**B.Sc. Degree (c.b.c.s.s.) examination**

**Fifth Semester**

Core Course – **EVOLUTION, ZOOGEOGRAPHY & ETHOLOGY**

Time: 3 hrs. Maximum: 60 Marks

**Part A (Short Answer Type)**

*Answer* **all** *questions in one word.*

*Each question carries* **1** *mark.*

1. Who is the father of Zoogeography?

2. What is the name given to the distribution of animals in the fresh water?

3. Give an example for continental island?

4. Which is known as ‘‘Bird continent’?

5. What is quantum speciation?

6. What is Pangaea?

7. Name the richest wool producing zone in India?

8. Name the intermediate horse.

 (8 x 1 = 8)

**Part B**

*Answer any* **six** *questions*. *Answer in* **one paragraph** *each.*

*Each question carries* **2** *marks.*

9. Distinguish between sympatric and allopatric speciation.

10. Write the importance of Galapagos Islands in the study of evolution

11. Give an account on Mutation theory of De Vries.

12. Explain use and disuse theory.

13. What is mutation theory?

14. What is Lamarckism?

15. Explain the ‘theory of panspermia’.

16. What is discontinuous distribution?

17. What is a deme?

18. What is punctuated equilibrium?

(6 x 2 = 12)

**Part C**

*Answer any* **four** *questions*. *Answer in* **one** *page each*.

*Each question carries* **4** *marks*.

19. Explain tooth radiation in mammals.

20. Explain the factors that upset Hardy –Weinberg equilibrium..

21. Describe the factors that affect animal distribution.

22. Explain variation.

23. Explain fission- track dating.

24. Describe natural selection theory.

(4 x 4= 16)

**Part D**

*Answer any* **two** *questions*. *Answers should not exceed* **four** *pages*.

*Each question carries* **12** *marks*.

25. Write an essay on Biochemical evolution.

26 Write an essay on speciation.

27. Write an essay on biogeography of India with special reference to Western Ghats.

28. Write an essay on different types of learning. (2 x 12= 24)

**B.Sc DEGREE (C.B.C.S.S) EXAMINATION**

**Fifth Semester**

**Core Course-ZY5B06U- ENVIRONMENTAL BIOLOGY, TOXICOLOGY AND DISASTER MANAGEMNT**

**Time – 3 hrs Maximum – 60marks**

**Part A**

*Answer* ***all*** *questions*

*Each Question carries 1 mark*

1. Define Ecotone.

2. What is Entropy?

3. Define Stratification.

4. Name a cold Desert.

5. Expand IPCC.

6. What is E-waste?

7. Any two environmental toxins present in plastics.

8. What is Red Data Book?

 **(8×1=8)**

**Part B**

*Answer any* ***Six*** *questions.*

*Answer in* ***one paragraph*** *each.*

*Each question carries 2 marks*

9. Comment on carbon credits.

10. What is Biomagnification?

11. Write four characteristic adaptations of sandy shore organism.

12. What is Botulinum toxin?

13. What are planktons? Write any four planktonic adaptations with examples.

14. What is a Wetland? Name 2 Ramsar sites in Kerala.

15. Give any four adaptations of desert animals.

16. What is Green House Effect?

17. Define autecology and synecology.

18. Explain the significance of wetland. State the threat to wetlands.

 **(6x2=12)**

**Part C**

*Answer* ***any four*** *questions.*

*Answer in* ***one*** *page each.*

*Each question carries 4 marks****.***

19. Briefly explain the toxic effect of heavy metals on organism.

20. Write a short note on Food additives.

21. What is ozone depletion? Add a note on it.

22. Discuss the causes and management of landslides.

23. What are non-renewable energy resources and how can we conserve it?

24. Define hazard, disaster, vulnerability and risk.

 **(4x4=16)**

**Part D**

*Answer* ***any two*** *questions.*

*Answer should not exceed* ***four*** *pages each.*

*Each question carries* ***12*** *marks****.***

25. Write an essay on Biotic, abiotic components and physico chemical nature of a Fresh water ecosystem. Add a note on threat to fresh water resources of Kerala.

26. Write an essay on e-waste and its management.

27. Explain the causes and consequences of four natural disasters.

28. Discuss reasons and remedies for present global environmental changes.

(2x12=24)

**B.S c. Degree (c.b.c.s.s.) examination**

**Fifth Semester**

**Core Course-ZY5BO8U -BIOCHEMISTRY, PHYSIOLOGY AND**

 **ENDOCRINOLOGY**

**Time: 3Hrs Maximum: 60 marks**

**Part A**

*Answer* ***all*** *questions*

*One word/short answer type.*

*Each question carries 1 mark*

1. Steroid hormones
2. Coenzymes
3. RDA
4. Haldane effect
5. Addison’s disease
6. Blood Brain Barrier
7. Kymograph
8. Dope test **(1x8=8)**

**Part B**

*Answer any* ***six***  *questions*

*Answer in one paragraph each.*

*Each question carries 2 marks*

1. Briefly explain the different factors that influence enzyme action.
2. What is ketosis?
3. What is Haemodynamic principle
4. What is the difference between ECG and EEG
5. What is MRI
6. What is rigor mortis
7. What is goiter? How is it caused
8. Which are the major respiratory pigments and their function in our body
9. Name any four anticoagulants and their action.
10. What is dyslexia

 **(2x6=12)**

**Part C**

*Answer any* ***four*** *questions*

*Answer in one page each.*

*Each question carries 4 marks*

1. Write an account on classification of lipids.
2. Mention and explain the disorders caused due to malnutrition.
3. Explain the mechanism of blood clotting and the factors involved in it.
4. Briefly explain the mechanism of hormone action.
5. Discuss about the mechanism that regulate the glomerular filtration rate (GFR).
6. Briefly explain about the drug abuse. **(4x4=16)**

**Part D**

*Answer any* ***two*** *questions*

*Answer should not exceed four pages*

*Each question carries 12 marks*

1. Write an essay on Protein metabolism.
2. What is a nerve impulse? Explain how a nerve impulse can propagate along a nerve fiber.
3. Write an essay on the mechanism of Muscle contraction.
4. What is an exercise? Explain the effect and significance of exercise on body systems

**(2x12=24)**

**B.S c. Degree (c.b.c.s.s.) examination**

**Fifth Semester**

**Core Course-ZY5BO5U -CELL BIOLOGY AND MOLECULAR BIOLOGY**

**Time: 3Hrs Maximum: 60 marks**

**Part A**

*Answer* ***all*** *questions*

*Each Question carries 1 mark*

1. What is Cell theory?
2. Define Plasmids
3. What do u mean by GERL Concept
4. What are Peroxisomes?
5. What are Telomeres?
6. What is Chargaff’s rule?
7. Comment on Transposones
8. Importance of Central dogma of molecular biology

 **(8×1=8)**

 **Part B**

*Answer any* ***Six*** *questions.*

*Answer in* ***one paragraph*** *each.*

*Each question carries 2 marks*

1. Explain the structure of an interphase nuclear envelop.
2. What is β- oxidation?
3. Draw a neat diagram of mitochondria and label the parts.
4. What is cell signaling? What are the different types of signaling processes?
5. What is chromatin? Distinguish between heterochromatin and euchromatin.
6. What is a genetic code? What are the characteristics of a genetic code.
7. What is replication of DNA?
8. Briefly explain One gene- One polypeptide hypothesis.
9. Comment on split genes.
10. What is the difference between a prokaryotic and eukaryotic genomes?

 **(6x2=12)**

**Part C**

*Answer* ***any four*** *questions.*

*Answer in* ***one*** *page each.*

*Each question carries 4 marks*

1. What is Sodium potassium pump and explain its function.
2. Comment on the morphology of ER.
3. What is Giant chromosome? Give one example.
4. Explain the various stages of Prophase I during Meiotic division.
5. What are the different types of RNAs?
6. What is Operon concept? Mention its significance.

**(4x4=16)**

**Part D**

*Answer any* ***two*** *questions,*

*Answer should not exceed four pages*

*Each question carries 12 marks*

1. Explain the various stages of Mitosis, sketch and label the stages involved in it. Point out the significance of mitosis in cell division.
2. Explain the functions of Plasma membrane.
3. With the help of a neat diagram,explain the transcriptional stages during protein synthesis. Add a note on Post transcriptional modifications in Eukaryotes.
4. Explain DNA as genetic material on the basis of experimental evidence.

**(2x12=24)**

**B.Sc. Degree (c.b.c.s.s.) examination**

**Fifth Semester**

**Open Course-ZY5DO2U –HUMAN GENETICS, NUTRITION, COMMUNITY**

 **HEALTH AND SANITATION**

**Time: 3Hrs Maximum: 80 marks**

**Part A**

*Answer* ***all*** *questions*

*Each Question carries 1 mark*

1. Define Vector?
2. What are Probes?
3. What is Botulin?
4. Name two diseases transmitted by water.
5. Expand AIDS and name the causative agent.
6. Define PNI
7. Which vitamin is called as ‘sunshine vitamin’?
8. Define Phenotype and Genotype.
9. Karyotype of down syndrome
10. What is balanced diet? **(10x1=10)**

 **Part B**

*Answer any* ***Eight*** *questions.*

*Answer in* ***one paragraph*** *each.*

*Each question carries 2 marks*

1. What are the major dangers of drug abuse?
2. Distinguish Euploidy and Aneuploidy?
3. Expand BMI and BMR.Write the formula for calculating BMI.
4. Mention the three E’s of accident prevention.
5. Mention the causative agent that cause the following diseases: Cholera, Typhoid, Leptospirosis and Gastroenteritis.
6. What are Carcinogens?
7. What is Cri-du chat syndrome?
8. What is Erythroblastosisfoetalis?
9. Distinguish Eugenics and Euthenics.
10. What are the major causes of infertility?
11. Explain the effect of exercise on respiratory system
12. Define Psychoneuroimmunology

 **(8x2=16)**

**Part C**

*Answer* ***any six*** *questions.*

*Answer in* ***one*** *page each.*

*Each question carries 4 marks*

1. Explain Single gene disorder with examples.
2. Write a short note on HGP.
3. Explain the process of Vermicomposting.
4. Describe any two methods for analyzing Bacteria in drinking water.
5. Explain the effect of exercise on bodily systems.
6. Explain the Principle of DNA Fingerprinting and its application.
7. Write an account on food borne diseases
8. Explain the potable water quality monitoring measures
9. Explain the different types of Yoga.

**(6x4=24)**

**Part D**

*Answer any* ***two*** *questions,*

*Answer should not exceed four pages*

*Each question carries 12 marks*

1. Write an essay on symptoms, treatment and prevention of major food borne diseases.
2. Explain the different techniques employed on prenatal diagnosis.
3. Write an essay on health and safety in daily life.
4. Give the chemical and biological characteristics of waste water. Explain the various methods involved in waste water management.

**(2x12=24)**

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**B.Sc. Degree (c.b.c.s.s.) examination**

# Fifth Semester

**Open Course- VOCATIONAL ZOOLOGY**

**Time : 3 hours Marks: 80**

**Part – A**

*Answer* ***all*** *questions*

Each Question carries 1 mark

1. What is a buck ?

2. What is Queen bee substance?

3. What is royal jelly?

3. What is bee pasturage?

4. What is a Queen excluder device?

5. What is swarming?

6. What is chandrika?

7. What is nuptial flight?

8.Give the names of two oviparous and viviparous Aquarium fishes?

9. What are the different types of Aquarium tanks based on the construction materials?

10. What is the importance of carbohydrates and proteins in fish nutrition?

 (10x1 = 10)

**Part – B**

*Answer any* ***Eight*** *questions.*

*Answer in* ***one paragraph*** *each.*

*Each question carries 2 marks*

 11. What is a vermibed?

 12. What is honey flow period?

 13. What is dearth period?

 14. What is propolis?

 15. What is apitherapy?

 16. What is moriculture? What is the use of moriculture in sericulture industry?

 17. What are the different species of earthworms used in vermiculture?

 18. Explain the feeding method in silkworms.

 19. Explain the breeding procedure in quail.

 20. What is the economic importance of honey, bee wax and bee venom?

 21. What are the indicators of fish diseases? Comment on the symptoms and treatment of any two diseases?

 22. Describe the egg collection methods in the breeding of carps and tetras?

 (2x8 = 16)

**Part – C**

*Answer* ***any six*** *questions.*

*Answer in* ***one*** *page each.*

*Each question carries 4 marks*

 23. Describe the life history of Bombyx mori.

 24. Explain the modern bee keeing methods and equipments used in apiculture.

 25. Explain the social organisation of honey bees.

 26. Explain the scope of rabbit farming.

 27. Write an account on the management of honey bees during monsoon and summer season.

 28. Write an account on bee diseases.

 29. What are the different types of filtration of Aquarium water? Explain Biological filtration in detail?

 30. What are live feeds? Explain the production of different live feeds?

 (4x6 = 24)

 ***Part D***

*Answer any* ***two*** *questions,*

*Answer should not exceed four pages*

*Each question carries 12 marks*

 **IV Long Essay/ Problems. Answer any two questions.**

31. Write an account on the methodology of vermiculture and vermicomposting.

 32. Describe the management practices in a sericulture unit.

 33. Write an essay on quail farming.

 34. Write an essay on the setting up and maintenance of a Fresh Water aquarium

 ( 2x15 = 30 )

**C.B.C.S.S. B.Sc. DEGREE EXAMINATION**

**Sixth Semester**

Core Course – **REPRODUCTIVE AND DEVELOPMENTAL BIOLOGY**

Time: 3 hrs. Maximum: 60 Marks

**Part A (Short Answer Type)**

*Answer* **all** *questions in one word.*

*Each question carries* **1** *mark.*

1. What is recapitulation theory?

2. What is a transgenic animal?

3. Name any two vital dyes.

4. Name any two ectodermal derivatives.

5. With an example define arrhenotoky.

6. Name any two organisms in which spiral cleavage is seen.

7. What is the effect of ionizing radiation on the embryo?

8. Which are the different types of regenerations?

 (8 x 1 = 8)

**Part B**

*Answer any* **six** *questions*. *Answer in* **one paragraph** *each.*

*Each question carries* **2** *marks.*

9. Expand: GIFT and IUGR.

10. Describe the structure of a sperm.

11. Explain the theory of epigenesist.

12. Write notes on different types of blastula.

13. Draw the fate map of a chordate blastula.

14. Name the foetal membranes in chick. Write any one function to each.

15. What is corpus luteum? Mention its function.

16. Write a note on 18 hours chick embryo.

17. Point out the causes of congenital defects.

18. Describe malformations.

(6 x 2 = 12)

**Part C**

*Answer any* **four** *questions*. *Answer in* **one** *page each*.

*Each question carries* **4** *marks*.

19. Describe the steps in IVF.

20. Explain different types of cleavage.

21. Explain Spemann’s constriction experiments.

22. Explain infections as teratogenic agents.

23. Explain the influence of yolk on egg..

24. What is estrous cycle? Expalin it.

(4 x 4= 16)

**Part D**

*Answer any* **two** *questions*. *Answers should not exceed* **four** *pages*.

*Each question carries* **12** *marks*.

25. Illustrate the mechanism of fertilization with suitable diagrams..

26. Explain gastrulation in chick with suitable diagrams.

27. Write an essay on developmental defects.

28. Write an essay on different types of placenta and its functions.

(2 x 12= 24)

**B.Sc DEGREE (C.B.C.S.S) EXAMINATION**

**Sixth Semester**

**Core Course-ZY6B10U- GENETICS AND BIOTECHNOLOGY**

**Time – 3 Hrs Maximum – 60marks**

**Part A**

*Answer* ***all*** *questions*

*Each Question carries 1 mark*

1. What is IPR?

2. What are Barr bodies?

3. Define Gynandromorphs.

4. Expand RFLP.

5. Define Karyotype?

6. What are Lethal genes?

7. What are Introns?

8. What is Pleiotropism?

 **(8×1=8)**

**Part B**

*Answer any* ***Six*** *questions.*

*Answer in* ***one paragraph*** *each.*

*Each question carries 2 marks*

9. What are marker genes?

10. What is Eugenics?

11. Define Monohybrid cross.

12. Write is Epistasis?

13. What are Transgenic animals?

14. Define Kappa particles in *Paramecium.*

15. What isBiowar and Biopiracy?

16. What are Stem cells?

17. Define Plasmid.

18. Define Aneuploidy.

**(6x2=2)**

**Part C**

*Answer* ***any four*** *questions.*

*Answer in* ***one*** *page each.*

*Each question carries 4 marks****.***

19. How did Mendel demonstrate the phenomenon of segregation?

20. Describe Genic Balance theory.

21. Explain any one method through which bacteria exchange genetic material.

22. Explain the ABO Blood group system in Man.

23. Explain DNA Fingerprinting.

24. Explain Polygenic inheritance with example.

 **(4x4=16)**

**Part D**

*Answer* ***any two*** *questions.*

*Answer should not exceed* ***four*** *pages each.*

*Each question carries* ***12*** *marks****.***

25. Discuss the prospectus and ethical issues involved in Human genetic engineering.

26. Write an essay on Mutation and its significance.

27. Write an essay on Crossing over.

28. What is PCR? Explain the working principle and applications of PCR.

 **(2x12=24)**

**B.S c. Degree (c.b.c.s.s.) examination**

**Sixth Semester**

**Core Course-ZY6B11U--MICROBIOLOGY AND IMMUNOLOGY**

**Time: 3Hrs Maximum: 60 marks**

**Part A**

*Answer* ***all*** *questions*

*One word/short answer type.*

*Each question carries 1 mark*

1. What is Lyophilization?
2. What are Spheroplast
3. Define Glycolysis
4. What is Bacteraemia
5. Causes of Inflammation
6. What are Haptens?
7. Importance of ELISA test
8. What are Interferons? **(1x8=8)**

**Part B**

*Answer any* ***six*** *questions*

*Answer in one paragraph each.*

*Each question carries 2 marks*

1. Write a note on Mycoplasma
2. What is the difference between flagella and pili in bacteria?
3. Comment on the working principle of autoclave
4. Differentiate between gram +ve and gram –ve bacteria.
5. Comment on the carriers of infection
6. What is erytroblastosisfoetalis?
7. What is hypersensitivity?
8. Briefly explain the hybrydoma technology and its use.
9. What is immunodeficiency?
10. Discuss about the cells of immune system and their role in providing immunity.

 **(2x6=12)**

**Part C**

*Answer any* ***four*** *question*

*Answer in one page each.*

*Each question carries 4 marks*

1. Give an account on the different types of culture media.
2. Briefly explain the growth cycle of bacteria.
3. Explain the TCA cycle.
4. Comment on the pathogenesis and prophylaxis of poliomyelitis.
5. Comment on the complement and its activation pathways.
6. What is MHC?

 **(4x4=16)**

**Part D**

*Answer any* ***two*** *questions*

*Answer should not exceed four pages*

*Each question carries 12 marks*

1. Write an essay on the resistance, replication and cultivation of viruses.
2. Write in detail about the nosocomial infections and how it can be prevented?
3. What are immunoglobulins? With the help of a diagram explain the structure, classification and functions of immunoglobulins.
4. What are vaccines? Briefly explain the recent trends in the preparation of current vaccines.

 **(2x12=24)**

**B.S c. Degree (c.b.c.s.s.) examination**

**Sixth Semester**

**Core Course-ZY6B12U-GENERAL INFORMATICS, BIOINFORMATICS AND BIOSTATISTICS**

**Time: 3Hrs Maximum: 60 marks**

**Part A**

*Answer* ***all*** *questions*

*One word/short answer type.*

*Each question carries 1 mark*

1. What is ALU?
2. What is meant by booting?
3. What is molecular phylogenetics?
4. Name any four operating system in a computer.
5. What is BLAST?
6. What is mean deviation?
7. What is binomial distribution?
8. What is a visualization tool in bioinformatics?

 **(1x8=8)**

**Part B**

*Answer any* ***six*** *questions*

*Answer in one paragraph each.*

*Each question carries 2 marks*

1. Give an account on the different types of computers.
2. Comment on output devices.
3. What is meant by computer languages?
4. Distinguish between bioinformatics and computational biology
5. Comment on the scope of bioinformatics.
6. Comment on any four bioinformatics tools.
7. What is Chi-square test?
8. What is correlation?
9. Describe ROM and RAM
10. Draw a frequency polygon using the following data

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Body weight in Kg | 40-45 | 45-50 | 50-55 | 55-60 | 60-65 | 65-70 |
| No.of students | 7 | 9 | 13 | 8 | 3 | 1 |

 **(2x6=12)**

**Part C**

*Answer any* ***four****questions*

*Answer in one page each.*

*Each question carries 4 marks*

1. Briefly explain the memory of a computer
2. Write notes on computer languages.
3. What are the measures of central tendency?
4. What is human brain project?
5. Explain computer aided drug discovery
6. Calculate the standard deviation and standard error of the following distribution.

25, 24, 20, 28, 29, 25, 24, 20, 21, 25

 **(4x4=16)**

**Part D**

*Answer any* ***two*** *questions*

*Answer should not exceed four pages*

*Each question carries 12 marks*

1. What is a computer network? Explain the basic services provided by the internet?
2. Explain the popular biological databases and its classification?
3. Give an account on the test of significance. Describe the procedure for testing the hypothesis using chi square test as an example.
4. Explain the different methods of graphical and diagrammatic presentation of data giving Eg.

 **(2x12=24)**

**B.Sc. DEGREE (C.B.C.S.S) EXAMINATION**

**Sixth Semester**

**Core Course-MICROBIAL WASTE MANAGEMENT
(For B.Sc. Industrial Microbiology and Zoology)**

 **Time: 3 hrs Part A Total Marks: 60**

**Short Answer Questions**(Answer **all** questions. Each question carries **1** mark)

1. Define bio magnification.
2. What is biological oxygen demand
3. Write a note on land fill
4. What are super bugs
5. Name the bacteria involved in biogas production.
6. Flocculation
7. List out the methods involved in primary treatment of waste water
8. What is super chlorination
 (8x1=8 Marks)

**Part B
Brief Answer Questions** (Answer any **six** questions. Each question carries **2** marks)

1. Explain activated sludge process
2. Write a note on bio remediation.
3. What is biosorption?
4. Explain COD
5. Septic tanks.
6. Biodegradation of leather
7. What are trickling filters
8. Comment on eutrophication.
9. Biodegradation of plastics

 (6x2= 12Marks)

 **Part C
Short Essay type Questions** (Answer any **four** questions. Each question carries **4** marks)

1. Explain about hospital waste management?
2. Describe the process of composting
3. Give an account on categories and sources of solid waste?
4. Biodegradation of dyes.
5. Describe oxidation ponds.
6. Write down the disinfection of sewage
7. Microbial indicators of water pollution

 (4x4=16 Marks)

 **Part D
Long Essay type Questions** (Answer any **two** questions. Each question carries **12** marks)

1. Describe various methods of waste water treatment?
2. Explain the bioremediation of hydrocarbon wastes.
3. Write an essay on the treatment of solid waste
4. Explain the bacteriological techniques for the examination of water

 (2 x12=24 Marks)

**B.Sc. DEGREE (C.B.C.S.S) EXAMINATION**

**Sixth Semester**

**Core Course-IMMUNOLOGY
(For B.Sc. Industrial Microbiology and Zoology)**

 **Time: 3 hrs Part A Total Marks: 60**

**Short Answer Questions**(Answer **all** questions. Each question carries **1** mark)

1. Define Hapten.
2. Name the second most abundant immunoglobulin
3. What are allografts
4. Why maternal milk is important for the immune protection of the baby
5. Give an example for a phagocytic cell
6. Which technology is used for the production of monoclonal antibodies
7. Name the molecule responsible for transplant rejection.
8. Which is the first recombinant vaccine approved for human use.
 (8x1=8 Marks)

**Part B
Brief Answer Questions** (Answer any **six** questions. Each question carries **2** marks)

1. Mention the role of NK cells in innate immunity
2. Write down the properties of tumor antigens.
3. What is inflammation and how does inflammation serve as a protective function
4. Outline the immunological functions of bone marrow
5. What are adjuvants? Give examples
6. Comment on DNA vaccines
7. Define graft versus host reaction
8. Write down the immunological functions of cytokines
9. Explain the cause and spread of AIDS

 (6x2= 12Marks)

 **Part C
Short Essay type Questions** (Answer any **four** questions. Each question carries **4** marks)

1. Briefly explain autoimmune diseases
2. Explain the production of monoclonal antibodies
3. What are immunodeficiency diseases? Briefly explain any one disease
4. Describe the ABO blood group system.
5. Describe HLA antigens and ad note on their role in immunity.
6. Outline the technique of ELISA
7. Explain the mechanism of humoral immune response

 (4x4=16 Marks)

 **Part D
Long Essay type Questions** (Answer any **two** questions. Each question carries **12** marks)

1. Classify immunity and describe acquired immunity in detail.
2. Enumerate the different classes of immunoglobulins with the aid of neat labeled diagrams
3. Briefly explain the organs of the immune system
4. Write an essay on various hypersensitivity reactions.

 (2 x12=24 Marks)

**B.S c. Degree (c.b.c.s.s.) examination**

**Sixth Semester**

**Elective Course-ZY6B15U –ECONOMIC ZOOLOGY**

**Time: 3Hrs Maximum: 80 marks**

**Part A**

*Answer* ***all*** *questions*

*Each Question carries 1 mark*

1. What is Clitellum?
2. Name an ornamental fish endemic to Kerala.
3. Define Pest.
4. What is Propolis?
5. Name the Scientific name of two pest of Paddy.
6. What is Royal jelly
7. What is meant by the term IPM?
8. What are the peculiarities of butterfly fish?
9. Name any two earthworms in vermiculture
10. What is honey flow period? **(10×1=10)**

 **Part B**

*Answer any* ***eight*** *questions.*

*Answer in* ***one paragraph*** *each.*

*Each question carries 2 marks*

1. Write the classification of Earthworm
2. What is the breeding procedure for Clownfish.
3. Distinguish vermiculture and vermicompost.
4. Write the peculiarities of leg of a worker bee.
5. Name two adult diseases and two larval diseases of Honey bee and it’s causative agents.
6. What is meant by autocidal control?
7. Define Bee pasturage.
8. Write the scientific name of two exotic fishes in aquculture
9. Write the composition of Honey and Wax.
10. Give an account on Marine ornamental fish.
11. Define bee dance
12. Mention any two pests of paddy

**(8x2=16)**

**Part C**

*Answer* ***any six*** *questions.*

*Answer in* ***one*** *page each.*

*Each question carries 4 marks*

1. Briefly explain the common diseases of aquatic fishes.
2. Explain the social life exhibited by Honeybees.
3. What are the requirements needed for setting an aquarium?
4. Explain the various steps involved in preparing a vermibed.
5. Write a short account on the nutrition and feed of aquatic fishes.
6. Explain the life cycle of any one of the pest of coconut you studied.
7. Write an account on the nutrition and feed of aquarium fishes
8. Briefly write on the social life and adaptation of honey bees
9. Write a short essay on marine ornamental fishes

**(6x4=24)**

**Part D**

*Answer any* ***two*** *questions,*

*Answer should not exceed four pages*

*Each question carries 12 marks*

1. Write an essay on various methods for the control of pest population.
2. With suitable diagrams explain the Bee keeping equipment. Add a note on Management and maintenance of an apiary.
3. Write an essay on common diseases of aquatic fishes and their management.
4. With a neat diagram explain the morphology of Earthworm and explain the role of earthworm in solid waste management.

**(2x15=30)**