2024

BOTANY

(Honours Core)

Paper : BOT–HC–4016

(Molecular Biology)

Full Marks : 60

Time : Three hours

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

1. Choose the correct answer of the following : 1×7=7

   (a) What is the main component of the smooth colonies of *Diplococcus pneumoniae* ?

   (b) Define *hn*RNA.

   (c) What is spliceosome ?

   (d) Give *one* example of promoter which helps in transcription.

   (e) What is cot curve ?

(f) Which of the following codons acts as stop codon in the transcription process ?

(i) AUG

(ii) UAA

(iii) AAA

(g) What is denaturation of DNA ?

2. Answer the following questions briefly : 2×4=8

(a) What do you mean by 'Gene Expression' and how transcription regulation in prokaryotes takes place through operon concept ?

(b) What are the differences between euchromatin and heterochromatin ?

(c) Define Wobble hypothesis giving stress on the economy of *t*RNA molecule.

(d) Mention the characters of eukaryotic RNA polymerases.

3. Answer ***any three*** of the following questions : 5×3=15

(a) "The whole world can be called as RNA world." Justify.

(b) Describe the process of rolling circle replication in prokaryotes.

(c) Discuss Avery, MacLeod and McCarty experiment and prove that DNA is genetic material.

(d) What is guide RNA and how does it help in RNA editing ?

(e) Define transcription and mention different steps of prokaryotic transcription.

4. Answer the following questions : ***(any three)*** 10×3=30

(a) What do you mean by central dogma of protein synthesis process ? Describe the process of synthesis of protein in eukaryotes. 2+8=10

(b) Define operon. How is transcription regulated in Lac-operon for the metabolism of lactose in bacteria ? 2+8=10

(c) Elaborate the Watson an Crick's model of DNA structure. What are the salient features of chloroplast DNA ? 7+3=10

(d) What are the differences between prokaryotic and eukanyotic ribosomes ? Explain the different sites of a ribosome with suitable diagram. 5+5=10

(e) What is replica ? Describe unidirectional and bidirectional replication of DNA. What are the enzymes involved in DNA replication ? 2+6+2=10

(f) Write detailed notes on the following : 5×2=10

(i) Heat shock proteins;

(ii) Peptide hormones.

2024

BOTANY

(Honours Core)

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. Choose the correct answer of the following : 1×7=7

   (a) Synecology deals with the study of

   (i) the interaction between species in a population

   (ii) the interactions between individuals of a species

   (iii) the interactions between species in communities

   (iv) experimental and inductive nature of population

(b) Which of the following is not an example of homeostasis ?
- (i) Osmotic adjustment in plants
- (ii) Presence of chlorophyll in green plants
- (iii) Regulation of temperature by organisms
- (iv) Glucose level in the blood plasma of animals

(c) Precipitation results from the heating of the earth's surface is known as
- (i) cyclonic precipitation
- (ii) convectional precipitation
- (iii) frontal precipitation
- (iv) stratiform precipitation

(d) The range of environmental conditions which a taxon can tolerate is called
- (i) edge effect
- (ii) ecological niche
- (iii) adaptive zone
- (iv) ecological amplitude

(e) It is the scientific study of seasonal changes, i.e., the periodic phenomenon of organisms in relation to climate is termed as
- (i) physiogamy
- (ii) abundance
- (iii) phenology
- (iv) vitality

(f) The wet woodland with accumulation of humus in the soil associated with micro-organisms is known as
- (i) climax forest
- (ii) shrub stage
- (iii) tree stage
- (iv) carr

(g) The phenomenon distribution of species associated with some geographical and ecological factors is called
- (i) endemism
- (ii) endangered species
- (iii) relic-endemism
- (iv) progressive endemism

2. Write short notes on the following : 2×4=8
- (a) Ecosystem ecology
- (b) Nudation
- (c) Coral reefs
- (d) Parasitism

3. Write briefly on ***any three*** of the following : 5×3=15
- (a) Adaptation of plants to variation of temperature
- (b) Ecotone and its importance
- (c) Factors of ecological succession
- (d) Shelford's law of tolerance
- (e) Theories of endemism

4. Answer ***any three*** of the following : 10×3=30

(a) Differentiate between edaphology and pedology. Describe the origin and formation of soil. 2+8=10

(b) What do you mean by ecological speciation ? Discuss briefly the types of speciation based on geography. Give suitable examples of ecological speciation. 2+6+2=10

(c) Define an ecological niche. Mention important characteristic features of an ecological niche. How does fundamental niche differ from realized niche ? 2+6+2=10

(d) Describe biochemical cycle with special reference to cycling of carbon. What are the major reservoirs of carbon ? 7+3=10

(e) How does food chain differ from food web ? Write briefly the detrital food web. Write the significance of food web. 2+4+4=10

(f) Who is the father of phytogeography ? Mention the phytogeographical divisions of India. Discuss briefly the vegetation of North-East India. 1+3+6=10

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3 (Sem–4/CBCS) BOT HC 3

2024

BOTANY

(Honours Core)

Paper : BOT–HC–4036

(Plant Systematics)

Full Marks : 60

Time : Three hours

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

1. Answer the following/Fill in the blank/ Choose the correct answer : 1×7=7

   (a) Who first used the term 'taxon' ?

   (b) What type of fruit is developed from an apocarpous gynoecium ?

   (c) Define phylogenetic tree.

   (d) What do you understand by 'OTUs' ?

   (e) '_____' is the conserved name of the family Poaceae.

Contd.

(f) Name the family where gynobasic style is found.

(g) The book, *Theories Elementaire de la Botanique* was written by

(i) Carolus Linnaeus

(ii) Theophrastus

(iii) Bentham and Hooker

(iv) A. P. de Candolle

2. Answer the following : 2×4=8

(a) Differentiate between taxonomic species concept and biological species concept.

(b) Describe the androecium of Zingiberaceae.

(c) Write the difference between monophyly and polyphyly.

(d) Mention the basic concept of which Linnaeus system of classification was based.

3. Answer ***any three*** of the following questions : 5×3=15

(a) What is virtual herbarium ? Discuss the advantages of virtual herbarium.

(b) Give a brief account on important botanical gardens of India.

(c) Describe the floral peculiarities of the family Orchidaccae.

(d) What do you mean by 'typification' ? Write an account on various 'types' used in plant nomenclature.

(e) Write a note on rules of 'effective and valid publication'.

4. Answer ***any three*** of the following : 10×3=30

(a) What is natural system of classification ? Give the detailed outline of Bentham and Hooker system of classification. Mention the merits and demerits of the classification. 1+6+3=10

(b) Why is the family Asteraceae regarded as most advanced among dicots ? Describe the characteristic features of in florescence found in Asteraceae. 7+3=10

(c) What is palynology ? Discuss the role of palynology in taxonomy. Give suitable example. 1+7+2=10

(d) What is the basic concept behind APG system of classification ? Write a brief note on APG system of classification. Discuss the merits and demerits of it.

1+6+3=10

(e) Describe different theories regarding the origin and evolution of Angiosperm.

(f) What is numerical taxonomy ? Describe the principle of numerical taxonomy. Mention the applications of it.

2+6+2=10
