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3 (Sem-4/CBCS) BOT HC 1

2021

BOTANY

(Honours)

Paper : BOT-HC-4016

(Molecular Biology)

Full Marks : 60

Time : Three hours

***The figures in the margin indicate
full marks for the questions.***

GROUP-A

(Marks : 30)

1. Answer the following questions : $1 \times 5 = 5$

(a) Who proved that DNA is the basic genetic material ?

Contd.

- (b) Define Viral Genome.
- (c) Is DNA replication semi-discontinuous or discontinuous ?
- (d) What are Spliceosomes ?
- (e) Why is lac operon inducible ?
2. Answer the following briefly : $2 \times 5 = 10$
- (a) What did Fraenkel-Conrat discover ?
- (b) Do you agree that Theta replication is unidirectional ? Give reasons.
- (c) Differentiate between Facultative and Constitutive heterochromatin.
- (d) What is a trp repressor ?
- (e) What are structural proteins ?
3. Write notes on **any three** of the following : $5 \times 3 = 15$
- (a) Adapter Hypothesis
- (b) Genetic Code

- (c) Nucleosomes
- (d) Gene silencing
- (e) Fidelity of translation.

GROUP-B

(Marks : 30)

4. Answer **any three** of the following : (Within **800** words)

(a) Describe in detail, the three major phases of the mechanism of transcription in prokaryotes. 10

(b) What is positive and negative gene regulation ? Explain with the help of diagram, the mechanism involved in the positive control system for regulation of gene activity in *E. coli* lac operon.

3+7=10

(c) "DNA replication is a biological process that occurs in all living organisms." Elucidate on the characteristics of replication and their patterns. 10

- (d) Discuss the steps involved in mRNA processing. Why is mRNA processing important for eukaryotes ? 6+4=10
- (e) "The shape of a Cot curve for a given species is a function of two factors." Explain. 10
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3 (Sem-4/CBCS) BOT HC 2

2021

BOTANY

(Honours)

Paper : BOT-HC-4026

(Plant Ecology and Phytogeography)

Full Marks : 60

Time : Three hours

***The figures in the margin indicate
full marks for the questions.***

1. Answer the following questions : $1 \times 5 = 5$

(a) The inherent ability and development of mechanism of the biological system to resist change and to maintain itself in the stable state of dynamic equilibrium is termed as —

(i) ecological amplitude

Contd.

- (ii) homeostasis
 - (iii) adaptations
 - (iv) carrying capacity
- (b) The dominance of therophytes in a particular area would indicate that climate is —
- (i) warm and dry
 - (ii) warm and moist
 - (iii) extremely cold
 - (iv) cold and dry
- (c) When the number of young and middle-aged individuals in a particular population is nearly equal, then the shape of age pyramid is —
- (i) urn-shaped
 - (ii) bell-shaped
 - (iii) triangular-shaped
 - (iv) irregular-shaped

(d) The stratum of a deep lake in temperate region which shows drastic thermal fluctuations during different seasons of year is —

(i) epilimnion

(ii) hypolimnion

(iii) thermocline

(iv) metalimnion

(e) The nutrient poor infertile and highly acidic soils formed in humid temperate climates is :

(i) Gleys

(ii) Podzols

(iii) Chernozems

(iv) Latosols

2. Write short notes on : 2×5=10

(a) Edge effect

(b) Sigmoid growth curve

(c) Commensalism

(d) Aquifer

(e) Paleoendemism.

3. Answer/Write on **any three** of the following : $5 \times 3 = 15$
- (a) Define ecological niche and discuss briefly its types.
 - (b) Discuss briefly the various ecological adaptations of plants in response to temperature.
 - (c) Describe in brief, the density-dependent regulation of population.
 - (d) What is soil profile ? Discuss briefly the various factors that contribute soil formation.
 - (e) Explain briefly the contributory factors responsible for endemism.
4. Answer **any three** of the following questions : (Within **500** words) $10 \times 3 = 30$
- (a) Explain the meaning of the term 'climax'. Write briefly the different schools of thought about the climax state. Mention few major trends of changes which are observed during the process of ecological succession.

- (b) What do you understand by the term 'ecological energetics'? Describe briefly the different models of energy flow in an ecosystem. Which model shows more realistic picture of energy flow and why ?
- (c) Mention the different mechanisms by which speciation occur in nature. Elucidate briefly allopatric speciation with the help of example.
- (d) "Each type of Eltonian pyramids provides different sorts of information about the trophic relationships between organisms at different levels in a community." Justify and elucidate the statement citing suitable examples.
- (e) Define biome. Explain briefly the major terrestrial biomes on earth with special reference to tropical and temperate biomes stating their characteristic vegetation type found.

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3 (Sem-4/CBCS) BOT HC 3

2021

BOTANY

(Honours)

Paper : BOT-HC-4036

(Plant Systematics)

Full Marks : 60

Time : Three hours

***The figures in the margin indicate
full marks for the questions.***

Group-A

1. Fill in the blanks / Answer the following :
1×5=5
 - (a) _____ is a device for easily identifying an unknown plant by a sequence of choices between two or more statements.
 - (b) The inflorescence of the family Lamiaceae is known as _____.

Contd.

- (c) A change in the genetic composition of one species or group in response to a genetic change in another is called _____.
- (d) What is Taxon ?
- (e) Define Cladogram.
2. Answer the following questions : $2 \times 5 = 10$
- (a) Inflorescence characters of Euphorbiaceae.
- (b) Write a note on Taxonomic categories.
- (c) Nomenclature of hybrid cultivars.
- (d) Importance of E-flora.
- (e) Differences between monophyly and polyphyly.
3. Answer the following questions : $5 \times 3 = 15$
- (a) Write an explanatory note on International Code of Botanical Nomenclature.
- (b) Discuss the objective and importance of Plant taxonomy.
- (c) Discuss the floral characters of the family Orchidaceae with floral diagram.

Group – B

4. Answer **any three** of the following questions : 10×3=30
- (a) What is Herbarium ? Discuss the role of herbaria in teaching and learning process of plant taxonomy.
 - (b) Describe the systematic position, floral characters and economic importance of *any one* of the following families :
 - i. Asteraceae.
 - ii. Poaceae.
 - iii. Apiaceae.
 - (c) What is Biosystematics ? Give examples and point out, in what essential ways numerical taxonomy has proved useful in the study of systematics.
 - (d) Discuss the outline of Bentham and Hooker system of plant classification. Why is this classification usually used for classifying herbarium specimens ?
 - (e) Discuss the method of illustrating the evolutionary relationship amongst the angiospermic taxa.