M.Sc 3rd Semester Examination, 2019

ZOOLOGY

PAPER – ZOO-303

Full Marks : 40

Time : 2 hours

Answer **all** questions

The figures in the right hand margin indicate marks

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

Illustrate the answers wherever necessary

ZOO-303—Fishery Special Paper

GROUP—A

(*Ichthyotaxonomy and Biology*)

1. Answer any *two* of the following : 2×2

(*a*) Place the following fishes in their appropriate order (any *four*) : $\frac{1}{2} \times 4$

Puntius sarana, Cirrhinus reba
Amplypharyngodon mola
Clarias batrachers, Pampus chirnsis,
Sperata aor, Harpodenchorius.

(*b*) Cite one example each of the following fish order (any *four*) : $\frac{1}{2} \times 4$

Clupeiformes, Raji formes, Syngnathi formes, Perciformes Lamniformes, Torpediniformes, Cyprinodontiformes.

(*c*) State the distinctive features of any *one* order : 2

(*i*) Mugiri formes,

(*ii*) Siluriformes,

(*iii*) Tetradertiformes.

(*d*) Why fish nutrional evaluation and fish growth assessment are important in fishery ? 2

(*Continued*)

2. Answer any *two* questions of the following : 4 × 2

(*a*) Write a short note on electrict organ.

(*b*) Give a detailed account on the relationship between photoperiod and fish growth.

(*c*) Mention the different types of Hormones which are secreted from pituitary gland with their distinct secreting sites.

(*d*) Why fish migrate ? State the different types of migration in fishes.

3. Answer any *one* of the following : 8 × 1

(*a*) In formulation of 35% protein feed for Tilapia, we used cotton sued (48%), maizegram meal (20%), ground nut (58%), polished rice (14%). Using square metheo of Hardy make a 250 kg of Tilapia feed by those mention feed staffs. 4 + 4

(*b*) Find out the percentage wt gain, FCR and PER value. When Initial wt of the fish – 5g, final weight 20g, Number of experimental fish is 25, duration of experiment – 50days,

Feed given to fish– @ 8% bw of fish, protein present in feed–35%, protein in faced maller–20%.
Make a conclusion from your Results. 8

GROUP–B

(*Oceanography*)

4. Answer any *two* questions of the following : 2 × 2

(*a*) Mention the different sub-zones of continental shelf. 2

(*b*) State the chemical composition of sea water. 2

(*c*) Write a note on CRZ. 2

(*d*) Why does temperature influence the productivity in sea-water ? 2

5. Answer any *two* questions of the following : 4 × 2

(*a*) Classify plankton on the basis of their size and state the role of zooplankton in food webs. 2 + 2

(*b*) Most of the natural lakes were formed by Catastrophic events—explain. 4

(*c*) 'Mangrove Ecosystem is an unique system in Nature'—Explain. 4

(*d*) Write notes on : 2 + 2

(*i*) Up welling

(*ii*) Causes of Oceanic pollution.

6. Answer any *one* question of the following : 8 × 1

(*a*) What is tide and classify tides on the basis of their nature of physical course of action. Mention the sub-zones of ocean with their biological constituents. 2 + 2 + 4

(*b*) Write the notes of the following (any *four*) :

(*i*) Oceanic 'Heat-budget' 2 × 4

(*ii*) Physical Oceanography

(*iii*) Cyclomorphosis of planktomic animals.

(*iv*) Echinoderm diversity in sea water.

(*v*) Eutrophication

(*vi*) Oceanic microbes.

Ecology Special

GROUP–A

(*Biodiversity and Conservation Ecology*)

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

(*a*) Enlist the characteristics of a biodiversity hotspot ? Give an example. 2

(*b*) State the advantages and disadvantages of Pitfall trap. 2

(*c*) What are the types of Recumbency ? What do you understand from operant conditioning ? 1 + 1

(*d*) Mention the principle and goals of CBD. 2

2. Answer any *two* questions from the following: 4 × 2

(*a*) State the modes of drug administration for Chemical Immobilization of animals. 4

(*b*) What is the purpose and meaning of HAD-ABC ? Jot down the current threats to survival of Tiger. 2 + 2

(*c*) Compare efficacy of GPS and collar tracking. 4

(*d*) What is species area relationship as proposed by Humboldt ? 4

3. Answer *one* question from the following : 8 × 1

(*a*) (*i*) Highlight the use of DNA fingerprinting in Wildlife conservation. What is meant by GMO ? 3 +1

(*ii*) Comment on Social Forestry. Write down the types of products available to communities in JFM areas. 2 + 2

(*b*) Enlist different National Parks, Ramsar sites and Biosphere Reserves and of West Bengal, India. How two Endemic birds in India ? Why wildlife trade is illegal ? Differentiate between Point and Line Transect. 3 + 2 + 1 + 2

GROUP–B

(*Aquatic Ecology*)

4. Answer any *two* questions of the following : 2×2

(*a*) Mention the differences between upwelling and out welling.

(*b*) Differentiate autochthonus nutrients from the allochthonus oxes.

(*c*) Highlight the consequences of coral bleaching.

(*d*) Enlist different geo-hydrological parameters determining ground water recharge process.

5. Answer any *two* questions of the following : 4×2

(*a*) Provide a generalized outline of vertical and horizontal zonation of sea.

(*b*) Differentiate municipal wastes from the industrial wastes.

(*c*) Explain the underlying principles of Integrated Coastal Zone Management (ICZM) highlighting CRZS.

(*d*) Outline the hydrological cycle of the Earth emphasizing precipitation, infiltration, surface run-off and evaporation as key processes.

6. Answer *one* question of the following : 8×1

(*a*) Define wetland. Mention the criteria to justify a landscape as an wetland. Why wetlands are considered as the lungs and kidney for the environment ? $2 + 2 + 4$

(*b*) (*i*) Why mangrove ecosystem is considered as the most productive ecosystem of the world ?

(*ii*) State the steps required for the restoration of freshwater ecosystem.

(*iii*) With a labelled diagram mention different stream orders of large rivers. $3 + 2 + 3$

Genetics and Molecular Biology
Special Paper

GROUP–A

(*genetics*)

1. Answer any *two* questions of the following : 2 × 2

(*a*) What will be the fate of a XY human having a duplication of the Wnt 4 region ?

(*b*) What happens when *fgf* 9 gene is knocked out in mice ?

(*c*) What is the function of cFlip protein ?

(*d*) Name one important protein expressed after NF-Kβ activation leading to block apoptosis.

2. Answer any *two* of the following : 4 × 2

(*a*) Enumerate the role of granzyme B in activation of executioner caspases.

(*b*) Why mouse gonad can not form testis if SOX 9 is absent even if sry is present ?

(*Continued*)

(*c*) State the role of holocytochrome C in caspase activation.

(*d*) Write briefly the simplified mechanism of nuclear mRNA precursor splicing.

3. Answer any *one* question from the following : 8 × 1

(*a*) Briefly narrate the formation of a death-inducing -signalling complex (DISC). 8

(*b*) Describe the events of sex-specific RNA splicing of two major Drosophila sex determining genes (sex specific lethal gene and transformer gene). 4 + 4

GROUP–B

(*Molecular Biology*)

4. Answer any *two* questions of the following : 2 × 2

(*a*) How does poly ubiquitination control NF-Kβ activation ?

(*b*) What do you mean by Pattern Recognition receptor (PRRs) ?

(*c*) State the role of methylguanine-DNA methyl transferase in DNA repair.

(*d*) State the role of R-smad protein in TGF-β signalling.

5. Answer any *two* questions from the following : 4 × 2

(*a*) DNA encounter G/T alternation occurred due to deamination of 5-methyl cytosine– Illustrate DNA repair system under the given condition with proper diagram.

(*b*) Peptidoglycan of a gram-positive bacteria bind with TLR-2 over the cell surface. How does the concerned cell will react thereafter ?

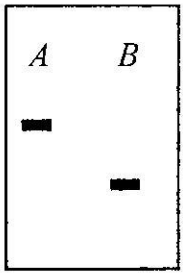
(*c*) In an immunofluorescence experiment using FITC conjugated anti NF-Kβ antibody, the nucleus of the cell gives green fluorescence under microscope. Explain the signalling mechanism behind the process.

(*d*) "Mobile Group-II introns move by reverse splicing and target primed reverse transcription of their excised RNA form."—Explain the mechanism.

6. Answer *one* of the following : 8 × 1

(*a*) (*i*) Discuss the mechanism of formation of mature Hedgehog protein.

(*ii*) Nuclear fraction was isolated from two sets of embryonic tissue of *Drosophila* Western blotting profile of nuclear fraction are given below. Explain the mechanism. 3 + 5



(*b*) (*i*) State the mechanism of Target primed Reverse transcription of Non-LTR elements.

(*ii*) In what ways are the LTR-retro-transposons differs from retrovirus genomes ? 5 + 3

[Parasitology Special Paper]

GROUP–A

(*Diversity and Biology of Parasite*)

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

(*a*) (*i*) Mention the unique features of blood fluke which make them different from other trematode.

(*ii*) What is schistosomule ? 1 + 1

(*b*) What is glycocalyx ? Mention its function ? 2

(*c*) What do you mean by hyperparasite and paratenic host ? Give example. 2

(*d*) Explain kleptoparasite with example. 2

2. Answer any *two* questions from the following : 4 × 2

(*a*) Draw a labelled diagram of an apicomplexan structure. Mention the functional significance of

(*i*) Rhoptries

(*ii*) Subpellicular microtubules

(*iii*) Micropares.

(*b*) Enumerate the structure of cestode tegument with labelled diagram.

(*c*) Write the scientific name of human lung fluke and their intermediate host. Mention pathogenecity and control of it.

(*d*) Write the symptoms and treatment of costiasis.

3. Answer *one* question from the following : 8 × 1

(*a*) Describe in brief about the life cycle of *Diphyllo bothrium latum*. Add a note on its pathogenecity and control. 5 + 2 + 1

(*b*) What is hydatid cyst ? Comment on its diagnosis and treatment. Add a note on primary amoebic menigoencephalities (PAM). 2 + 3 + 3

GROUP–B

(*Immunoparasitology*)

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

(*a*) What do you mean by allergens ?

(*b*) Distinguish between central tolerance and peripheral tolerance.

(*c*) Write a short note on hybridization probe.

(*d*) What is HAT medium ? State its uses in molecular immunology.

5. Answer any *two* questions from the following : 4 × 2

(*a*) Write a note on different types of transplants with diagram. 4

(*b*) Explain why serum IgM cannot activate complement prior to antigen binding. 4

(*c*) What do you mean by autoimmune disease ? Give example. Write mechanism and symptom of any one autoimmune disease you have studied. 1 + 3

(*d*) Write down the mechanisms by which complement activation is regulated. 4

6. Answer any *one* question from the following : 8 × 1

(*a*) You have prepared knockout mice with mutations in the genes that encode various complement components. Each knockout strain cannot express one of the complement components listed across the top of the table below. Predict the effect of each mutation on the steps in complement activation and on the complement effector functions indicated in the table using following symbols : *NE* = No effect ; *D* = process/ function decreased but not abolished; *A* = process/function abolished. 8

	C1q	C4	C3	C9	Factor-B	MASP-2
Formation of classical pathway C_3 convertase						
Formation of alternative pathway C_3 convertase						
Formation of lectin pathway C_3 convertase						
Formation of classical pathway C_5 convertase						
C_3 *b* mediated opsonization						
Neutrophil chemotaxis and inflammation						
Cell lysis						

(*b*) (*i*) Describe the mechanism of MyD88 dependent and independent pathway with proper illustration.

(*ii*) What do you mean by Pattern Recognition receptor ? Give the example. 5 + 2 + 1