

2017

M.Sc.

4th Semester Examination

BOTANY

PAPER—BOT-402

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.

Special Paper

(Advanced Plant Taxonomy)

Answer all questions.

1. Answer any five of the following : 5×2

(a) Define phycocode. Who first proposed it?

(b) What is 'heterobathmy'? Give an example.

(Turn Over)

- (c) What is 'Flora' and Vegetation ? Give an example from each.
- (d) Name two exotic plants of your University Campus with their families.
- (e) What are Eudicots ? Give examples.
- (f) Name two Mangrove taxa of West Bengal.
- (g) Define Phylocode.
- (h) Define Cladistics. Give an example.

2. Write the difference on any *two* of the following :

2×5

- (a) ICBN and ICN ;
- (b) Endemic Flora and Exotic Flora ;
- (c) *In-situ* Conservation and *Ex-situ* Conservation ;
- (d) Dendogram and Cladogram ; and
- (e) True Mangrove and Mangrove Associate.

3. Answer any *two* of the following :

2×10

- (a) What is chemotaxonomy ? What are macro and micro molecules ? Mention the importance of protein and isoenzymes in solving the taxonomic problems. 2+2+6

- (b) Write the systematic position characteristics and putative phylogenetic relationships of the subclass Asteridae (sensu Cronquist 1968). Write six economically and ethnomedicinally important plants of this subclass. 7+3
- (c) Define Parasite Taxa. What are the basic differences between Holo and Hemiparasitic plants? Discuss in details with example and suitable sketches of the adaptive features, distribution and phylogeny of Parasitic plants. 2+2+6
- (d) What is phylogenetic classification? What is the full form of APG? Mention its outline and indicate the merits and demerits of this system. Which is the latest APG system of plant classification and where it was published? 1+1+4+2+1+1
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(Ecology and Biodiversity)

Answer Q. No. 1 and any three from the rest.

1. Comment on the following (any five): 5×2
- (a) Red Data Book;
 - (b) Growth curves;
 - (c) *El Nino*;
 - (d) Shifting cultivation;
 - (e) Eutrophication;
 - (f) Acid precipitation;
 - (g) Green house effect; and
 - (h) Chapman cycle.
2. Write short notes on the following : 2×5
- (a) Wetlands as 'Nature's Kidney'.
 - (b) Adaptive features of Mangroves.

3. Define pollutant. Name two major air pollutants. Comment on the significance of phytoremediation technique in environmental cleaning. 2+2+6
4. Define stress. Enumerate the commonly prevailing environmental stresses. Write briefly the adaptive strategies of aquatic plants. 3+3+4
5. What is invasive species ? Name two invasive species one each from animals and plants. Discuss their negative impact on native biodiversity. 2+2+(3+3)
6. Define biodiversity upto various levels. Comment on the role of Ramsar sites in the conservation of biodiversity. 3+7
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(Microbiology)

Answer Q. No. 1 and any *three* from the rest.

1. Answer any *five* questions : 5×2
- (a) What is kefir ? Mention the microorganisms involved in kefir production.
 - (b) What is acid fast staining ? Give example of an acid fast bacteria.
 - (c) What is triple vaccine ? Give example.
 - (d) What are the different classes of immunoglobulins ?
 - (e) Give two important properties of mycoplasma.
 - (f) Mention the substrates and microorganism need for industrial production of lactic acid.
 - (g) Mention the fundamental difference between SEM and TEM.
 - (h) Mention one application each of citric acid and glutamic acid.

2. Write short notes on :

$4 \times 2 \frac{1}{2}$

- (a) Cell mediated immunity;
- (b) Application and types of proteases;
- (c) Acidophilus milk; and
- (d) Actinomycetes.

3. (a) Write down different mechanisms of antibiotic resistance found in bacteria.

(b) Write down mode of action of penicillin on bacteria.

6+4

4. (a) Mention properties of hybridoma. How are they developed?

(b) What is secondary sewage treatment? Discuss any one of such treatment process.

(c) Write down two properties of cancerous cell.

$(1+4)+(1+2)+2$

5. (a) What is hapten?

(b) Write down in detail about the process of ELISA.

(c) Write down benefits of fermented food. 4+1+5

6. (a) Depict schematically the industrial production of cheese by exploitation of microorganisms.
- (b) Define bioleaching. Mention the reactions involved in bioleaching of copper mediated by microorganisms.
- 5+(2+3)

(Palaeobotany and Palynology)

1. Answer any *five* questions : 5×2
- (a) What is meant by 'dip' and 'strike' of a bed ?
- (b) What is conglomerate ?
- (c) Name two important megafloral elements of Tiki formation.
- (d) Define kerogen.
- (e) What are coacervates ?
- (f) What is 'pangaea' ?

- (g) Differentiate lithostratigraphy from biostratigraphy.
 (h) What is meant by diastrophism ?

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

- (a) State how palynomorphs help to identify different formations of Indian lower Gondwana sequence.
 (b) Give a brief account of palaeontological evidences in support of the 'continental drift hypothesis'.
 (c) Write short note on the nomenclature of fossil plants.
 (d) Describe the role of palynology in stratigraphic deduction of oil bearing sequence.

3. Answer any *two* of the following : 2×10

- (a) What is meant by Gondwana sequence? Write the basis of three fold classification of Indian Gondwana. Describe the megaflores of lower Gondwana in Damodar Valley basin. 1+2+7
 (b) Describe the Holocene vegetational history of Western India. 10
 (c) Describe the megaflores succession through Siluro-Devonian sequence. 10

- (d) Discuss the different methods used for **absolute** dating of rocks and fossils. State how **plant fossils** help in dating sedimentary strata. 10
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(Plant Genetics and Biotechnology)

Answer Q. No. 1 & 5 and any *three* from the rest taking at least one from each unit.

Unit-I

1. Answer any *five* questions : 5×1
- (a) What is heteropycnosity of chromosome ?
 - (b) Define Robertsonian fusion.
 - (c) What is bimodal Karyotype ?
 - (d) Define T_m value of DNA.
 - (e) How does isochromosome form ?
 - (f) What is a proto X chromosome ?
 - (g) Define β -chromosome.

- (h) How does an euploid differ from aneuploid ?
2. Define reciprocal translocation. Explain the role of polyploidy and aneuploidy in the evolution of crop. 2+8
3. State the stages of occurrence of 1c DNA and 4c DNA in a cell cycle. Define C-value paradox. Outline the mechanics of change in nuclear DNA during evolution. 2+2+6
4. Mention chromosomal characteristics of Pteridophytes. Give an account of synteny in Angiosperms. 4+6

Unit-II

5. Answer any *five* questions : 5×1
- (a) What should be the maximum concentration of a microelement in a culture medium ?
- (b) What is the significance of single cell culture ?
- (c) What is meant by redifferentiation in plant tissue culture ?
- (d) What is molecular pharming ?

- (e) Mention the basic working principle of electroporation.
- (f) What is meant by PEDC in somatic embryogenesis?
- (g) Define artificial seed.
- (h) What is turbidostat?
6. What is agroinfection? Discuss the process involved in the *Agrobacterium* mediated gene transfer in plant genome. 2+8
7. Write a brief note on any *two* of the following : 5×2
- (a) Functions of vir genes.
- (b) Nurse culture Technique.
- (c) Molecular features of Ti plasmid.
8. What is IEDC? Give example. Illustrate the different requisites for somatic embryogenesis and their utilities.

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