PG/IVS/ZOO-403/15

M.Sc. 4th Semester Examination, 2015

ZOOLOGY

PAPER – ZOO-403

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

(Special : *Genetics and Molecular Biology*)

GROUP – A

(*Recombinant DNA and Molecular Analysis*)

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

   (*a*) What are the advantages of use of dUTP over dTTP in PCR reactions ?

(*b*) What are the difference between semi-quantitative and quantitative RT-PCR ?

(*c*) Explain the basic principle of Blue-white screening.

(*d*) Compare Taq and Pfu polymerase. Which one is useful for sequencing reaction.

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

(*a*) Illustrate the properties of prokaryotic expression vector with proper example. 4

(*b*) What do you mean by 'terminal transferase activity of Taq polymerase' ? How do you utilize there property in cloning of a prokaryotic gene. 2 + 2

(*c*) What is Chemiluminescence ? What are the different types of Chemiluminescence ? Explain with proper example. 4

(*d*) Illustrate how does RNA molecules are hybridize and detected through Northern Blotting. Mention how this process is different from the Southern Blot technique. 3 + 1

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

(*a*) (*i*) Describe the basic principle and procedure of dideoxy sequencing.

(*ii*) What are the experimental modification were made to improve original sanger method of DNA sequencing. 5 + 3

(*b*) What is GFP ? What is the biological source of this protein. Discuss the utility of the protein in molecular analysis related to biology. 2 + 2 + 4

GROUP – B

(*Applied Genetics*)

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

(*a*) Name two high-capacity vectors that have been used extensively in the Human Genome Project.

(*b*) What is 'Electrospray Ionization' ?

(*c*) Mention the biological application of Monoclonal Antibody (MAb).

(*d*) What are the basic properties of MALDI Matrix ? Give examples.

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

(*a*) Explain the principle of Edman Degradation method with proper illustrations. 4

(*b*) Write the principle and application of Immunofluorescence. 2 + 2

(*c*) What are LATS antibodies ? Add a note on any one autoimmune disease you have studied. 1 + 3

(*d*) Write the key features of the BAC vector with a proper diagram. 4

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

(*a*) (*i*) Elucidate the steps involved in a typical sequence based metagenomic project.

(*ii*) Comment on metagenomic approach by sequencing of 16s r DNA Amplicons. 5 + 3

(*b*) (*i*) Describe briefly the major findings of human chromosome 22 in relation to annotated genes, duplications, conserved sequences and the rate of recombination from the sequencing of Human Genome.

(*ii*) What do you mean by junctional diversity? 6 + 2

GROUP – A

(Systems and Molecular Ecology)

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

(*a*) Distinguish between Deterministic and Stochastic ecological modelling.

(*b*) Define Landscape Add the relationship between Patch and Corridor.

(*c*) Differentiate between β and γ diversity.

(*d*) Represent the concept of Ecorestoration graphically.

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

(*a*) State the difference between Species Richness and Species Evenness. Explain the phenomena with the help of a Rank -Abundance diagram. 2 + 2

(*b*) Contrast Nutrient cycling in terrestrial and open-water aquatic ecosystems. Enlist vertical strata of tropical Rainforests. 2 + 2

(*c*) Mention the diversity of Ecotourism resources in India. Enlist the responsibilities of an Ecotourist. 2 + 2

(*d*) Diagrammatically represent the various spatial Microdistribution patterns. 4

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

(*a*) Write short notes on any *four* : 2 × 4

(*i*) Keystone species

(*ii*) Sorensen's Index of similarity

(*iii*) Graphical relation between dispersal rate and species diversity

(*iv*) CAS

(*v*) Synchrony in Plankton Metacommunities

(*vi*) MDF and VDF

(*vii*) Types of Lakes based on Annual Vertical mixing.

(*b*) (*i*) Define Metapopulation and Metacommunity. Describe the four paradigms of Metacommunity theory.

(*ii*) Classify the Forest vegetation patterns in India briefly. 4 + 4

GROUP – B

(*Human Ecology*)

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

(*a*) Enlist four major global environmental issues relating to atmosphere.

(*b*) Mention different 'Pull Factors' of urbanisation.

(*c*) Enlist four major Environmental Acts in India.

(*d*) State the difference between primary and secondary pollutants with examples.

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

(*a*) Classify different urban wastes. 4

(*b*) Briefly discuss on three major pathways for enhancing carbon sequestration in Ocean. 4

(*c*) Briefly discuss on major steps in EIA. 4

(*d*) What are the prime sources of Indoor pollution ? 4

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

(*a*) Mention principal causes of soil erosion. Briefly classify soil errosion and highlight different controlling measures. Add a note on watershed management. $1\frac{1}{2}+1\frac{1}{2}+2\frac{1}{2}+2\frac{1}{2}$

(*b*) Draw the relationship among greenhouse effect, global warming and climate change. Briefly discuss on the impact of high temperature on the parental behaviour of birds. Write the criteria for developing green belt in the industry. $2 + 3 + 3$

(*Continued*)

(Special : *Fishery*)

GROUP – A

(*Aquaculture and Fish Technology*)

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

(*a*) Distinguish between nursery and Stocking pond.

(*b*) Causes and preventive measures of Fish spoilage.

(*c*) What is captive breeding ? Site examples.

(*d*) State the implications of transgenic fishes in Aquaculture.

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

(*a*) What do you mean by "selective breeding" and state the importance of selective breeding ? 1 + 3

(*b*) Discuss in brief on the role of Aquaculture in rural development. 4

(*c*) Define "Integrated fish forming". Mention different types of integration used in India. 1 + 3

(*d*) Describe in brief on the "poultry-fish" integrated forming practiced in India. 4

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

(*a*) Describe fish freezing, drying and canning technology operated in India and state its significance. 2 + 2 + 2 + 2

(*b*) Discuss the protocol for cryopreservation of fish gamets and state its significance in Aquaculture. 5 + 3

GROUP – B

(*Inland and Marine Fisheries*)

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

(*a*) Mention the different larval stages of brackish water shellfish. 2

(*b*) Write a note on : Fishery co-operatives in fish culture sector. 2

(*c*) State major achievements in aquaculture sectors. 2

(*d*) What is lagoons and site one example. 1 + 1

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

(*a*) Define reservoir. State the different phases of reservoir development. 1 + 3

(*b*) Mangroove ecosystem develop a unique relationship with flora and fauna'. – Explain. 4

(*c*) In fishery point of view West-coast in more productive than East coast. – Justify of our answer with reasons. 1 + 3

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

(*i*) Importance of fishery extension

(*ii*) Public health fishery.

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

(*a*) (*i*) Describe the different mode of use of sewage water for traditional fish culture system. 4

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

(*I*) Culture of inhabiting species in aquaculture

(*II*) Problems of marine fishery.

(*b*) Write notes on (any *four*) of the following : 2 + 2 + 2 + 2

(*i*) Biofertilizer

(*ii*) Oxidative pondes

(*iii*) Deep sea fishes

(*iv*) Traditional fish culture

(*v*) Backwater fishery

(*vi*) MPEDA.
