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11/5/17  
Your Roll No.....

Sr. No. of Question Paper : 2790

Unique Paper Code : 32161401

Name of the Paper : MOLECULAR BIOLOGY

Name of the Course : B.Sc. (Hons.) Botany

Semester : IV

Duration : 3 Hours

Maximum Marks : 75

**Instructions for Candidates**

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **five** questions in all, including Q. No. 1 which is compulsory.
3. Illustrate your answers with appropriate diagrams wherever necessary.

1. (a) Define **any five** of the following terms : (1×5=5)

- (i) Central dogma
- (ii) Transcription unit
- (iii) Ribozyme
- (iv) Enhancer

P.T.O.

(v) Snurps

(vi) Exon

(b) Expand the following terms (**any five**) : (1×5=5)

(i) GTF

(ii) CPSF

(iii) MTE

(iv) hnRNP

(v) ORF

(vi) SSB

(c) Match the following terms from column A with column B :  
(1×5=5)

**Column A**

**Column B**

- |                          |                             |
|--------------------------|-----------------------------|
| (i) H. Khorana           | (a) DNA polymerase I        |
| (ii) H. Fraenkel-Conrat  | (b) <i>Lac</i> operon       |
| (iii) A. Kornberg        | (c) Genetic code            |
| (iv) F. Jacob & J. Monod | (d) Base composition        |
| (v) E. Chargaff          | (e) RNA as genetic material |

2. Differentiate between the following terms (**any five**, tabulate the comparison) : (3×5=15)

(a) Purine and Pyrimidine bases

(b) Euchromatin and Heterochromatin

(c) Pribnow box and Goldberg-Hogness box

(d) Left handed DNA and Right handed DNA

(e) Inducible gene *regulation* and Repressible gene *regulation*

(f) Eukaryotic and Prokaryotic Ribosomes

3. Write short notes on **any five** of the following : (3×5=15)

(a) Telomerase

(b) Gene silencing

(c) Organelle DNA

(d) Nucleosome model

(e) Cot curve

(f) Wobble Hypothesis

(g) Structure of tRNA

4. (a) Briefly describe the *lac* operon and how it controls the metabolism of lactose in bacteria. (9)

- (b) Give a brief account of different types of RNAs found in the cell and discuss their functions. (6)
5. (a) Explain in detail, the process of transcriptional initiation in eukaryotes. (9)
- (b) Write the consensus sequence of the following (**any two**)
- (i) Shine-Dalgarno sequence
  - (ii) 5'-splice site
  - (iii) Kozak sequence (1.5×2=3)
- (c) Define alternative splicing and discuss its significance. (3)
6. (a) Illustrate and list the various proteins that assemble at the replication fork in prokaryotes. Discuss their functions. (9)
- (b) Discuss the different ways by which proteins are modified after translation. (6)
7. (a) Explain in detail the initiation of translation in prokaryotes. How does it differ from that of eukaryotes? (List three key differences) (9)
- (b) Discuss in detail the experiment that employed radioactive isotopes and conclusively proved that DNA is the genetic material. (6)

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Your Roll No.....

Sr. No. of Question Paper : 2791

GC-4

Unique Paper Code : 32161402

Name of the Paper : ECOLOGY

Name of the Course : B.Sc. (Hons.) BOTANY

Semester : IV

Duration : 3 Hours

Maximum Marks : 75

**Instructions for Candidates**

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **FIVE** questions in all. Question No. 1 is compulsory.
3. **All** questions carry **EQUAL** marks.
4. All parts of a question **MUST** be attempted together.

1. (a) Define **any five** of the following : (1×5=5)

- (i) Biome
- (ii) Pedogenesis
- (iii) Ecological Pyramids
- (iv) Detritus

P.T.O.

- (v) Soil Texture
- (vi) Key Stone Species
- (b) Give one word for **any five** of the following : (1×5=5)
- (i) Instrument used to measure Wind Velocity
- (ii) Light Loving Plants
- (iii) Water held between the pore spaces of soil particles and angles between them
- (iv) Listed species content of plants in an area
- (v) Total water present in the soil
- (vi) More or less decomposed finely divided organic matter in the soil
- (c) Match the following : (1×5=5)
- | <u>Column A</u>           | <u>Column B</u>                |
|---------------------------|--------------------------------|
| (i) Ecotone               | Light Intensity                |
| (ii) Xerophyte            | Zone of Leaching               |
| (iii) Insectivorous Plant | <i>Opuntia</i>                 |
| (iv) Eluvial Zone         | <i>Nepenthes</i>               |
| (v) Luxmeter              | Transition Zone of Communities |
- (5+5+5=15)

2. Briefly explain **any five** of the following : (3×5=15)
- (a) Hydrological Cycle
- (b) Adaptations to Fire
- (c) Precipitation-types
- (d) Homeostasis
- (e) Trophic Structure
- (f) Principles of Phytogeography
3. Differentiate between **any five** of the following : (3×5=15)
- (a) Grazing Food Chain & Detritus Food Chain
- (b) Standing State & Standing Crop
- (c) Stratosphere & Troposphere
- (d) r-Selection & k-Selection
- (e) Autecology & Synecology
- (f) Primary Succession & Secondary Succession
4. Write short notes on **any three** of the following : (5×3=15)
- (a) Age Pyramids

(b) Theory of Tolerance

(c) Soil Formation

(d) Ecological Speciation

5. Describe **any three** of the following : (5×3=15)

(a) Humus

(b) Niche

(c) Structure of Ecosystem

(d) Y-Shaped Energy Flow Model

6. (a) What are Biogeochemical Cycles ? Explain cycling of Nitrogen. (8)

(b) Explain the process of Succession in a xeric environment with the help of a suitable diagram. (7)

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Your Roll No.....

Sr. No. of Question Paper : 2792

GC-4

Unique Paper Code : 32161403

Name of the Paper : Plant Systematics

Name of the Course : B.Sc. (Hons.) Botany

Semester : IV

Duration : 3 Hours

Maximum Marks : 75

**Instructions for Candidates**

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **five** questions in all.
3. Question No. 1 is compulsory.
4. **All** questions carry equal marks.
5. Answer all parts of a question together.

1. (a) Fill in the blanks : (10)
  - (i) ..... is known as the father of Genus Concept.
  - (ii) Takhtajan represented his system of classification in the form of a ..... diagram.
  - (iii) ..... is the author of Theorie Elementaire de la Botanique.

P.T.O.

- (iv) Angiosperms were given the taxonomic rank of ..... by Cronquist.
- (v) ..... is the name of a genus commemorating a person.
- (vi) ..... is a journal dedicated to the publication of research in Plant Systematics.
- (vii) ..... is an angiosperm lacking vessels.
- (viii) The occurrence of similar features in different species with common ancestry is known as .....
- (ix) A binomial with identical generic name and specific epithet is known as a .....
- (x) The occurrence of both advanced and primitive characters in a taxon is known as .....
- (b) Give the alternative name and type genus of the following : (5)
- Labiatae, Guttiferae, Umbelliferae, Palmae, Gramineae.
2. (a) Outline the system of classification proposed by Bentham and Hooker. (7)
- (b) Explain why this system is considered a major improvement over earlier systems. (5)
- (c) Expand the following (**any three**) : (3)
- ICN, IAPT, nom.nud., APG.

3. (a) Explain the importance of Botanical Gardens in the field of systematics. (5)
- (b) Name any one national and one international Botanical Garden. (2)
- (c) What are secondary metabolites? Discuss their role in solving taxonomic problems citing suitable examples. (2+6)
4. (a) Explain the Principle of Priority in Nomenclature. Discuss the limitations to the application of this principle? (3+3)
- (b) Differentiate between apomorphic and plesiomorphic characters. (3)
- (c) Discuss any two theories regarding the most probable ancestors of angiosperms. (6)
5. Write short notes on the following (**any three**) : (3×5)
- (i) Biological species concept.
- (ii) Valid publication of names.
- (iii) Multi-access keys.
- (iv) Use of computers in plant systematics.
- (v) Englerian concept of primitive flower.



6. (a) Differentiate between the following (**any three**) :
- (i) Indented and Bracketed Keys
  - (ii) Holotype and Lectotype
  - (iii) Phylogram and Phenogram
  - (iv) Flora and Monograph (3×3)
- (b) Interpret the following :
- (i) *Gossypium tomentosum* Nutt, ex Seem. (1)
  - (ii) *Phyllanthus* Linn, emend. Mull. (1)
  - (iii) *Salix X capreola* (1)
  - (iv) *Delphinium viscosum* Hook.f. et Thomson (1)
  - (v) *Dudleya variegata* (Wats.) Moran *Sedum variegata* Wats. (2)
7. (a) Explain the use of molecular data as a modern taxonomic tool with suitable examples. (5)
- (b) Outline the steps of numerical taxonomic analysis. (5)
- (c) Write a short note on the contributions of Linnaeus in classification and nomenclature of plants. (5)