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UNIVERSITY OF NORTH BENGAL
B.Sc. Honours 6th Semester Examination, 2024

North Bengal St. Xavier's College
Library
Rajshahi, Post Box No.-1
Pin.- 735134, Dist.- Jalpaiguri

CC13-ZOOLOGY

DEVELOPMENTAL BIOLOGY

Time Allotted: 2 Hours

Full Marks: 40

*The figures in the margin indicate full marks.*1. Answer any **five** questions from the following:

1×5 = 5

- What is Hensen's node?
- Which group of vertebrates have telolecithal eggs?
- State the function of aqueduct of Sylvius.
- Name any two vital dyes.
- Define teratogen with example.
- Sertoli cells secrete the following hormone — (Choose the correct option from the following)
(i) Relaxin (ii) Ghrelin (iii) Inhibin (iv) Gastrin
- What is optic placode?
- What do you mean by splanchnopleure?

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

5×3 = 15

- Write a note to describe the process of capacitation. State its importance in internal fertilization. 3+2
- Write a short note on cortical rotation.
- Write a note on Mid-blastula transition (MBT).
- How epiblast and hypoblast are formed in chick?
- Define implantation. Describe the implantation process of mammalian blastocyst. 1+4

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

10×2 = 20

- Describe the transformation process of a spermatid towards a functional sperm. Write a note on chemoattraction in external fertilization. 6+4
- State the role of yolk in determining cleavage patterns. Describe the formation of chorion and amnion in chick embryo. 5+5
- Describe the role of involution during gastrulation in frog. How prospective ectoderm is formed in frog embryo? 7+3
- Define regeneration. Discuss the different types of regeneration using suitable examples. Comment on the significance of regeneration. 1+6+3

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CC14-ZOOLOGY

EVOLUTIONARY BIOLOGY AND BIostatISTICS

Time Allotted: 2 Hours

Full Marks: 40

The figures in the margin indicate full marks.

1. Answer any **five** questions:

1×5 = 5

- What is cladogenesis?
- What is macroevolution?
- Why genetic drift is effective in small population?
- What is *p* value in biostatistics?
- Define sibling species.
- Mention the characteristics of Coacervate.
- What is mode?
- What is balanced polymorphism?

2. Answer any **three** questions:

5×3 = 15

- Write a short note on convergent evolution in placental mammals.
- Write a short note on stochastic model of speciation.
- What do you mean by Darwinian fitness? Explain the fitness.
- Find out the median for the age of the following eight students:
23, 19, 32, 25, 26, 22, 24, 20
- Write a short note on phylogenetic species concept.

1+4

5

3. Answer any **two** questions:

10×2 = 20

- What is Mendelian Population? State the Hardy-Weinberg Principle. Write about the factors that disrupt the Hardy-Weinberg equilibrium.
- What is panspermia? Describe Stanley Miller's experiment and explain how it proves the biochemical theory of origin of life.
- What is isolation? Discuss various post-zygotic isolating mechanisms in evolution.
- Serum lipid peroxide (SLP) levels of ten adults undergoing treatment for diabetes mellitus were recorded to be:

2+2+6

2+8

2+8

3+2+5

No. of patient	1	2	3	4	5	6	7	8	9	10
SLP value	5.85	6.17	6.09	7.70	3.17	3.83	5.17	4.31	3.09	5.24

Compute the mean, variance, standard deviation.

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DSE-P3-ZOOLOGY

Time Allotted: 2 Hours

Full Marks: 40

The figures in the margin indicate full marks.

**The question paper contains *two* groups GROUP-A and GROUP-B.
The candidates are required to answer any *one* from *two* groups and
candidates should mention it clearly on the Answer Book.**

GROUP-A
MICROBIOLOGY

1. Answer any *five* questions: 1×5 = 5
 - (a) What is nucleoid?
 - (b) What do you mean by bacterial transformation?
 - (c) What is pili?
 - (d) Write one feature of Gram negative bacteria.
 - (e) Define epidemic.
 - (f) Name the causative agent of polio.
 - (g) What is Hfr strain?
 - (h) What do you mean by sporadic disease?

2. Answer any *three* of the following: 5×3 = 15
 - (a) Describe few important cytoplasmic inclusions of bacteria.
 - (b) Write a short note on bacterial cell wall.
 - (c) Write briefly on bacterial chromosome.
 - (d) Write a note on Griffith's experiment.
 - (e) Write the symptoms and preventive measures of staphylococcal food poisoning.

3. Answer any *two* of the following: 10×2 = 20
 - (a) Describe the normal flora of human skin and gut. Name the places of the body where normal flora are found. 8+2
 - (b) Describe different complex culture media for culture of bacteria.

- (c) Briefly describe the pathogen, symptoms, pathogenicity and prophylaxis for typhoid. $2\frac{1}{2}+2\frac{1}{2}+2\frac{1}{2}+2\frac{1}{2}$
- (d) Write about bacterial transduction.

GROUP-B PARASITOLOGY

1. Answer any **five** questions: $1 \times 5 = 5$
 - (a) Where is the cyst form of *Giardia intestinalis* found in human?
 - (b) What is microfilariae?
 - (c) Define pathogenicity.
 - (d) Name the infective stage of *Ancylostoma duodenale*.
 - (e) What is an obligatory parasite?
 - (f) Which is the infective stage of *Brugia malayi*?
 - (g) Which arthropod class does tick belong to?
 - (h) What is meant by pediculosis?

2. Answer any **three** questions: $5 \times 3 = 15$
 - (a) Write a short note on host parasite relationship.
 - (b) Describe in brief the life cycle of *Taenia saginata*.
 - (c) What is brood parasitism? Give a brief account on brood parasitism in birds.
 - (d) Name and describe the larval forms of *Schistosoma haematobium*.
 - (e) Write a note on the parasitic nature of Hood Mocking Bird.

3. Answer any **two** questions: $10 \times 2 = 20$
 - (a) Elaborate the prevalence, pathogenicity, diagnosis and treatment of *Leishmania donovani*. $2\frac{1}{2} \times 4 = 10$
 - (b) Describe the life cycle, medical importance and control of *Sarcoptes* sp. $4+3+3$
 - (c) Describe the life cycle, pathogenicity and treatment of *Wuchereria bancrofti*. $5+3+2$
 - (d) Give an account of the pathogenicity, life cycle and treatment of *Ascaris lumbricoides*. $3+4+3$

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DSE-P4-ZOOLOGY

Time Allotted: 2 Hours

Full Marks: 40

*The figures in the margin indicate full marks.***The question paper contains three groups: GROUP-A, GROUP-B and GROUP-C****The candidates are required to answer any *one* from *three* groups.****Candidates should mention it clearly on the Answer Book.****GROUP-A****ANIMAL BIOTECHNOLOGY**

1. Answer any *five* questions: 1×5 = 5
 - (a) What is replicon?
 - (b) What is genetic engineering?
 - (c) Define genomics.
 - (d) What is bacterial plasmid?
 - (e) What do you mean by recombinant DNA?
 - (f) Expand YAC.
 - (g) Give an example of Type I restriction enzyme.
 - (h) What is minimal media?

2. Answer any *three* questions: 5×3 = 15
 - (a) Write the structure of pBR322.
 - (b) State the characteristics of expression vector.
 - (c) Give a brief account of the procedure of PCR.
 - (d) Write a short note on electroporation.
 - (e) Write down the genetic basis of sickle cell anemia.

3. Answer any *two* questions: 10×2 = 20
 - (a) What do you mean by genetically modified organisms? Explain the process of production of cloned organisms with example. 2+8
 - (b) Write down the principle and procedure of DNA sequencing by Sanger method. 2+8
 - (c) Differentiate between colony and plaque hybridization. Write the process of DNA fingerprinting. 4+6
 - (d) Differentiate between the prokaryotic and eukaryotic genome. Describe the packaging of eukaryotic DNA. 4+6

GROUP-B
FISH AND FISHERIES

1. Answer any *five* questions: 1×5 = 5
- (a) Name two exotic carps.
 - (b) Name two transgenic fish.
 - (c) What is inland fisheries?
 - (d) What type of fins do the carp have?
 - (e) What is the meaning of hydrodynamics?
 - (f) What is swim bladder?
 - (g) What do you mean by catadromous migration?
 - (h) What is osmoregulation?
2. Answer any *three* questions: 5×3 = 15
- (a) Give a short description of electric organ and bioluminescence in fishes.
 - (b) Write a short note on marine fishery.
 - (c) Explain the process of gas exchange in fishes.
 - (d) What are the common types of scales found in osteichthyes fishes? How can it help to determine the age of the fish?
 - (e) Write a brief note on the processing of harvested fish.
3. Answer any *two* questions: 10×2 = 20
- (a) Give a comparative account of the different bacterial and viral diseases of fish.
 - (b) Give a detailed account of the environmental factors influencing the seasonal variation in fish catch in the Bay of Bengal.
 - (c) Discuss the method of induced breeding and mention its aims, objectives and advantages. 4+(2+2+2)
 - (d) What do you mean by composite fish culture? State the scope and importance of composite fish farming in India. 2+8

GROUP-C
BIOLOGY OF INSECTS

1. Answer any *five* questions: 1×5 = 5
- (a) Define insect.
 - (b) What is elytra?
 - (c) What do you mean by hypognathous head?
 - (d) What is book lung?
 - (e) What do you mean by allelochemicals?

- (f) What is an ootheca?
- (g) Give examples of holometabolous and hemimetabolous insect (one each).
- (h) What are prolegs?

2. Answer any *three* questions:

5×3 = 15

- (a) Differentiate between mechanical and biological vectors.
- (b) Write briefly about the social structure of termite colony.
- (c) Write a short note on the digestive system of an insect.
- (d) What are the main castes of honey bees?
- (e) What are the characters that make insects a successful class?

3. Answer any *two* questions:

10×2 = 20

- (a) What do you mean by vector? Discuss the role of housefly and mosquito as vectors. 2+4+4
- (b) What do you mean by trophallaxis? Explain the process of trophallaxis in case of ants. 3+7
- (c) Write down the structure of a compound eye of insect with suitable diagram. What do you mean by Ocelli? 8+2
- (d) Write in detail about any four types of mouth parts present in insects with suitable diagram and examples. $2\frac{1}{2} \times 4 = 10$

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