



WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 6th Semester Examination, 2022

ZOOACOR13T-ZOOLOGY (CC13)

DEVELOPMENTAL BIOLOGY

Time Allotted: 2 Hours

Full Marks: 40

*The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.*

1. Answer any **eight** questions from the following: 2×8 = 16
- (a) Differentiate between holoblastic and meroblastic cleavage.
 - (b) State the function of Resact.
 - (c) What is the effect of Thalidomide on the embryo?
 - (d) What are radial and spiral cleavage? Give examples.
 - (e) What do you mean by Primary Organizer?
 - (f) What is Acrosome reaction?
 - (g) How epiblast and hypoblast are formed in avian gastrulation?
 - (h) What is Trophoblast?
 - (i) Why amniocentesis is done during pregnancy?
 - (j) What do you mean by haemo-chorial and endothelio-chorial placenta?
 - (k) What is the function of Zona Pellucida?
 - (l) What is Mid Blastula Transition (MBT)?
2. Answer any **three** questions from the following: 3×3 = 9
- (a) What is the fast block of Polyspermy? Explain.
 - (b) What do you mean by fertilization cone? How is it formed?
 - (c) State the prerequisite of IVF.
 - (d) Write short notes on: (any **one**)
 - (i) Cortical reaction
 - (ii) Capacitation
 - (iii) Egg-Sperm recognition.
 - (e) Classify placenta on the basis of maternal and fetal attachment.



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

- (a) Differentiate between Spermatogenesis and Oogenesis.
- (b) Briefly describe the steps of neurulation and formation of brain with suitable diagram.
- (c) Briefly describe an experiment showing inducing power of early and late gastrula in newt embryo.
- (d) Describe spermiogenesis. What are the functions of Sertoli Cells?
- (e) Briefly describe (with suitable diagram) the process of primitive streak formation in chick.

2+3

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WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 6th Semester Examination, 2022

ZOOACOR14T-ZOOLOGY (CC14)

Time Allotted: 2 Hours

Full Marks: 40

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1. Answer any **eight** questions from the following: 2×8 = 16
 - (a) Define natural selection.
 - (b) What is ring species?
 - (c) What is bottleneck phenomenon?
 - (d) Distinguish between microevolution and macroevolution.
 - (e) What is 'Cambrian Explosion'?
 - (f) Write two characteristics of *Homo habilis*.
 - (g) Define cline and race.
 - (h) What is neo-Darwinism?
 - (i) What is genetic drift? Who proposed this theory?
 - (j) What is molecular clock?
 - (k) Distinguish between orthologous genes and paralogous genes with examples.
 - (l) Who are called 'hominins'?

2. Answer any **three** questions from the following: 3×3 = 9
 - (a) Write down the Hardy Weinberg principle. Mention the factors on which this principle depends. 1+2
 - (b) Briefly explain allopatric speciation. What is 'incipient species'?
 - (c) Differentiate between analogous and homologous organs with examples.
 - (d) Make a comparison among the three domains of life.
 - (e) Comment on the evolution in vertebrate globin genes.
 - (f) Write a short note on the dating of fossils.

3. Answer any **three** questions from the following: 5×3 = 15
 - (a) How fossils are formed? What are the different types of fossils? 2+3
 - (b) Write in brief about the pre-mating isolating mechanisms. 5



- (c) Describe disrupting, stabilizing and directional selection with examples.
- (d) Write a short note on adaptive radiation with suitable example. Give examples of adaptive convergence each from placental and marsupial mammal groups.
- (e) What advantages did Bipedalism offered to early hominids? Comment on the theory of use and disuse.
- (f) What do you mean by panmixis? The number of heterozygous individuals in a population is eight times greater than the number of homozygous recessives. What are the frequencies of the recessive allele?

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WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 6th Semester Examination, 2022

ZOOADSE04T-ZOOLOGY (DSE3/4)

FISH AND FISHERY

Time Allotted: 2 Hours

Full Marks: 40

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1. Answer any **eight** questions from the following: 2×8 = 16
- (a) What are the roles of mahua oil cake in aquaculture?
- (b) What is Catamaran?
- (c) Name two fishes exhibiting bioluminescence.
- (d) Distinguish between pelagic and demersal fishery.
- (e) What is ductus pneumaticus?
- (f) Write the name of causative agent and symptoms of 'gill rot' disease. 1+1
- (g) How would you determine the sex of male and female carp during induced breeding?
- (h) What is stripping?
- (i) What is gas bubble disease?
- (j) Define SMGT method.
- (k) What do you mean by anadromous fish? Give Indian example. 1+1
- (l) Mention the difference between Breeding Hapa and Hatching Hapa.
- (m) What do you mean by Active and Passive Gear?
- (n) What is Ovaprim? Mention its advantages. 1+1
2. Answer any **three** questions from the following: 3×3 = 9
- (a) What is Pen Culture? Write its merits and demerits. 1½ + 1½
- (b) Distinguish between extensive, semi-intensive and intensive fish culture. 3
- (c) Write in brief about glass jar hatchery. Which one is superior glass jar hatchery or eco hatchery? 2+1
- (d) Write a short note on EEZ. 3
- (e) Describe different types of fish scales with examples. 3



3. Answer any *three* questions from the following:
- (a) Write about pre-stocking management adopted in composite fish culture. 5
 - (b) What do you mean by transgenic fish? What is your opinion about introduction of transgenic fish in aquaculture? 2+3
 - (c) Draw and describe two types of gears and two types of crafts used commonly in fishing in India. $2\frac{1}{2} + 2\frac{1}{2}$
 - (d) Classify fishes (up to subclass) with characters and example of each living taxon. 5
 - (e) What is the basic principle of induced breeding? Discuss the advantages of this technique. Briefly state the factors affecting successful induced breeding. 1+2+2

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B.Sc. Honours 6th Semester Examination, 2022

ZOADSE05T-ZOOLOGY (DSE3/4)

Time Allotted: 2 Hours

Full Marks: 40

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1. Answer any **eight** questions from the following: 2×8 = 16
 - (a) What is “ring stage”?
 - (b) Differentiate parasitism and commensalism with example.
 - (c) What is a hyperparasite?
 - (d) Who serve as the definitive and intermediate hosts of *Leishmania donovani*?
 - (e) Compare mechanical and biological vectors with suitable examples.
 - (f) What is mealy pork?
 - (g) How do the *Schistosomes* differ from other *trematodes*?
 - (h) What is zoonosis?
 - (i) What is Loeffler’s syndrome?
 - (j) What do you mean by definitive host?
 - (k) Write two medical importance of *Pediculus Humanus*.
 - (l) Write the difference between taeniasis and cysticercosis.

2. Answer any **three** questions from the following: 3×3 = 9
 - (a) What are the differences between male and female *Ascaris lumbricoides* (on the basis of morphological features)?
 - (b) Differentiate between erythrocytic and exo-erythrocytic schizogony.
 - (c) Describe with a diagram, the structure of scolex in *Taenia solium*.
 - (d) What is neurocysticercosis in human being?
 - (e) Write a short note on ‘root-knot nematode’.

3. Answer any **three** questions from the following: 5×3 = 15
 - (a) Name the parasite and its secondary host that causes urinary schistosomiasis. Why fascioliasis is considered as a global emerging disease? 2+3
 - (b) Draw and describe the life cycle of *Wuchereria bancrofti*.
 - (c) Describe the pathogenicity of the disease caused by *Entamoeba histolytica*. Why the parasite is so named? 3+2
 - (d) Briefly describe host parasite relationship in the following given features listed below: 2½ + 2½
 - (i) Parasitic castration
 - (ii) Types of host cell degeneration.
 - (e) Distinguish between hard tick and soft tick. Compare their disease potential. 2+3

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WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 6th Semester Examination, 2022

ZOOADSE06T-ZOOLOGY (DSE3/4)

Time Allotted: 2 Hours

Full Marks: 40

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1. Answer any **eight** questions from the following: 2×8 = 16
- Where would you find coniferous forest and mangrove forest in West Bengal?
 - Write the full forms of GPS and GIS.
 - Name two wildlife sanctuaries of West Bengal.
 - Give the full forms of CITES and IUCN.
 - What is meant by 'habitat improvement zone' for a biosphere reserve?
 - Why is the mangroves called 'osmotic desert'? Name two major plant species of the mangroves of West Bengal.
 - Why the population of white-rumped vulture has been reduced?
 - What is Cryopreservation?
 - What is Red Data Book? Mention its importance.
 - Give scientific names of two endangered mammals from West Bengal.
 - What is Flagship species? Give an example.
 - Name two National Parks in West Bengal where one-horned Rhinoceros are found.
2. Answer any **three** questions from the following: 3×3 = 9
- Write a note on human-leopard conflict in the Northern West Bengal.
 - Discuss the application of captive breeding in Species Conservation.
 - Differentiate between *In Situ* and *Ex Situ* Conservation.
 - Write briefly on the functions of National Board of Wildlife in accordance to WPA (1972).
 - Differentiate between Schedule I and Schedule II animals under WPA (1972) with suitable examples.



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

- (a) Enumerate the role of NTCA to conserve tigers in India. How is Buxa rejuvenated as a tiger habitat? 3+2
- (b) What is edge effect? How does it affect the structure of a wilderness reserve? Mention two measures adopted to mitigate human-elephant conflict in the western part of the West Bengal. 1+2+2
- (c) What is geostationary satellite? Discuss, how forest cover changes may be monitored by Remote Sensing and GIS. 2+3
- (d) Justify, how anthropogenic activities lead to depletion of wildlife globally.
- (e) What are the advantages and disadvantages of wildlife tourism?

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WEST BENGAL STATE UNIVERSITY
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ZOOACOR13T-ZOOLOGY (CC13)

Time Allotted: 2 Hours

Full Marks: 40

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1. Answer any **eight** questions from the following: 2×8 = 16
- What are totipotent cells? Give an example.
 - What is spermiogenesis?
 - What is the primary organizer? State its role in development.
 - What is fertilization cone?
 - Draw a neat diagram of the Fate map of chick blastoderm.
 - What is discoblastula?
 - State the location and function of vitelline envelope.
 - What is capacitation?
 - Define area pellucida and area opaca.
 - In which type of egg the yolk is concentrated in the vegetal pole? Which type of egg is present in human? 1+1
 - What are the functions of Leydig cells?
 - Define Amniocentesis.
2. Answer any **three** questions from the following: 3×3 = 9
- Briefly explain spermiogenesis. What is the function of Sertoli cell? 2+1
 - Classify eggs on the basis of distribution and amount of yolk. 3
 - What is Fate map? Discuss about one technique used for fate mapping. 1+2
 - Briefly describe any three morphogenetic movements during gastrulation. 1+1+1
 - State the risks involved in In vitro fertilization (IVF). 3
 - Write a note on Spemann's organizer. 3



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

- (a) Explain the steps of development of lens in vertebrate with diagram. 5
- (b) Classify teratogens based on their different types. Write an example of a most common notorious teratogenic agent. What are the malformations caused due to the effect of teratogenic agent on embryonic development? 2+1+2
- (c) What is the mechanism of 'fast block' to polyspermy? 5
- (d) Describe the role of yolk in determining the pattern of cleavage. 5
- (e) Classify placenta in mammals according to distribution of villi and intimacy between foetal and maternal tissue with example and diagram. 5
- (f) Give an account of the growth phase of oogenesis. 5

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WEST BENGAL STATE UNIVERSITY
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ZOOACOR14T-ZOOLOGY (CC14)

Time Allotted: 2 Hours

Full Marks: 40

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1. Answer any **eight** questions from the following: 2×8 = 16
- What do you mean by RNA world hypothesis?
 - What is hot dilute soup?
 - What are the factors that disrupt H-W equilibrium?
 - What is Darwinian fitness?
 - What is blending hypothesis of inheritance?
 - Name the various periods of Palaeozoic era.
 - What is 'founder effect'?
 - What are the effects of a genetic drift?
 - What is radioactive clock method?
 - In which periods birds and amphibians originated?
 - State two post mating isolating mechanism.
 - What is gene pool?
 - What is stabilizing selection?
 - Who are Cro-magnons?
2. Answer any **three** questions from the following: 3×3 = 9
- How can you determine the age of fossils by radioactive carbon method? What are the drawbacks of this method?
 - Distinguish between man and ape.
 - Define Darwinian fitness and selection coefficient.
 - What is genetic drift? What are the consequences of genetic drift?
 - What is the basic principle of a molecular clock?
 - Write a short note on the types of fossils.



3. Answer any **three** questions from the following:
- (a) Define biological species. Discuss the drawbacks of biological species concept. 3+2
- (b) Describe the processes of allopatric and sympatric speciation with examples. What is cline? 4+1
- (c) Name the divisions of the coenozoic era. What is the importance of this era? 3+2
- (d) How does a vertebrate globin gene prove evolution? 5
- (e) Describe disrupting and directional selection with examples. $2\frac{1}{2} + 2\frac{1}{2}$
- (f) Write short notes on founder effect and population bottleneck with examples. $2\frac{1}{2} + 2\frac{1}{2}$

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WEST BENGAL STATE UNIVERSITY
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ZOOADSE04T-ZOOLOGY (DSE3/4)

FISH AND FISHERY

Time Allotted: 2 Hours

Full Marks: 40

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1. Answer any **eight** questions: 2×8 = 16
- (a) What is Pen culture?
 - (b) What do you mean by “drag net” and “bag net”?
 - (c) What is EEZ?
 - (d) Name two synthetic hormones used in induced breeding of carp.
 - (e) State the causative agent and symptoms of abdominal dropsy.
 - (f) What is red gland? State its function.
 - (g) What do you mean by “column feeder” and “bottom feeder” fish?
 - (h) What is gill raker? Write its function.
 - (i) What do you mean by “estuary”? Give scientific name of one ichthyofauna of estuary of West Bengal.
 - (j) Define polyculture. Write the proper ratio of Indian major carps in polyculture.
 - (k) “Western coast of India has higher fish production.” – Why?
 - (l) State the basic difference between intrinsic and extrinsic bioluminescence in fish.
 - (m) Write the name and use of any two fishing craft.
 - (n) What do you mean by ovoviviparity in shark?
2. Answer any **three** questions: 3×3 = 9
- (a) What is Cage culture? Write its merits and demerits. 3
 - (b) What do you mean by transgenic fish? Write the importance of transgenic fishes. 1+2
 - (c) Briefly state about physoclistous and physostomous swim bladder. 1 $\frac{1}{2}$ + 1 $\frac{1}{2}$
 - (d) Classify fish depending on feeding habit and give example of each. 3
 - (e) Write in brief about Eco-hatchery along with its merits and demerits. 3



3. Answer any *three* questions:

- (a) Briefly state the structure of septal gill and explain how it works during respiration. 5x3=15
3+2
- (b) Define induced breeding. Explain the process of hormone extract preparation during this technique. What is the dose and injection technique follows here? 1+2+2
- (c) Explain the causes of depletion of fishery resources. State the basic importance of remote sensing in fishery. 3+2
- (d) Explain in brief how remote sensing and GIS can be applied in fisheries? 5
- (e) Discuss about bioluminescence in fishes. 5

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WEST BENGAL STATE UNIVERSITY

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ZOOADSE05T-ZOOLOGY (DSE3/4)

Time Allotted: 2 Hours

Full Marks: 40

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1. Answer any **eight** questions from the following: 2×8 = 16
 - (a) What is signet ring?
 - (b) What is 'hypnozoite'?
 - (c) Write two differences between soft ticks and hard ticks.
 - (d) What are the recommended drugs for *Schistosomiasis*?
 - (e) What is *cysticercus cellulosae*?
 - (f) What are the differences between biological and chemical vectors?
 - (g) Define parasitoid. Give an example.
 - (h) Define zoonosis.
 - (i) Name two families which are responsible for myiasis.
 - (j) Name the causative agent and vector of Kala-azar.
 - (k) What is febrile paroxysm?
 - (l) How Meloidogyne damages a plant?
 - (m) What is 'gynaecophoric canal'?
 - (n) What is 'Loeffler's syndrome'?
 - (o) Define 'ookinete'.

2. Answer any **three** questions from the following: 3×3 = 9
 - (a) Write the pathogenicity caused by *Entamoeba histolytica*. 3
 - (b) Describe briefly about the structure of rostrum of *Taenia*. What is gravid proglottids? 2+1
 - (c) What are the differences between male and female *Ascaris*? 3
 - (d) Write a short note on 'microfilarial periodicity'. 3
 - (e) Why mosquitoes are considered as vectors to spread pathogens. 3

3. Answer any **three** questions from the following: 5×3 = 15
 - (a) Describe the human cycle of *Plasmodium vivax* with suitable diagram. 3+2
 - (b) What is the pathogenicity and prophylaxis of *Taenia solium*. 3+2
 - (c) Write about the life cycle and pathogenicity of *Giardia intestinalis*. 3+2
 - (d) Describe the life cycle of body louse and how it acts as an agent to spread diseases. 3+2
 - (e) What is 'LD body'? Discuss the role of Sand fly as host and vector of Visceral Leishmaniasis. Name a drug used to treat the disease. 1+3+1

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1. Answer any **eight** questions from the following: 2×8 = 16
- (a) What is meant by core and buffer area in a wildlife sanctuary?
 - (b) What do you mean by prey base study for tiger?
 - (c) Name one Ramsar site and a biosphere reserve from West Bengal.
 - (d) What do you mean by a geostationary satellite?
 - (e) What are trap cropping and buffer cropping? Give examples.
 - (f) Give the full forms of CITES and IUCN.
 - (g) Where do you find dry deciduous and mixed moist deciduous forests in West Bengal?
 - (h) State the status and distribution of Bengal Florican.
 - (i) Differentiate between nodes and corridors. Indicate an elephant corridor in the northern West Bengal.
 - (j) Mention two *in situ* conservation strategies for the one-horned Rhinoceros.
 - (k) What do you mean by community reserve? Give example.
 - (l) Give the scientific names of one critical and one vulnerable mammals from India.
2. Answer any **three** questions from the following: 3×3 = 9
- (a) Where do you find alluvial grasslands in West Bengal. Mention the importance of grassland ecosystem. 1+2
 - (b) What are sentinel species? Why are they important? 1+2
 - (c) Comment on the application of satellite imaging in vegetation mapping. 3
 - (d) Enumerate the roles of zoo gardens as an *ex situ* measure of wildlife conservation. 3
 - (e) Write a note on the structure of a biosphere reserve. 3



3. Answer any **three** questions from the following:
- (a) Describe the various reasons for depletion of wildlife resource in India. 5
 - (b) Define human-animal conflict. State the reasons for increasing conflict between human and elephant in West Bengal. Suggest some measures to mitigate such problem. 1+2+2
 - (c) Distinguish between wildlife sanctuary and national park. Name the biosphere reserves of India with their respective locations. 2+3
 - (d) Discuss about the salient features, merits and demerits of WPA, 1972. 3+1+1
 - (e) Add a note on joint forest management (JFM). 5

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