic" role. 8+2=10
- (f) What do you mean by metabolism ? Describe in detail about the anabolism and catabolism with suitable examples. 2+4+4=10
- (g) Describe briefly on compartmentalization of metabolic pathways.
- (h) Explain the metabolism, biochemical importance and inborn errors of : 5+5=10
 - (i) Glycine and
 - (ii) Phenylalanine, tyrosine

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Nanda
(G)

3 (Sem-4/CBCS) ZOO HG/RC

2022

ZOOLOGY

(Honours Generic/Regular)

Paper : ZOO-HG-4016/ZOO-RC-4016

(Genetics and Evolutionary Biology)

Full Marks : 60

Time : Three hours

***The figures in the margin indicate
full marks for the questions.***

Answer **either** in English **or** in Assamese.

FIRST HALF

1. Answer the following : **(any seven)**

1×7=7

তলত দিয়া প্রশ্নসমূহৰ উত্তৰ দিয়া : (যিকোনো ৭টাৰ)

(i) What is epistasis?

এপিষ্টেছিছ কি?

Contd.

(ii) What is allelomorph ?

এলিলমৰ্ফ কি?

(iii) What is chromosomal theory of inheritance ?

বংশগতিৰ ক্রমজমীয় মতবাদ কি?

(iv) What is co-dominance ?

সহ-প্রভাবীতা কি?

(v) At what stage does crossing over occur in meiosis ?

হ্রাসাত্মক বিভাজনৰ কোন দশাত জিন বিনিময় হয়?

(vi) What is sympatric speciation ?

ছিমপেট্রিক স্পেছিয়েচন কি?

(vii) What is mass extinction ?

সমূহ বিলুপ্তি কি?

(viii) Who postulated the theory of 'Natural selection' ?

'প্রাকৃতিক নির্বাচন' মতবাদ কোনে আগবঢ়াইছিল?

(ix) What is bioclast ?

বায়ক্লাস্ট কি?

(x) The scientific name of Cro-Magnon Man is _____.

ক্র-মেগনন্ মানবৰ বৈজ্ঞানিক নাম হ'ল _____।

2. Answer **any four** of the following :

2×4=8

যিকোনো 4টাৰ উত্তৰ দিয়া :

Write the difference between :

পার্থক্য লিখা :

(i) Genotype and Phenotype

জিনীয়ৰূপ আৰু ব্যক্তৰূপ

(ii) Recessive lethals and Dominant lethals

অপ্রভাবী ঘাতক আৰু প্রভাবী ঘাতক

(iii) X-linked gene and Y-linked gene

X-সহলগ্ন জিন আৰু Y-সহলগ্ন জিন

(iv) Mendelian inheritance and Cytoplasmic inheritance

মেণ্ডেলীয় বংশগতি আৰু কোষ প্রবসী বংশগতি

(v) Complete linkage and Incomplete linkage

সম্পূৰ্ণ সহলগ্নতা আৰু অসম্পূৰ্ণ সহলগ্নতা

(vi) Interference and Coincidence

ইন্টাফেৰেন্স আৰু সংযোগ

(vii) Somatic mutation and Germinal mutation

দেহকোষীয় উৎপৰিবৰ্তন আৰু জননকোষীয় উৎপৰিবৰ্তন

(viii) Continuous variation and Discontinuous variation

অবিচ্ছিন্ন প্ৰকাৰণ আৰু বিচ্ছিন্ন প্ৰকাৰণ

3. Answer **any three** of the following :

5×3=15

তলত দিয়া প্ৰশ্নৰ যিকোনো তিনিটাৰ উত্তৰ লিখা :

(i) What is extra-chromosomal inheritance ?
Write about the important features of extrachromosomal inheritance.

বহিঃক্ৰমজমীয় বংশগতি কি? বহিঃক্ৰমজমীয় বংশগতিৰ মুখ্য চৰিত্ৰসমূহৰ বিষয়ে লিখা।

(ii) Write about the incomplete linkage of *Drosophilla melanogaster* with suitable diagram.

1+4=5

উপযুক্ত চিত্ৰৰ সহায়ত কুনকুনী মাখিৰ অসম্পূৰ্ণ সহলগ্নতাৰ বিষয়ে লিখা।

(iii) What is speciation? Write a note on the limitations of biological speciation.

1+4=5

প্রজাতিৰ উদ্ভাৱন বুলিলে কি বুজা? জৈৱিক প্রজাতিৰ ধাৰণাৰ সীমাবদ্ধতাৰ ওপৰত এটি টোকা লিখা।

(iv) Describe the modern theory of evolution.

জীৱৰ উৎপত্তিৰ আধুনিক মতবাদৰ বিষয়ে বৰ্ণনা কৰা।

(v) Write a short note on human evolution.

মানুহৰ ক্ৰমবিকাশৰ ওপৰত এটি চমু টোকা লিখা।

(vi) What is pleiotropic gene? Describe the phenomenon of pleiotropy with suitable example.

1+4=5

প্লিঅ'ট্ৰপীক জিন কি? উপযুক্ত উদাহৰণৰ সহায়ত প্লিঅ'ট্ৰপীক পৰিঘটনাৰ বৰ্ণনা কৰা।

(vii) What is multiple allele? Write the main characteristics of multiple alleles.

2+3=5

একাধিক বা বহু এলিল বুলিলে কি বুজা? একাধিক বা বহু এলিলৰ মুখ্য চৰিত্ৰসমূহ লিখা।

(viii) Write the characteristics of modern horse.

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আধুনিক ঘোঁৰাৰ বৈশিষ্ট্যসমূহ লিখা।

SECOND HALF

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

তলৰ যিকোনো তিনিটাৰ উত্তৰ লিখা :

- (i) Describe the role of extinction on evolution.

ক্রমবিকাশত বিলুপ্তিৰ ভূমিকাৰ বিষয়ে বৰ্ণনা কৰা।

- (ii) What is macroevolution? Describe the principles and mechanisms of macro-evolution. 2+4+4=10

স্থূল বিকাশ কি? স্থূল বিকাশৰ নীতি আৰু কাৰ্যপদ্ধতি বৰ্ণনা কৰা।

- (iii) What is genetic variation? Describe the types and sources of genetic variation. 2+4+4=10

জৈৱ প্ৰকাৰণ কি? জৈৱ প্ৰকাৰণৰ প্ৰকাৰ আৰু উৎসৰ বিষয়ে বৰ্ণনা কৰা।

- (iv) What is fossil? What are different types of fossil? Write a note on formation of fossil. 1+3+6=10

জীৱাশ্ম কি? বিভিন্ন প্ৰকাৰৰ জীৱাশ্মসমূহ কি কি? জীৱাশ্মৰ গঠনৰ ওপৰত এটি টোকা লিখা।

- (v) What is mutation? What are different types of mutation? Describe the consequences and significance of mutation in animal life. $1+2+(3+4)=10$

উৎপৰিবৰ্তন বুলিলে কি বুজা? বিভিন্ন প্ৰকাৰৰ উৎপৰিবৰ্তন-সমূহ কি কি? জীৱদেহৰ ওপৰত উৎপৰিবৰ্তনৰ প্ৰভাৱ আৰু গুৰুত্বসমূহ বৰ্ণনা কৰা।

- (vi) Write about the principles of genetic mapping.

ক্ৰমছমীয় মানচিত্ৰণ পদ্ধতিৰ নীতিসমূহৰ বিষয়ে লিখা।

- (vii) What is linkage? Describe the mechanism of linkage. Write about the significance of linkage. $2+5+3=10$

সহলগ্নতা কি? সহলগ্নতাৰ প্ৰক্ৰিয়া বৰ্ণনা কৰা। সহলগ্নতাৰ গুৰুত্বসমূহ লিখা।

- (viii) Enumerate Darwin's theory on evolution. Write the difference between Lamarckism and Darwinism. $5+5=10$

বিবৰ্তন সম্পৰ্কে ডাৰউইনৰ মতবাদ আলোচনা কৰা।
লেমাৰ্কবাদ আৰু ডাৰউইনবাদৰ মাজৰ পাৰ্থক্যসমূহ লিখা।