2012

M.Sc.

3rd Semester Examination

ZOOLOGY

PAPER—ZOO-304

Full Marks : 40

Time : 2 Hours

The figures in the right-hand margin indicate full marks.

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

Illustrate the answers wherever necessary.

Answer *all* questions.

FISHERY SPECIAL PAPER

Group—A

(*Fish Taxonomy and Biology*)

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

(a) Place the undermentioned Fin-fishes in their appropriate orders :

(i) *Labeo rohita* ;

(ii) *Clarias batrachus* ;

(iii) *Mugil parsia* ;

(iv) *Scoleodon sorakowa.*

(b) Write examples of the Fin-fish orders given below :

(i) *Anguilloformes* ;

(ii) *Tetradontiformes* ;

(iii) *Pleuronectiformes* ;

(iv) *Syngnathiformes.*

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

(i) Relationship between Photoperiod and fish growth with suitable illustrations.

(ii) Explain the relationship between dissolved oxygen and fish growth with diagram.

(iii) Biotic factors influences fish growth — discuss in brief.

(iv) State the function of pituitary hormones in fish.

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

(a) Calculate percentage weight gain, Feed conversion ratio (FCR) and protein efficiency ratio (PER) when —

Initial weight of the fish - 10g
Final weight of the fish - 25g
Number of fish - 15
Duration of experiment - 90 days
Feed given to fish - @ 6% bwd^{-1}
Protein in feed - 35%
Protein in faccal matter - 45%

(b) Formulate a 30% protein grower Indian major carps feed using silkworm pupae meal (68% protein) and Rice polishing (14% protein). Calculate the requirement of silkworm pupae meal and Rice polishing to prepare 100 kg feed by using square method of Hardy, 1975.

Group—B

(*Limnology and Oceanography*)

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

(a) Mention the different sub-zones of Continental shelf.

(b) State the chemical composition of sea water.

(c) Why the aquatic habitates of lake remain vertically stratified in relation to light intensity ?

(d) What is infauna ?

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) 'Mangrove Ecosystem is an unique cascade' — Justify.

(c) What do you mean by the wetland ? Classify wetland on the basis of their biological properties. 1+3

(d) Most of the natural lakes were formed by Catastrophic events – explain.

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

(a) Define the 'lotic and lentic' environment with example. Mention different biotic components of a freshwater ecosystem. Write a note on : Rock inhabitant lifes in lotic ecosystems. 2+4+2

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

(i) Upwelling ;

(ii) Classify Lakes on the basis of water mixing patterns.

(iii) Oceanic Mollusca.

(iv) Physical Oceanography.

(v) Rotifers of different habitants.

(vi) Cuclomorphosis of planktonic animals.

ECOLOGY SPECIAL PAPER

Group—A

(*Terrestrial and Mathematical Ecology*)

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

(a) What is a Geophile ?

(b) State the difference between the forests : VDF and MDF.

(c) Explain the purpose and formula for coefficient of Dispersion.

(d) What is oxisol ? Where it is found ?

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

(a) Differentiate betwwen 'Mull' and 'Mor' type of humus.

(b) Distinguish between Deterministic and Stochastic models in Ecology.

(c) Define Sorensen's Quotient (C_S) of Similarity and tabulate 'Jaccard and Sorensen' indices scale that is used for adjudgement.

(d) Classify soil fauna on the basis of degree of dependence on soil.

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

(a) (i) Distinguish between Capillary water and Gravitational water. Define Alfisol and state its area of occurrence. 2+2

(ii) Illustrate the basic patterns of spatial distribution of species (add diagram). 4

(b) (i) Explain the reasons of Tropical Forest being more productive than Temperate Forest. Where is the maximum nutrients localised in the tropical forest? 3+1

(ii) Enlist the different types of Tropical forests (according to Champion and Seth) with a dominant flora of each type. 4

Group—B

(*Human Ecology*)

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

(a) Why Ecorestoration is referred to as 'Acid Test'?

(b) Enlist the factors leading to Soil Erosion.

(c) What is 'Demogaphic Transition'?

(d) Why chemical fertilizers are considered both as point and nonpoint pollutants?

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

(a) Briefly discuss different activities relating to Ecotoureism.

(b) Explain 'Thermal Imursion' and its role in atmospheric pollution.

(c) Discuss the composition, source and management of Municipal solid wastes.

(d) Environmental consequences of Acid rain in respect of plants' growth and productivity.

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

(a) What is Doubling time of population? Calculate doubling time of a population where growth rate is 1.4% per year. Compare the demographic trends in developing and developed countries. 2+2+4

(b) Define urbanisation. Mention the attributes required for considering an area as urban area. Briefly discuss the merits and demerits of urbanisation on biodiverisity. 1+3+4

MOLECULAR BIOLOGY AND GENETICS SPECIAL PAPER

Group—A

(*Molecular Biology*)

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

(i) State the function of guanine nucleotide exchange factor (GEF).

(ii) What is the variation of death receptor pathway among Type-I and Type-II cells?

(iii) State the functional differences between Protein Kinase C and Protein Kinase A.

(iv) How CPG dinucleotide changed to TPG dinucleotide?

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

(a) What are the role of Histone acetyl-transferase? What is CPG island? 2+2

(b) Describe the role of MGMT in single step DNA repair mechanism. State the role of p53 in DNA repair.

(c) Illustrate the detail mechanism of Base excision repair with suitable diagram.

(d) What is the function of Inhibitors of apoptosis protein (IAPs) ?

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

(a) Write a brief note on significance of C-FLIP protein in death receptor pathway. 5

(b) What is the role of Granzyme B in activation of executioner caspases ? 3

Or

(a) Explain the mechanism of RTK activation highlighting the role of GRB2 and SOS protein. 3

(b) "Cholera is due to altered G-protein activity" — provide molecular explanation. 2

(c) "CaM-Kinase acts as a molecular memory device" — Explain with diagram. 3

Group—B

(*Genetics*)

4. 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 is the role of Tra protein in Drosophila sex determination ?

(c) Mention the role of RuvC resolvase.

(d) What happens when Fgt9 gene is knocked out in mice ?

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

(a) Illustrate sex specific RNA splicing in doublesex and fruitless gene in Drosophila sex determination with suitable diagram.

(b) Why mouse gonad can not form testis if Sox9 is absent, even if Sry is present?

(c) List the three steps in homologous recombination in which Rec A participates with a short explanation of each.

(d) Draw a diagram of Holliday junction.

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

(a) (i) Describe the genetic structure of Tn3 and Tn10 tramporons.

(ii) Explain AC-DS transposition in Corn.

(iii) With the help of Cointegration model elucidate the mechanism of replicative transposition.

(b) Illustrate the two models for creation of 3' terminals single stranded DNAs by Rce BCD.

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