

SH-II/Zoology/201C-3/PR/19

B.Sc. 2nd Semester (Honours) Practical Examination, 2019

ZOOLOGY

(Non-chordates II)

Paper : 201C-3

Course ID : 22621

Time: 2 Hours

Full Marks: 15

*The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words
as far as practicable.*

1. Identify the specimens (A, B & C) with reasons. 3+3+1=7
For A and B:
Scientific name — 1, Reasons — 2.
For C:
Identification — ½, Reasons — ½.
 2. Dissect out the digestive system of the specimen provided. Draw a labelled diagram of the same. 2+1+1=4
 3. Submission of project report along with the life cycle stages (specimens to be provided) of any insect. 1+1=2
 4. Submission of laboratory notebook. 2
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SH-II/Zoology/201C-3/(PRI)/19

B.Sc. 2nd Semester (Honours) Practical Examination, 2019

ZOOLOGY

(Non-Chordates II)

Paper : 201 C-3

Course ID : 22621

Instruction to the Examiners.

1. For questions number 1, two identifications (A & B) are to be given from item No. (1) and one identification (c) is to be given from item No. (2). 3+3+1=7

For Item No. — (1)

Scientific Name : 1 mark and

Reasons : 2 marks

2. For Question No.(2), any one dissection is to be given from the following: 2+1+1=4

Digestive System of Earthworm

Or,

Digestive system of *Periplaneta*.

Dissection : 2 marks

Drawing : 1 mark

Labelling : 1 mark

3. For Question No. (3), a project report along with the life cycle stages of any insect (selected from Item No.–5) is to be submitted. 1+1=2

Report : 1 mark,

Specimen : 1 mark

4. For Question No. (4), a periodically signed Laboratory notebook containing neat and scientifically correct diagrams is to be submitted. 2

SH-II/Zoology/202/C-4(T4)/19

B.Sc. 2nd Semester (Honours) Examination, 2019

ZOOLOGY

(Cell Biology)

Paper : 202/C-4(T4)

Course ID : 22612

Time : 1 Hour 15 Minutes

Full Marks : 25

*The figures in the right hand side margin indicate marks.
Candidates are required to give their answers in their own words
as far as practicable.*

- 1. Answer any five questions:** 1×5=5
- (a) Name the types of RNA which is synthesized by Nucleolus.
 - (b) What do you mean by “second messenger”?
 - (c) Mention one advantage and one disadvantage of meiotic cell division.
 - (d) Write two important functions of “gap junction”.
 - (e) Define “suicidal bag”.
 - (f) What is “giant chromosome”?
 - (g) What is “signal sequence”?
 - (h) What do you mean by dysplasia?
- 2. Answer any two questions:** 5×2=10
- (a) With the help of a flow chart explain the extrinsic pathway of apoptosis. What is G₀ stage of cell division. 4+1=5
 - (b) “Cytoskeleton is the driving force behind functioning of cell”— Justify the statement. 5
 - (c) Briefly explain the role of cholesterol in maintaining the plasma membrane structure. What is the full form of GPCR. 4+1=5
 - (d) What are uniport, symport and antiport? What is “flip flop movement”? 3+2=5

3. Answer *any one* question:

10×1=10

- (a) What are sarcoma and carcinoma? Give four differences between the cancer cell and normal cell. Elaborate the relationship between t (9, 22) (q³², q¹¹) *ber*-*abl* fusion gene and CML in human. 2+2+6=10
- (b) Write down the various check points in cell cycle. State the role of cyclin dependent kinase (CDK) and cyclin dependent kinase complex (CDKs) in cell cycle regulation. 2+8=10
- (c) Differentiate between antioncogene and oncogene. Briefly describe the RAS protein mediated signal transduction with suitable instructions. “ Origin of cancer is a multi-step process” — Justify the statement with suitable example. 10
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B.Sc. 2nd Semester (Honours) Practical Examination, 2019

ZOOLOGY

(Cell Biology Practical)

Paper : 202/C-4 (P-4)

Course ID : 22622

Time: 2 Hours

Full Marks: 15

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

1. Identify the cell division stages (A, B) from the supplied permanent slides. Write the identifying characters of the stages.

Identification	½
Characters	1½

 2. Prepare a temporary stained slide from onion root tip. Show and identify any mitotic stage. Draw a labelled diagram of that stage.

Squash preparation	3
Identification	1
Drawing and labelling	1

 3. Prepare a temporary stained slide of Barr body from the cheek epithelium.

Preparation	3
Drawing	1

 4. Submit your laboratory note book. 2
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SH-II/Zoology/202/C-4/(PRI)/19

B.Sc. 2nd Semester (Honours) Practical Examination, 2019

ZOOLOGY

(Cell Biology Lab)

Paper : 202/C-4 (P-4)

Course ID : 22622

Time: 2 Hours

Full Marks: 15

Instructions to the Examiners

1. The examiners are requested to make necessary arrangements before the date of commencement of practical examinations.
2. For Question No. 1 examiners are requested to arrange two ideal stages (A and B), one from mitotic and one from meiotic cell division from permanent slides. Marks are distributed as mentioned in syllabus.
3. For Questions No. 2, examinees are asked to prepare a temporary stained slide from onion root tip and should show an ideal stage to any examiner and draw it in the answer-script.
4. For Questions No. 3, examinees are asked to prepare a temporary stained preparation of Barr body from cheek epithelium and should show it to any examiner and draw it in the answer script.
5. During assessment of laboratory notebook examiners are requested to verify that all items of the syllabus are covered by the candidate and signed regularly so that distinction can be offered to the deserving candidates.
6. Full name and signature along with address of the examiners should be enclosed with the answer scripts.
7. After completion of examination the answer scripts should be enclosed in a sealed packet containing top sheet. Other details should be submitted in separate envelope.

SH-II/Zoology-203/GE-2(T)/19

B.Sc. 2nd Semester (Honours) Examination, 2019

ZOOLOGY

(Aquatic Biology)

Paper : 203/GE-2(T)

Course ID : 22614

Time: 1 Hour 15 Minutes

Full Marks: 25

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

*দক্ষিণ প্রান্তস্থ সংখ্যাগুলি প্রশ্নের পূর্ণমানের নির্দেশক।
পরীক্ষার্থীদের যথাসম্ভব নিজের ভাষায় উত্তর দিতে হবে।*

1. Answer any five of the following:

1×5=5

যে কোনো পাঁচটি প্রশ্নের উত্তর দাও :

(a) Define ‘Inter-tidal Zone’.

‘Inter-tidal Zone’ কাকে বলে?

(b) Mention the Biotic components of coral reefs.

‘Coral reef’ এর জৈব ও উপাদানগুলির নাম লেখো।

(c) Name one edible sea weed. (Scientific name)

খাদ্য উপযোগী একটি ‘sea weeds’ এর বিজ্ঞানসম্মত নাম লেখো।

(d) What is ‘Reservoir pool’?

‘Reservoir pool’ কী?

(e) Give the full form of ‘PAN’.

‘PAN’-এর পুরো নাম লেখো।

(f) Define ‘green house effect’.

‘Green house effect’ এর সংজ্ঞা দাও।

(g) Mention two adhesive organs of hill stream fishes.

‘Hill stream’ মাছের দুটি adhesive অঙ্গের নাম লেখো।

(h) Mention the value of BOD of pure water.

বিশুদ্ধ জলের ‘BOD’ মাত্রা কত?

2. Answer any two questions of the following:

5×2=10

যে কোনো দুটি প্রশ্নের উত্তর দাও :

(a) Define Stream. Mention the major type of streams along their characteristic features.

1+2+2=5

‘Stream’ কাকে বলে? শ্রেণিবিভাগসহ বিভিন্ন প্রকার stream এর বৈশিষ্ট্য উল্লেখ করো।

(b) Name the parameters used in zonation of ocean? Describe the different zones of pelagic realm of an ocean.

2+3=5

কোন উপাদান সমুদ্রকে বিভিন্ন স্তরে পৃথক করেছে? সমুদ্রের ‘Pelagic realm’ এর বিভিন্ন স্তরগুলির বর্ণনা দাও।

(c) Define ‘‘Biogeochemical Cycle’’. Mention how sulphur is recycled in nature with schematic diagram.

1+2+2=5

‘Biogeochemical Cycle’ কী? ‘Sulphur’ এর প্রকৃতিতে পুনরাবর্তনের পদ্ধতি রেখাচিত্রের দ্বারা বর্ণনা করো।

(d) What is ‘‘Estuarine’’ ecosystem? Mention the physicochemical features of an estuarine ecosystem in West Bengal.

1+4=5

‘Estuarine’ বাস্তুব্যবস্থা কী? পশ্চিমবঙ্গের যে কোনো ‘Estuarine’ Ecosystem-এর ভৌতরাসায়নিক বৈশিষ্ট্যগুলি উল্লেখ করো।

3. Answer any one question of the following:

10×1=10

যে কোনো একটি প্রশ্নের উত্তর দাও :

(a) What are ‘‘Secondary Pollutants’’? What are the causes of industrial pollution in India? Mention the harmful effects of industrial pollution on animals and the control measures in brief.

2+4+2+2=10

‘Secondary Pollutants’ কী? ভারতবর্ষে ‘Industrial pollution’ এর কারণগুলি উল্লেখ করো। প্রাণীকূলের উপর শিল্প দূষণের ক্ষতিকর প্রভাব ও নিয়ন্ত্রণ পদ্ধতির সংক্ষিপ্ত বর্ণনা দাও।

(b) Write short notes on any two:

5×2=10

টীকা লেখো (যে কোনো দুটি) :

(i) Continental shelf

(ii) Thermal pollution

(iii) Ozone hole

SH-II/Zoology/203GE-2/PR/19

B.Sc. 2nd Semester (Honours) Practical Examination, 2019

ZOOLOGY

(Aquatic Biology Lab)

Paper : 203-GE-2 (P)

Course ID : 22624

Time: 2 Hours

Full Marks: 15

*The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words
as far as practicable.*

1. Identify three given specimens (A, B, C) with identifying characters.
(Identification: ½; Identifying Characters: 1½) 2×3=6

 2. Determine the
 - (i) free Carbon di-oxide or
 - (ii) pH in a given water sample collected from a nearby water body and write the working principle and result.
(Principle:2; Result:3) 5

 3. Submission of project report on a visit to sewage treatment plant/marine bio-reserve/Fisheries institute/Freshwater ecosystem. 2

 4. Submission of laboratory notebook. 2
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SH-II/Zoology/203GE-2/(PRI)/19

B.Sc. 2nd Semester (Honours) Practical Examination, 2019

ZOOLOGY

(Aquatic Biology Lab)

Paper : 203-GE-2 (P)

Course ID : 22624

Instruction to the Examiners.

1. The examiners are requested to make the necessary arrangements before the date of commencement of practical examination.
2. For Question No.1 examiners are requested to supply the permanent slides of Zooplanktons as mention in the syllabus. Candidate must write at least two identifying characters:
3. For Laboratory Note Book must be signed by the respective teachers regularly.
4. Key for Identification of Questions No.1 duly signed by the examiners is to be attached.
5. A key to the identifications of specimens has to be prepared and duly signed by the examiners for each batch of candidates and should be enclosed along with the evaluated answer-scripts.
6. For Question No.2, examiners are requested to set any one experiment from (i) or (ii) for the candidates of each batch. The combination for each batch should be clearly mentioned in the answer scripts containing the answer keys and duly signed by the examiners.
7. For Question No.3, a project report should be submitted by each student properly signed by the respective teachers.
8. Examiners are requested to send the evaluated answer scripts within 7 days after completion of practical examination to the Controller of Examination, Bankura University.
9. "Datasheet" should be furnished mentioning Names, Specimen Signature, Address and Phone number of all the examiners.

SP-II/Zoology/201/C-1B/19

B.Sc. 2nd Semester (Programme) Examination, 2019

ZOOLOGY

(Ecology)

Paper : 201/C-1B

Course ID : 22618

Time : 1 Hour 15 Minutes

Full Marks : 25

*The figures in the right hand side margin indicate marks.
Candidates are required to give their answers in their own words
as far as practicable.*

*দক্ষিণ প্রান্তস্থ সংখ্যাগুলি প্রশ্নের পূর্ণমানের নির্দেশক।
পরীক্ষার্থীদের যথাসম্ভব নিজের ভাষায় উত্তর দিতে হবে।*

1. Five questions are to be answered out of 8.

1×5=5

আটটির মধ্যে পাঁচটি প্রশ্নের উত্তর দিতে হবে।

(a) Define synecology.

সিনইকোলজির সংজ্ঞা দাও।

(b) What is Bio indicator?

Bio indicator কী?

(c) What do you understand by eurythermal animal?

ইউরিথার্মাল প্রাণী বলতে কী বোঝো?

(d) Define emigration?

Emigration-এর সংজ্ঞা দাও।

(e) What do you mean by Profundal region?

প্রোফান্ডাল অঞ্চল বলতে কী বোঝো।

(f) Give definition of ecological succession.

ইকোলজিক্যাল সাকসেশনের সংজ্ঞা দাও।

(g) What do you understand by detritus consumer?

কর্কর ভক্ষক বা ডেট্রিটাস ভক্ষক বলতে কী বোঝো?

(h) Write the full form of "CITES".

"CITES"-এর পুরো নাম লেখো।

2. Two questions are to be answered out of 4.

5×2=10

চারটির মধ্যে দু'টি প্রশ্নের উত্তর দিতে হবে।

(a) What are the characteristics of population? Explain 'J' shaped population growth curve with figure. 2+3=5

পপুলেশনের কী কী বৈশিষ্ট্য দেখা যায়? 'J' আকৃতির পপুলেশন Growth Curve টি চিত্র সহকারে ব্যাখ্যা করো।

(b) Write a short note on ecological pyramid. Explain the relation between the food chain and food web. 3+2=5

ইকোলজিক্যাল পিরামিড সম্পর্কে সংক্ষিপ্ত টীকা লেখো। খাদ্য শৃঙ্খল ও খাদ্যজালের মধ্যে সম্পর্ক ব্যাখ্যা করো।

(c) Schematically represent the process of nitrogen cycle. 3+2=5

চিত্রের মাধ্যমে নাইট্রোজেন চক্রটি প্রদর্শন করো।

(d) What is human modified forest ecosystem? Mention its characteristics 1+4=5

মানুষের দ্বারা পরিবর্তিত অরণ্য বাস্তুতন্ত্র কী? এর বৈশিষ্ট্যগুলি লেখো।

3. One question is to be answered out of 2.

10×1=10

দুটির মধ্যে একটি প্রশ্নের উত্তর দিতে হবে।

(a) What do you understand by ecological efficiency? Describe the Universal Model of energy flow with suitable diagram. 2+8=10

ইকোলজিক্যাল এফিসিয়েন্সি বলতে কী বোঝো? বাস্তুতন্ত্রে শক্তিপ্রবাহ কীভাবে ঘটে?

(b) Describe various types of ex-situ conservation methods. Explain the following terms — 4+2+2+2=10

বিভিন্ন 'এক্সসিটু' সংরক্ষণ পদ্ধতিগুলি বর্ণনা করো। নীচের বিষয়গুলি ব্যাখ্যা করো —

(i) Species diversity

প্রজাতি বৈচিত্র্য

(ii) Species dominance

প্রজাতি প্রকটতা

(iii) Species richness

প্রজাতি প্রাচুর্যতা

SP-II/Zoology/201/C-1B/(PR)/19**M.Sc. 2nd Semester (Programme) Practical Examination, 2019****ZOOLOGY****(Ecology Lab)****Paper : 201/C-1B****Course ID : 22628****Time: 2 Hours****Full Marks: 15**

1. Identify the given specimen (Genus) (1A and 1B) with two reasons. Write down the systematic position. ($\frac{1}{2}+1+1$) \times 2=5

প্রদত্ত দুটি Plankton নমুনাকে কারণসহ সনাক্ত করো দুটি কারণ দেখিয়ে। শুধুমাত্র নাম এবং প্রাণীজগতে অবস্থান উল্লেখ করো।

2. (a) Estimate the Dissolved Oxygen content (Winkler's method) of the water sample provided, with principle, observation inference. 6

Winkler's method অনুসরণ করে প্রদত্ত জলের নমুনায় Dissolved Oxygen content পরিমাপ করো। পরীক্ষাটির নীতি, পদ্ধতি, ফলাফল ও সিদ্ধান্ত লেখো।

Principle	1
Procedure	1
Result and calculation	3
Inference	1

Or, অথবা

- (b) Estimate the free Carbon-di-oxide content of the water sample provided, with principle, observation and inference. 6

প্রদত্ত জলের নমুনায়, Free CO₂-এর পরিমাপ করো। পরীক্ষাটির নীতি, পদ্ধতি, ফলাফল ও সিদ্ধান্ত লেখো।

Principle	1
Procedure	1
Result and calculation	3
Inference	1

3. Submission of the report prepared on a visit to a National Park/Biodiversity Park/Wildlife Sanctuary. 4

National Park/Biodiversity Park/ Wildlife Sanctuary দর্শন সম্পর্কে রিপোর্ট জমা করো।

- (a) Report copy submission 2
 (b) Viva voce 2

B.Sc. 4th Semester (Programme) Examination, 2019

ZOOLOGY

Paper : 404/SEC-2

[Aquarium Fish Keeping (Economic Zoology)]

Course ID : 42610

Time : 2 Hours

Full Marks : 40

*The figures in the right hand side margin indicate full marks.
Candidates are required to give their answers in their own words
as far as practicable.*

*দক্ষিণ প্রান্তস্থ সংখ্যাগুলি প্রশ্নের পূর্ণমানের নির্দেশক।
পরীক্ষার্থীদের যথাসম্ভব নিজের ভাষায় উত্তর দিতে হবে।*

1. Answer any five of the following questions:

2×5=10

নিম্নলিখিত প্রশ্নগুলির মধ্যে যে কোনো পাঁচটির উত্তর দাও :

(a) What are Ornamental fishes?

Ornamental fish কাকে বলে?

(b) Mention two economic importance of the Aquarium Fish Keeping.

Aquarium fish keeping-এর দুটি অর্থনৈতিক গুরুত্ব লেখো।

(c) Mention two foods for aquarium fishes.

Aquarium Fish-দের দুটি খাবারের নাম উল্লেখ করো।

(d) Name two famous Aquariums of India.

ভারতের দুটি বিখ্যাত Aquarium-এর নাম করো।

(e) What is Gold fish?

Gold fish কী?

(f) Define Aquarium fish Keeping.

Aquarium fish Keeping-এর সংজ্ঞা দাও।

(g) Mention the names of four aquarium fishes.

চারটি Aquarium fish-এর নাম লেখো।

(h) Write some important factors associated with live fish transport.

জীবিত মাছ পরিবহনের কিছু গুরুত্বপূর্ণ শর্ত উল্লেখ করো।

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

5×4=20

নিম্নলিখিত প্রশ্নগুলির মধ্যে যে কোনো চারটির উত্তর দাও :

- (a) Draw a labelled diagram of an aquarium and describe its different components.
চিহ্নিত চিত্র সহযোগে একটি Aquarium-এর বিভিন্ন অংশের বর্ণনা দাও।
- (b) Give an account of different types of Aquarium Fish Foods.
বিভিন্ন রকমের Aquarium Fish Food সম্পর্কে আলোচনা করো।
- (c) Write a short note on aquarium maintenance.
Aquarium maintenance-এর উপর একটি টীকা লেখো।
- (d) Mention the important characteristics of the aquatic ecosystem of an aquarium.
একটি Aquarium-এর জলজ বাস্তুতন্ত্রের গুরুত্বপূর্ণ বৈশিষ্ট্যগুলি লেখো।
- (e) Describe the life cycle of any aquarium fish.
যে কোনো একটি aquarium fish-এর জীবনচক্র বর্ণনা করো।
- (f) Describe different steps of live fish transport.
জীবিত মাছ পরিবহণের বিভিন্ন ধাপগুলি আলোচনা করো।

3. Answer *any one* of the following questions:

10×1=10

নিম্নলিখিত প্রশ্নগুলির মধ্যে যে কোনো একটির উত্তর দাও :

- (a) Explain scopes of Aquarium Fish Farm as a cottage industry in India.
ভারতবর্ষে কুটির শিল্পরূপে Aquarium Fish Farm-এর সুযোগ সম্পর্কে আলোচনা করো।
- (b) Describe the common characters of some fresh water and marine aquarium fishes.
মিঠাজল এবং সামুদ্রিক জলে বসবাসকারী কিছু aquarium fish-এর সাধারণ বৈশিষ্ট্যসমূহ আলোচনা করো।

B.Sc. 4th Semester (Honours) Examination, 2019

ZOOLOGY

(Sericulture)

Paper : 405/SEC-2

Course ID : 42615

Time : 2 Hours

Full Marks : 40

*The figures in the right hand side margin indicate marks.
Candidates are required to give their answers in their own words
as far as practicable.*

1. Answer *any five* of the following questions: 2×5=10
- (a) Name two Economic Branches of Zoology.
 - (b) Define moriculture.
 - (c) Which state in India ranked first in silk production?
 - (d) What is 'Chasam'?
 - (e) Define 'Chandraki'.
 - (f) Name two diseases of Silk moth.
 - (g) What is Rendita or 'Denier'?
 - (h) Give the scientific name of Muga Silk moth.
2. Answer *any four* of the following questions: 5×4=20
- (a) Describe the 5th instar larva of Mulberry silk moth with labelled diagram. 3+2=5
 - (b) Name the major four (4) types of silk, silk moths (Scientific name) with their host plants (Scientific name). 1+2+2=5
 - (c) What is Silk? Why silk is called the Golden fibre, of textile industry? Mention four (4) major properties of silk. 1+2+2=5
 - (d) What is Silk gland? Describe the structure of Silk gland with suitable diagram. 1+2+2=5
 - (e) Define voltinism. Mention the characteristics features of a typical rearing house of silkworm.
 - (f) Name the protozoan-and-bacterial disease of Silkworm, their Pathogen and control measures. 2+2+1=5

3. Answer *any one* of the following questions: 10×1=10

(a) What is sericin and fibroin? Describe the life cycle of a Mulberry silk moth with the suitable diagram. 1+6+3=10

(b) Write short notes on (*any two*): 5×2=10

(i) Pests of Silk worm.

(ii) Non Mulberry Sericulture.

(iii) Rearing appliances of Silkworms.

(iv) Prospects of Sericulture in India.

B.Sc. 4th Semester (Honours) Examination, 2019**ZOOLOGY****(Aquarium Fish Keeping)****Paper : 405/SEC-2****Course ID : 42615****Time : 2 Hour****Full Marks : 40**

*The figures in the right hand side margin indicate marks.
Candidates are required to give their answers in their own words
as far as practicable.*

1. Answer *any five* of the following questions: 2×5=10
- (a) Define virtual aquariums.
 - (b) Why is an aquarium tank made of glass?
 - (c) Define fish.s
 - (d) How do butterfly fish reproduce?
 - (e) Comment on the role aquarium fish keeping in self-employment.
 - (f) What is Sexual dimorphism?
 - (g) Mention four important equipments used for fish handling.
 - (h) Mention two economic importances of aquarium.
2. Answer *any four* of the following questions: 5×4=20
- (a) Differentiate between the male and female molly fish. Write down the names of two varieties of gold fish. 3+2=5
 - (b) Write short note on Aquarium maintenance.
 - (c) Describe “Nitrogen Cycle” of an aquarium. Which chemical is used in mosquito foggers? 4+1=5
 - (d) Describe the symbiotic relationship of aquarium Anemone fish.
 - (e) Differentiate between exotic-and endemic-species of aquarium fishes with examples.
 - (f) Explain—“Aquarium fish as larval predator”.

Please Turn Over

3. Answer *any one* of the following questions: 10×1=10

(a) Give an account on packing and forwarding techniques of live fish transportation. Describe the potential scope of aquarium fish industry as a cottage industry. 6+4=10

(b) Describe the preparation and composition of formulated fish feeds. Give an account of live fish feed organisms. 6+4=10

B.Sc. 4th Semester (Programme) Examination, 2019

ZOOLOGY

Paper : 401/C-1D

(Vertebrate)

Course ID : 42618

Time : 1 Hour 15 Minutes

Full Marks : 25

*The figures in the right hand side margin indicate full marks.
Candidates are required to give their answers in their own words
as far as practicable.*

*দক্ষিণ প্রান্তস্থ সংখ্যাগুলি প্রশ্নের পূর্ণমানের নির্দেশক।
পরীক্ষার্থীদের যথাসম্ভব নিজের ভাষায় উত্তর দিতে হবে।*

1. Answer any five of the following questions:

1×5=5

নিম্নলিখিত প্রশ্নগুলির মধ্যে যে কোনো পাঁচটির উত্তর দাও :

(a) Mention the peculiarities of notochord in *Branchiostoma*.

Branchiostoma-এর notochord-এর বিশেষত্ব উল্লেখ করো।

(b) Justify the name 'Cyclostomata'.

Cyclostomata নামের তাৎপর্য লেখো।

(c) What is Siphonoglyphos type of fang?

Siphonoglyphos fang কী?

(d) Distinguish between Synapsid and Diapsid skull.

Synapsid ও Diapsid খুলির পার্থক্য উল্লেখ করো।

(e) Cite examples of a bird which can cover highest longitudinal and altitudinal distance.

সর্বাধিক অনুদৈর্ঘ্য পরিযান ও সর্বোচ্চ অনুলম্ব পরিযান করতে পারে এমন পাখির নাম লেখো।

(f) What do you mean by echolocation?

Echolocation বলতে কী বোঝো?

(g) What is 'Bastard wing'?

Bastard wing কী?

(h) Name two mammal species inhabiting Oriental Realm.

Oriental Realm-এর দুটি স্তন্যপায়ী প্রাণীর নাম লেখো।

2. Answer any two of the following questions:

5×2=10

নিম্নলিখিত প্রশ্নগুলির মধ্যে যে কোনো দুটির উত্তর দাও :

(a) Name and describe briefly four organs which perform the excretory function in *Branchiostoma* along with a note on their roles. 2+3=5

সংক্ষেপে *Branchiostoma*-এর রেচনে অংশগ্রহণকারী চারটি অঙ্গের নাম লেখো এবং রেচনে ওই অঙ্গগুলির ভূমিকা বর্ণনা করো।

(b) “All vertebrates are chordates, but all chordates are not vertebrates.”— Justify the statement.

“সকল vertebrate হল chordates, কিন্তু সকল chordates vertebrates নয়”—এই বক্তব্যের যৌক্তিকতা দেখাও।

(c) Mention the type of skull found in snake. Name the muscles and bones associated with biting mechanism in snake with suitable diagram. 1+(2+2)=5

সাপে কী ধরনের খুলি পাওয়া যায়? কামড়ানোর সময় ব্যবহৃত সাপের পেশিগুলির ও হাড়গুলির নাম চিত্রসমেত লেখো।

(d) Name a legless amphibia. Mention its order. What do you mean by metamorphosis?

1+1+3=5

পা-বিহীন একটি উভচর প্রাণীর নাম এবং সেটি কোন বর্গের অন্তর্ভুক্ত লেখো। Metamorphosis বলতে কী বোঝো?

3. Answer any one of the following questions:

10×1=10

নিম্নলিখিত প্রশ্নগুলির মধ্যে যে কোনো একটির উত্তর দাও :

(a) Classify Amphibia upto living orders with examples (scientific names).

উভচরের বর্গ অবধি উদাহরণ (বিজ্ঞানসম্মত নাম) সমেত শ্রেণিবিন্যাস করো।

(b) What do you mean by cambered shape of wing? State the Bernoulli's law on aerodynamics.

Comment on hovering flight with suitable diagram. What is 'Aspect ratio'? 2+2+(2+2)+2=10

Cambered shape of wing বলতে কী বোঝো? Bernoulli's law on aerodynamics সম্পর্কে লেখো।

Hovering flight-এর উপর চিত্রসহ টীকা লেখো। Aspect ratio কী?

B.Sc. 4th Semester (Honours) Examination, 2019

ZOOLOGY

Paper : 401/C-8

(Comparative Anatomy of Vertebrates)

Course ID : 42611

Time : 1 Hour 15 Minutes

Full Marks : 25

*The figures in the right hand side margin indicate full marks.
Candidates are required to give their answers in their own words
as far as practicable.*

1. Answer *any five* of the following questions: 1×5=5
 - (a) Define hyostylic Jaw suspension.
 - (b) What is OS-innominatum?
 - (c) What is thecodont dentition?
 - (d) Define venous heart.
 - (e) What is foramen of pannizza?
 - (f) What is Mullerian duct?
 - (g) What do you mean by Nociceptors?
 - (h) What is foramen of magnum?

2. Answer *any two* of the following questions: 5×2=10
 - (a) Differentiate between the horn and antler. Write the structural features of a typical feather. 2+3=5
 - (b) Briefly describe the structure of a fish brain. Add a note on the distribution of Xth cranial nerve. 4+1=5
 - (c) Differentiate between the mesonephros and metanephros kidney with suitable diagrams. 3+2=5
 - (d) Write down the modifications of aortic arches in birds with suitable diagrams. 3+2=5

3. Answer *any one* of the following questions: 10×1=10
 - (a) Briefly describe the structure of a ruminating stomach with suitable diagram. Differentiate between the simple and duplex uterus in mammals. (6+2)+2=10
 - (b) Briefly describe the structure of respiratory organ of birds with suitable diagram. Define double respiration. (5+3)+2=10

B.Sc. 4th Semester (Honours) Examination, 2019**ZOOLOGY****(Animal Physiology, Life Sustaining Systems)****Paper : 402/C-9****Course ID : 42612****Time : 1 Hour 15 Minites****Full Marks : 25**

*The figures in the right hand side margin indicate full marks.
Candidates are required to give their answers in their own words
as far as practicable.*

- 1. Answer any five questions:** 1×5=5
- (a) Why SA node is named as such and mention its location on heart?
 - (b) Which type of bile is more alkaline and why?
 - (c) What is Crocodile's Tear?
 - (d) How many amino acids are present of a haemoglobin molecule?
 - (e) Define Bohr effect.
 - (f) What is Mastigation and Deglutition?
 - (g) Define Vasa recta.
 - (h) What is Diastasis?
- 2. Answer any two questions:** 5×2=10
- (a) Define Bombay Phenotype. Describe the different types of antigen and antibody present in ABO Blood Group. 1+2+2=5
 - (b) Define Podocytes. Describe the counter current multiplier system of urine formation with neat diagram. 1+4=5
 - (c) Define "Polymorphonuclear Leucocytes"? Describe the different types of leucocytes in respect to
 - (i) Morphology
 - (ii) Percentage and
 - (iii) Functions 1+2+1/2+1/2=5
 - (d) What is Apex of Heart? Mention the different types of Junctional tissue of mammalian heart with their functions. 1+4=5

3. Answer *any one* question:

10×1=10

(a) Define Embolus and Thrombus. How CO₂ is carried from the tissue to lungs through blood in the form of Bicarbonate salts with suitable diagram. Define Chloride shift.

1+1+6+2=10

(b) What is Osmoconformer and Osmoregulators? Describe the process of Osmoregulation of an anadromous and a catadromous fish during migration.

1+1(4+4)=10

B.Sc. 4th Semester (Honours) Examination, 2019

ZOOLOGY

Paper : 403/C-10

(Immunology)

Course ID : 42613

Time : 1 Hour 15 Minutes

Full Marks : 25

*The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words
as far as practicable.*

1. Answer *any five* of the following questions: 1×5=5
- (a) What is MAC?
 - (b) What is CTL?
 - (c) Define MALTs.
 - (d) What is ADCC?
 - (e) Differentiate between immunogen and allergen.
 - (f) State the function of IgE.
 - (g) What is Opsonization?
 - (h) What is immunological memory?
2. Answer *any two* of the following questions: 5×2=10
- (a) Briefly describe type I hypersensitivity. What is atopy? 4+1=5
 - (b) Briefly describe the structure of an immunoglobulin molecule. 5
 - (c) What is TCR? How it recognises the antigen bound MHC? Describe it with suitable illustration. 2+3=5
 - (d) What are DNA vaccines, booster dose, and clonal anergy? 2+2+1=5
3. Answer *any one* of the following questions: 10×1=10
- (a) Briefly describe the cytosolic pathway of antigen presentation with suitable diagram. Comment on the sandwich ELISA. 8+2=10
 - (b) How CTL is responsible for killing a pathogen infected cell? State the function of Treg Cells. What are Cytokines and how it is different from Chemokines? 5+2+2+1=10
-

SH-IV/ZOO/403/CP-10/(PR)/19

B.Sc. 4th Semester (Honours) Practical Examination, 2019

ZOOLOGY

Paper : 403/CP-10

(Immunology Lab)

Course ID : 42623

Time : 2 Hours

Full Marks : 15

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

Answer all questions.

1. Identify the histological slides with reasons (A & B). Mention at least three specific characters. 2×2=4
(Identification ½ mark. Reasons 1½ marks).
 2. Prepare a temporary stained blood film. Identify any one white blood cell and draw it. 6
(Preparation–4 marks. Identification–1 mark. Drawing–1 mark).
 3. Determine the Bleeding Time (BT) of your blood. 3
(Experiment–2 marks. Result–1 mark).
 4. Submit Laboratory Notebook. 2
-

SH-IV/ZOO/403/CP-10/(PRI)/19

B.Sc. 4th Semester (Honours) Practical Examination, 2019

ZOOLOGY

Paper : 403/CP-10

(Immunology Lab)

Course ID : 42623

Instructions to the Examiners.

1. For Question No. 1, (identification with reasons) two items (A and B) should be selected from the list of the syllabus.
2. For Question No. 2 and 3, proper precaution should be maintained.
3. For Question No. 4, emphasis should be given on covering all the practical items, scientific drawing and regular sign by the respective teachers.

SH-IV/ZOO/401/C-8/(PR)/19

B.Sc. 4th Semester (Honours) Practical Examination, 2019

ZOOLOGY

(Comparative Anatomy of Vertebrates/Lab)

Paper : 401/C-8

Course ID : 42621

Time : 2 Hours

Full Marks : 15

*The figures in the right hand side margin indicate marks.
Candidates are required to give their answers in their own words
as far as practicable.*

1. Identify the specimen (skeletal structure) (A, B and C with) reasons. 2×3=6
(Identification : ½, Characteristic features – 1½).
 2. Mount and stain the specimen provided. 1+1=2
(Mounting : 1, Staining : 1)
 3. Dissect and display the part of the specimen provided. Draw a neat diagram and label the parts. 3+1+1=5
(Dissection and display – 3; Drawing – 1; Labeling – 1).
 4. Submission of the Laboratory notebook. 2
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SH-IV/ZOO/401/C-8/(PRI)/19

B.Sc. 4th Semester (Honours) Practical Examination, 2019

ZOOLOGY

(Comparative Anatomy of Vertebrates)

Paper : 401/C-8

Course ID : 42621

Instructions to the Examiners.

1. Necessary arrangements may please be made before the date of commencement of practical examinations.
2. For Question No 1, three specimens are to be selected taking one from skull/carapace plastron, one from vertebrae and one from girdle.
For Question No 1, separate loose sheets should be supplied to the candidates in the identification hall and should be collected within schedule time.
The loose sheets are to be attached with the main answer scripts after evaluation and duly signed by the examiner.
3. For question No 2, one mounting and staining from the followings may be allotted:
 - (a) Placoid scale
 - (b) Ctenoid scale
 - (c) Cycloid scalePlease write the selected mounting (for the students) on the blackboard kept in the laboratory. Instruct the examinees to write the allotted mounting on the first right page of the answer script and should be duly signed by the examiner.
4. For question No 3, one dissection from the followings may be allotted:
 - (a) Afferent branchial arterial system of carp
 - (b) IXth and Xth cranial nerves of carpPlease write the selected dissection (for the students) on the blackboard kept in the laboratory. Instruct the examinees to write the allotted dissection of the first right page of the answer script and should be duly signed by the examiner.
Examinees have to draw the labeled diagram of the dissection.
5. During assessment of laboratory notebook all items of the syllabus should be covered by the candidate and signed regularly so that distinction can be offered to the deserving candidates.
6. Only the examiner and laboratory personnel's should be allowed in the laboratory during examination.
7. Full name and signature together with address of the examiners should be enclosed with the answer scripts.
8. After completion of examination the answer scripts should be enclosed in a sealed packet containing top sheet. Award list should be separately submitted.

B.Sc. 4th Semester (Honours) Practical Examination, 2019

ZOOLOGY

Paper : 402/C-9

(Animal Physiology: Life Sustaining System Lab)

Course ID : 42622

Time : 2 Hours

Full Marks : 15

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

1. Enumerate RBC or WBC from any mammal using haemocytometer. Put down the total count of RBC or WBC/ml. 6+2=8

(Preparation–6 marks, Result–2 marks)

Or,

Estimate haemoglobin content of blood from any mammal using Sahli's haemoglobinometer in mg/ml. Write down the procedure of the experiment. 6+2=8

2. Determine your own blood group using the method for ABO blood grouping. Write down the procedure for ABO blood grouping elaborating the reactions involved. 3+2=5

Or,

Prepare haemin crystal with enriched RBC from mammalian blood. Draw and label a haemin crystal. 3+1+1=5

Or,

Record blood pressure of a candidate appearing for the examination from his/her brachial artery at the elbow following auscultatory method from both hands. Comment on the normal blood pressures of your age. 4+1=5

3. Submit your Laboratory notebook. 2

B.Sc. 4th Semester (Honours) Examination, 2019

ZOOLOGY

Paper : 404/GE-4

(Insect Vectors and Diseases)

Course ID : 42614

Time : 1 Hour 15 minutes

Full Marks : 25

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

*দক্ষিণ প্রান্তস্থ সংখ্যাগুলি প্রশ্নের পূর্ণমানের নির্দেশক।
পরীক্ষার্থীদের যথাসম্ভব নিজের ভাষায় উত্তর দিতে হবে।*

1. Answer *any five* questions from the following:

1×5=5

নিম্নলিখিত প্রশ্নগুলির মধ্যে যে কোনো পাঁচটির উত্তর দাও :

(a) What is Plumose antenna?

প্লুমোজ (Plumose) অ্যানটেনা বলতে কী বোঝায়?

(b) Define Biological vector.

বায়োলজিক্যাল ভেক্টর কাকে বলে?

(c) What is Maggot?

ম্যাগট (Maggot) কী?

(d) By which insect Chagas disease is carried out?

চাগাস রোগ (Chagas disease) কোন পতঙ্গের দ্বারা বাহিত হয়?

(e) Name a fish which consumes mosquito larva.

মশার লার্ভা ভক্ষণকারী একটি মাছের নাম লেখো।

(f) What is Myiasis?

মিয়াসিস (Myiasis) কী?

(g) Name the vector of Leishmaniasis.

লিসম্যানিয়াসিস (Leishmaniasis) রোগের বাহকের নাম কী?

(h) What is Primary host?

মুখ্য পোষক (Primary host) কাকে বলে?

2. Answer *any two* questions from the following:

5×2=10

নিম্নলিখিত প্রশ্নগুলির মধ্যে *যে কোনো দুটি* প্রশ্নের উত্তর দাও :

(a) Name the pathogen of Dengue. Write down the different measures for controlling mosquito.

1+4=5

ডেঙ্গু রোগের জীবাণুটির নাম লেখো। মশার নিয়ন্ত্রণ কৌশলগুলি লেখো।

(b) Briefly describe the symptoms and treatment procedures of plague.

2½+2½=5

প্লেগ রোগের বিভিন্ন লক্ষণগুলি উল্লেখ করো এবং এর চিকিৎসা পদ্ধতি সম্পর্কে সংক্ষেপে আলোচনা করো।

(c) Discuss the differences between the transmitter and vector with examples. Add a note on reservoir host.

3+2=5

উদাহরণ সহযোগে Transmitter ও Vector-এর পার্থক্য বর্ণনা করো। Reservoir host-এর সংজ্ঞা দাও।

(d) Briefly describe the different symptoms and treatment procedures of Filariasis.

2½+2½=5

ফাইলেরিয়া রোগের বিভিন্ন লক্ষণগুলি উল্লেখ করো এবং এই রোগের চিকিৎসা পদ্ধতি সম্পর্কে আলোচনা করো।

3. Answer *any one* question from the following:

10×1=10

নিম্নলিখিত প্রশ্নগুলির মধ্যে *যে কোনো একটি* প্রশ্নের উত্তর দাও :

(a) Describe the asexual phase of a malaria parasite with a suitable diagram. What is Ookinete?

8+2=10

ম্যালেরিয়া পরজীবীর অযৌন জনন দশটি চিত্রসহ বর্ণনা করো। উকাইনেট কী?

(b) Briefly describe the symptoms of Kala-azar or Black fever. Write the various control measures of bed bug.

6+4=10

কালাজুরের বিভিন্ন লক্ষণগুলি সংক্ষেপে আলোচনা করো। ছারপোকাকার নিয়ন্ত্রণ কৌশল বর্ণনা করো।

SH-IV/ZOO/404/GE-4/(PR)/19

B.Sc. 4th Semester (Honours) Practical Examination, 2019

ZOOLOGY

Paper : 404/GE-4

(Insect Vectors and Diseases Lab)

Course ID : 42624

Time : 2 Hours

Full Marks : 15

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

1. Identify the specimens (A, B, C) as provided with reasons and mention the disease transmitted by them. 3×3=9
(Identification: ½, Reasons: 1½, Disease Transmitted: 1).
 2. Prepare a temporary mount of the specimen provided with drawing and labelling. 2
(Preparation of mounting: 1, Drawing and labelling: 1).
 3. Submit a Project report on an insect i.e.; *Culex / Anopheles / Cimex / Phlebotomus / Musca* along with life cycle stages. 2
 4. Laboratory notebook. 2
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SH-IV/ZOO/404/GE-4/(PRI)/19

B.Sc. 4th Semester (Honours) Practical Examination, 2019

ZOOLOGY

Paper : 404/GE-4

(Insect Vectors and Diseases Lab)

Course ID : 42624

Instructions to the Examiners.

1. The examiners are requested to make the arrangements before the date of commencement of practical examination.
2. For question no.-1, examiners are requested to supply the permanent slides of insect vectors/ photographs of the insect vectors mentioned in the syllabus.
3. For question no.-2, examiners should supply the living specimen (narcotized) to the examinees. (either mosquito/cockroach)
4. For question no.-3, special credit will be given to the candidates for duly signed copies by the respective teachers.
5. Credit will be given to the duly signed laboratory notebook.
6. Key for identification of question no. 1 duly signed by the examiners may please be given along with the answer scripts.
7. Examiners are requested to send the evaluated answer scripts within 7 days after completion of practical examination to the Controller of Examination, Bankura University.
8. "Datasheet" should be furnished mentioning names, specimen signatures, addresses and Phone numbers of all the examiners.

SP-IV/ZOO/401/C-1D/(PR)/19

B.Sc. 4th Semester (Programme) Practical Examination, 2019

ZOOLOGY

Paper : 401/C-1D

(Vertebrate Lab)

Course ID : 42628

Time : 2 Hours

Full Marks : 15

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

1. Identify the specimens (A, B and C) with reasons. 3×3=9
[Generic name: ½, Systematic position: ½, Reasons: 2]

 2. Dissect and display the parts of the specimen provided. Draw the diagram and label the parts.
[Dissection and display: 3+1, Drawing: 1 and Labelling: 1] 6
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SP-IV/ZOO/401/C-1D/(PRI)/19

B.Sc. 4th Semester (Honours) Practical Examination, 2019

ZOOLOGY

Paper : 401/C-1D

(Vertebrate Lab)

Course ID : 42628

Instructions to the Examiners.

1. For question no.-1, examiners are requested to select specimen A from Protochordata and Agnatha, specimen B from Fishes and Amphibia, specimen C from Reptilia and Mammalia.
2. For question no.-2, examiners are requested to supply Tilapia/carp for dissection of brain and pituitary. The supplied specimens should be clearly mentioned on blackboard.
3. For question no.-1, separate sheet should be supplied to the candidates.

B.Sc. 2nd Semester (Honours) Examination, 2019

ZOOLOGY

(Non Chordates II)

Paper : 201/C-3

Course ID : 22611

Time : 1 Hour 15 Minutes

Full Marks : 25

*The figures in the right hand side margin indicate marks.
Candidates are required to give their answers in their own words
as far as practicable.*

1. Answer *any five* questions: 1×5=5
- (a) What is schizocoelic coelom?
 - (b) What you mean by exonephric nephridia.
 - (c) What are spiracles?
 - (d) What are ommatidia?
 - (e) Define detorsion?
 - (f) Define odontophore.
 - (g) Distinguish between commissures and connectives.
 - (h) Why hemichordates are called invertebrate chordates?
2. Answer *any two* questions: 5×2=10
- (a) Give an account of the water vascular system of *Asterias* with proper diagram 4+1=5
 - (b) Classify phylum Annelida upto class with characters and examples. 4+1=5
 - (c) “Onychophorans exhibit both Arthropod and Annelid characters”. Justify the statement. 5
 - (d) Describe the respiratory organs of *Pila* sp. with labelled diagram. 3+2=5
3. Answer *any one* question: 10×1=10
- (a) What do you mean by “ Critical period” in insect metamorphosis? Mention the names of endocrine gland involved in metamorphosis along with the chemistry of hormones in Lepidopteran insects. Schemetically represent the hormonal regulation of metamorphosis in Lepidoptera.

(b) Write short notes on the following echinoderms larve: (*any two* with suitable diagram):

5×2=10

- (i) Bipinnaria Larva
 - (ii) Echinopluteus Larva
 - (iii) Doliolaria Larva
 - (iv) Auricularia Larva
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