

Nalanda Open University
Annual Examination - 2013
B.Sc. Botany (Honours), Part-I
Paper-I

Time: 3.00 Hrs.

Full Marks: 80

Answer any five questions. All questions are of equal value.

1. Describe the reproductive organs of *Chara*.
2. Give an account of structure and reproduction of *Ectocarpus*.
3. Describe the structure and reproduction of *Alternaria*.
4. Describe the characteristic features of Bryophyta and its classification.
5. Compare the structure of sporogonium of *Pellia* and *Anthoceros*.
6. Mention the characteristic features of Pteridophyta.
7. Describe the vascular structure of the stem of *Lycopodium*.
8. Write in short about four of the following:
 - (a) Chloroplast in *Oedogonium*
 - (b) Teleutospore in *Puccinia*
 - (c) Nutrition in Fungi
 - (d) Longitudinal Section of the cone of *Selaginella*
 - (e) Longitudinal section of the spore producing organ of *Ophioglossum*
 - (f) Classification of Fungi
9. Describe the structure and reproduction of Lichen.
10. Compare any four of the following sets-
 - (a) Zoospores of *Chlamydomonas* and *Oedogonium*
 - (b) Zoospores of *Synchytrium* and *Albugo*
 - (c) External morphology of the thallus of *Marchantia* and *Anthoceros*
 - (d) Haplostele and Actinostele
 - (e) Pigments of green algae and red algae
 - (f) Mycelium of *Albugo* and *Erysiphe*

Nalanda Open University
Annual Examination - 2013
B.Sc. Botany (Honours), Part-I
Paper-II

Time: 3.00 Hrs.

Full Marks: 80

Answer any five questions. All questions are of equal value.

1. Describe the characteristic features of Gymnosperms.
2. Give an account of the female gametophyte of *Pinus*.
3. Describe the development of male gametophyte of *Gnetum*.
4. Give a brief account of the fossil flora of Bihar and Jharkhand.
5. Describe fructification of *Calamites*.
6. What are important twelve principles proposed by Maheshwary for the classification of Angiosperm.
7. Give an account of classification of Angiosperms proposed by Bentham and Hooker.
8. Give a brief account of nomenclature type.
9. Describe the floral characters of Ranunculaceae with its floral formula and floral diagram. Also, give name of two common plants of this family.

Or

Describe the floral features of Euphorbiaceae with its floral formula and floral diagram. Give the botanical name of two plants of economic importance of this family.

10. Write short notes on any four of the following:
 - (a) Transfusion tissue
 - (b) Pollen grain of *Pinus*
 - (c) Sporangium of *Rhynia*
 - (d) Verticillaster
 - (e) Cupule of *Lyginopteris*
 - (f) Gynobasic style



Nalanda Open University
Annual Examination - 2013
B.Sc. Botany (Subsidiary), Part-I
Paper-I

Time: 3.00 Hrs.

Full Marks: 80

Answer any five questions. All questions are of equal value.

1. Describe the characteristic features of Virus.
2. Give an account of the life cycle of *Oedogonium*.
3. Describe the life cycle of *Albugo*.
4. Mention the mode of reproduction in *Sphagnum*.
5. Describe the structure of cone of *Selaginella* and compare it with that of *Equisetum*.
6. Describe the characteristics features of Pteridophyta.
7. Describe the development of female gametophyte of *Pinus*.

Or

Give an account of the characteristic features of Gymnosperm.

8. Write short notes on any four of the following:
 - (a) Bacteria causing human diseases
 - (b) Nucule
 - (c) Pleurilocular sporangia
 - (d) Mycelium of Zygomycotina and Ascomycotina
 - (e) Apothecium
 - (f) Teleutospore
9. Write the floral characters, floral formula and floral diagram of the family Lamiaceae.
10. Assign the following plants to their respective family.

(a) <i>Nigella</i>	(b) <i>Cucurbita</i>
(c) <i>Ricinus</i>	(d) <i>Nerium</i>
(e) <i>Ocimum</i>	(f) <i>Cucumis</i>
(g) <i>Triticum</i>	(h) <i>Zea maydis</i>



Nalanda Open University

Annual Examination - 2013

B.Sc. Botany (Honours), Part-II

Paper-III

Time: 3.00 Hrs.

Full Marks: 80

Answer five question selecting at least one question each from Group-A, Group-B and Group-C.
All questions are of equal value.

Group-A (Microbiology)

1. Describe the structure and reproduction of TMV.
2. Give an account of industrial importance of bacteria.
3. Describe the microbial degradation of agricultural produce.

Group-B (Plant Pathology)

4. Describe the process of infection.
5. Discuss the role of toxins in pathogenesis.
6. Give an account of biochemical defense of the host.
7. Describe the symptom, etiology and control of late blight of potato.

or

Write short notes on any four of the following:

(a) Transmission of TMV (b) Phytoalexin (c) Hot Water Treatment (d) Contribution of Louis Pasteur (e) Heteroecious (f) Incubation period

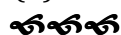
Group-C (Embryology)

8. Describe microsporogenesis.
9. Describe the development of **polygonum** type of embryosac.
10. What do you mean by experimental embryology?

or

Write notes on any two of the following:

(a) Anther culture (b) Embryo culture
(c) Induced parthenocarpy (d) Double fertilization.



Examination Programme, 2013

Bachelor of Science, Part-II

All Honours Subjects (B.Sc., Part-II के सभी विद्यार्थियों के लिए)

(Except B.Sc. Geography & Home Science)

(B.Sc., Part-II भूगोल और गृह विज्ञान को छोड़कर)

Date	Paper	Time	Name of Examination Centre
03/6/2013	HONOURS PAPER – III	3.30 to 6.30 pm	Nalanda Open University, Patna
05/6/2013	HONOURS PAPER – IV	3.30 to 6.30 pm	Nalanda Open University, Patna
07/6/2013	(SUB.) (Botany -II)	8 to 11 am	Nalanda Open University, Patna
08/6/2013	(SUB.) (Math -II)	8 to 11 am	Nalanda Open University, Patna
10/6/2013	(SUB.) (Chemistry - II)	8 to 11 am	Nalanda Open University, Patna
11/6/2013	(SUB.) (Geography -II)	8 to 11 am	Nalanda Open University, Patna
12/6/2013	(SUB.) (Physics- II)	8 to 11 am	Nalanda Open University, Patna
13/6/2013	(SUB.) (Zoology - II)	8 to 11 am	Nalanda Open University, Patna
15/6/2013	(SUB.) (Home Science II)	8 to 11 am	Nalanda Open University, Patna
19/6/2013	Hindi 100 orUr 50+Hn50	3.30 to 6.30 pm	Nalanda Open University, Patna

Nalanda Open University

Annual Examination - 2013

B.Sc. Botany (Honours), Part-II

Paper-IV

Time: 3.00 Hrs.

Full Marks: 80

Answer five question selecting at least one question each from Group-A, Group-B and Group-C.
All questions are of equal value.

Group-A

1. Describe xerophytic adaption in the anatomy of plants.
2. Define periderm. Describe the function of different periderms.
3. What is abnormal secondary growth? Describe abnormal secondary growth in *Tinospora*.

Group-B

4. Describe the structure and function of nucleus.
5. What are lipids? Classify different types of lipids.
6. Define enzymes. Describe the classification of enzymes.
7. Give an account of Vitamin B.
8. Write short notes on any four of the following:
(a) Centrosome (b) Micronutrients (c) Nitrogen bases (d) Simple protein
(e) Alkaloids (f) Central Dogma (g) Essential oil (h) Polysaccharides

Group-C (Embryology)

9. Give an account of pulses of Bihar State.
10. Describe the fibre yielding plants of Bihar state and mention the uses of fibres extracted from plants.

Or

Write short notes on any four of the following:

- | | | | |
|----------------|-----------------|-------------|-----------------|
| (a) Holy basil | (b) Opium poppy | (c) Paddy | (d) Linseed oil |
| (e) Sugarcane | (f) Tomato | (g) Tobacco | (h) Turmeric |



Nalanda Open University

Annual Examination - 2013

Bachelor of Science Part-II

Botany (Subsidiary), Paper-II

Time: 3.00 Hrs.

Full Marks: 80

Answer any five questions. All questions are of equal value.

1. Describe the principle of distribution of mechanical tissue.
2. Give an account of root–stem transition.
3. Describe the megasporogenesis.
4. What is endosperm? Describe its type and morphological nature in brief.
5. Describe the structure of chloroplast.

or

Describe the structure and function of nucleus.

6. Define mutation and its different types.
7. What are enzymes? Write their properties.
8. Describe the formation of pyruvic and acid from glucose.
9. Define ecosystem. Describe the forest ecosystem.
10. Write short notes on any four of the following:
 - (a) Anomalous Secondary growth
 - (b) Double fertilization
 - (c) Function of chromosome
 - (d) Enzymes
 - (e) Soil Conservation
 - (f) Acid rain

Nalanda Open University
Annual Examination - 2013
B.Sc. Botany (Honours), Part-III
Paper-V

Time: 3.00 Hrs.

Full Marks: 80

Answer any Five Questions. Question No. 1 is compulsory.

All questions carry equal marks.

1. Multiple choice questions.
 - (i) The Cytoplasm of a cell shrinks in a solution. The phenomenon is called as
(a) Osmosis (b) Plasmolysis (c) Both of these (d) None of these
 - (ii) Transpiration would be most rapid when
(a) Atmosphere is fully humid (b) Air is still
(c) Weather is very dry (d) Weather is dry
 - (iii) Ion uptake is called active because
(a) Ions are active (b) Ions move freely (c) Energy is expended (d) Ions move positively
 - (iv) The process of transpiration helps in
(a) Absorption of CO₂ from atmosphere (b) Opening of stomata
(c) Absorption of O₂ from atmosphere (d) Upward conduction of water
 - (v) Opening of stomata is due to
(a) Size of guard cells (b) Turgidity of guard cells
(c) Amount of CO₂ in atmosphere (d) None of the above
 - (vi) In C₄ pathway of carbon fixation, first stable product is
(a) Phosphoglyceric acid (b) Phosphoenol pyruvic acid (c) Pyruvic acid (d) None of these
 - (vii) In Calvin cycle the enzyme which brings about fixation of CO₂ is
(a) Catalase (b) Dehydrogenase (c) Carboxy dismutase (d) Transketolase
 - (viii) Photosynthesis takes place chiefly in
(a) Red light (b) Blue light (c) Indigo light (d) Green light
 - (ix) How many ATP will be produced during the production of one mol. of Acetyl CoA from one mol. of pyruvic acid
(a) 6 (b) 3 (c) 8 (d) 38
 - (x) Pyruvic acid before combining with oxalo acetic acid of Krebs cycle, changes to
(a) Acetyl CoA (b) Lactic acid (c) Aceto acetic acid (d) Cis-aconitic acid
 - (xi) Gibberellin for the first time was obtained from
(a) Fungus (b) Alga (c) Bacteria (d) Lichen
 - (xii) Elongation of genetically dwarf plant is brought about by the application of
(a) Vitamin (b) Gibberellin (c) Cytokinin (d) α -ray
 - (xiii) Effect of day light on flowering of a plant is known as
(a) Photoperiodism (b) Phototropism (c) Chemotropism (d) Photorespiration
 - (xiv) The radicle of the germinated seed grows due to
(a) Apical meristem (b) Intercalary meristem (c) Lateral Meristem (d) All of the above
 - (xv) Which of the following plant cannot fix atmospheric nitrogen?
(a) Castor (b) Lablab bean (c) Pea (d) Lentil
 - (xvi) Fat can be synthesized from carbohydrates via
(a) Acetyl CoA (b) Malic acid (c) Citric (d) Oxalosuccinic acid
2. Describe the mechanism of opening and closing of stomata.
3. Give an account of Hatch and Slack pathway of CO₂ fixation.
4. Describe TCA cycle.
5. What are auxins? What role do these play in the physiology of plants?
6. Describe the role of pigment in flower initiation.
7. Discuss the mechanism of geotropism.
8. What role do the trace elements play in the physiology of plants?
9. Write notes of any two of the following
 - (a) Osmosis (b) Non-cyclic photophosphorylation
 - (c) Electron Transport System (d) Condensation of fatty acid and glycerol
10. What do you mean by Vernalization? Describe its mechanism and significance.

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Nalanda Open University
Annual Examination - 2013
B.Sc. Botany (Honours), Part-III
Paper-VI

Time: 3.00 Hrs.

Full Marks: 80

Answer any Five Questions. Question No. 1 is compulsory.

All questions carry equal marks.

1. Multiple choice questions.
 - (i) In which category the phytoplankton will be placed?
(a) Producer (b) Decomposer (c) Consumer (d) None of these
 - (ii) The study of ecology in relation to gene is known as
(a) Synecology (b) Autecology (c) Genecology (d) None of these
 - (iii) The pyramid of number is inverted when the producer is
(a) Tree (b) Grass (c) Both of these (d) None of these
 - (iv) Which of the following is used experimentally for space ecology?
(a) *Chlorella* (b) *Spirogyra* (c) *Oedogonium* (d) *Chlamydomonas*
 - (v) Lithophytes are plants growing on
(a) Sand (b) Rock (c) Acidic soil (d) Saline soil
 - (vi) Which of the following is a halophyte?
(a) Hydrilla (b) Lichen (c) Wolffia (d) Rhizophora
 - (vii) Net primary productivity is equal to
(a) Gross primary productivity minus organic matter lost in respiration
(b) Total product of photosynthesis (c) Both of these (d) None of these
 - (viii) Snake can be placed as
(a) Secondary consumer (b) Tertiary consumer
(c) Top consumer (d) All of these
 - (ix) Nitrifying bacteria produce
(a) $\text{NH}_3 \rightarrow \text{NO}_3$ (b) Protein $\rightarrow \text{NH}_3$ (c) $\text{NO}_3 \rightarrow \text{N}_2$ (d) None of these
 - (x) The largest reservoir of S and P in the biosphere is
(a) River (b) Rock (c) Aerial atmosphere (d) organism
 - (xi) Cycling of mineral element in an ecosystem is called
(a) Biogeochemical cycle (b) Chemical cycle
(c) Geological cycle (d) Biological cycle
 - (xii) Acid rain is formed due to union of water with
(a) N_2 (b) Dust (c) SO_2 (d) None of these
 - (xiii) Arsenic in underground water comes from
(a) Radioactive waste (b) Pesticides (c) Rock (d) Fume of automobiles
 - (xiv) Sunken stomata are found in
(a) China rose (b) Hydrilla (c) Orchid (d) Casuarina
 - (xv) Pioneer of plant succession on rock is
(a) Moss (b) Lichen (c) Ferns (d) Bryophyta
 - (xvi) Well developed mechanical tissue is seen in
(a) Epiphytes (b) Sciophytes (c) Xerophytes (d) Hydrophytes
2. What is ecosystem? What are the various components of ecosystem?
3. What is population? Give a brief account of characteristics of population of an organism.
4. Define plant succession. Describe stages of hydrosere.
5. Discuss the ecological pyramids.
6. Give an account of ecological adaptations in hydrophytes.
7. Describe the sources of water pollution and suggest the measures to check it.
8. Describe the methods of soil conservation.
9. Give an account of the conservation of biological diversity.
10. Write notes on any four of the following:
 - (a) Primary productivity (b) Grassland ecosystem (c) Plant community
 - (d) Xerophytic leaves (e) Vivipary (f) Non-conventional source of energy.

Nalanda Open University
Annual Examination - 2013
B.Sc. Botany (Honours), Part-III
Paper-VII

Time: 3.00 Hrs.

Full Marks: 80

Answer any Five Questions. Question No. 1 is compulsory.

All questions carry equal marks.

1. Multiple choice questions.
 - (i) The activities of living cells are controlled by
(a) Auxins (b) Mitochondria (c) Nucleus (d) Chloroplast
 - (ii) The network of endoplasmic reticulum is present in the
(a) Chromosome (b) Nucleus (c) Ribosome (d) Nucleolus
 - (iii) The nucleolus was discovered by
(a) Crick (b) Nirenberg (c) Altman (d) Fontana
 - (iv) Nuclear membrane disappears during
(a) Early prophase (b) Late prophase (c) Anaphase (d) Telophase
 - (v) A nucleosome consists of
(a) DNA only (b) Histone with DNA wrapped around
(c) RNA and Histone (d) Histone and linker DNA
 - (vi) DNA duplication occurs during
(a) G₁ period (b) G₂ period (c) S period (d) Prophase
 - (vii) Structural unit of chromosome is
(a) Centriole (b) Nucleosome (c) Centromere (d) None of these
 - (viii) Crossing over takes place in
(a) Pachytene (b) Zygotene (c) Diplotene (d) Diakinesis
 - (ix) Budding in yeast is an example of
(a) Amitosis (b) Endomitosis (c) Brachymeiosis (d) Normal mitosis
 - (x) Double helix DNA model was discovered by
(a) Fisher and Heldane (b) Hugo de Vries (c) Lamark and Darwin (d) Watson and Crick
 - (xi) Two strands of DNA are attached by H-bond between
(a) A-G, G-C (b) A-C, G-T (c) A-G, T-C (d) A-U, G-C
 - (xii) Essential gene material is
(a) Fat and Protein (b) Protein (c) RNA (d) DNA
 - (xiii) Somatic cell division includes
(a) Karyokinesis only (b) Cytokinesis only
(c) Cytokinesis followed by Karyokinesis (d) karyokinesis followed by cytokinesis
 - (xiv) The number of mitotic division required to produce 128 cells from a single cell
(a) 7 (b) 14 (c) 16 (d) 32
 - (xv) Evidence for cytoplasmic inheritance was first reported in *Mirabilis jalapa* by
(a) Mendel (b) Caspari (c) Bateson (d) Correns
 - (xvi) Extranuclear genes occur in
(a) ER and cytoplasm (b) Cytoplasm and Ribosome
(c) Cytoplasm only (d) Mitochondria and cytoplasm
2. Describe the structure of DNA and compare it with that of RNA.
3. Give the detailed structure of chromosome and its function.
4. Discuss the chromosome theory of inheritance. Explain Mendel's laws using chromosome as the carrier of Mendelian factors.
5. Describe the cell cycle in details.
6. What is cytoplasmic inheritance? Give example and its characteristics.
7. What is linkage? Give experimental proof of the linked genes.
8. What is plant breeding? Discuss the aims and objectives of plant breeding.
9. Give an account on breeding work done on wheat in India.
10. Write notes on any **two** of the following:
(a) Emasculation (b) Pure line selection (c) β - chromosome (d) Significance of meiosis

Nalanda Open University
Annual Examination - 2013
B.Sc. Botany (Honours), Part-III
Paper-VIII

Time: 3.00 Hrs.

Full Marks: 80

Answer any *Five* Questions. Question No. 1 is compulsory.

All questions carry equal marks.

1. Multiple choice questions.
 - (i) A ratio of 9:3:3:1 is modified in complimentary genes to
(a) 15:1 (b) 13:3 (c) 9:7 (d) 12:3:1
 - (ii) Duplicate factors show the ratio
(a) 9:7 (b) 15:1 (c) 12:3:1 (d) 9:6:1
 - (iii) Variation in individual chromosome number of an organism is
(a) Aneuploidy (b) Euploidy (c) Polyploidy (d) Aberration
 - (iv) The phenomenon of hiding the effect of one pair of genes by another pair is
(a) Heterosis (b) Mutation (c) Dominance (d) Epistasis
 - (v) Red–white seed colour in F_2 shows the ratio of 1:4:6:4:1. It is caused by
(a) Two polygenes (b) Supplementary genes
(c) Complementary genes (d) Duplicate genes
 - (vi) A trisomic individual has chromosome number of
(a) $2n - 1$ (b) $2n + 2$ (c) $2n + 1$ (d) $2n + 3$
 - (vii) Polyploidy is artificially induced by
(a) Auxin (b) Kinin (c) Colchicine (d) Gibberellin
 - (viii) Dawn's syndrome in human being is due to
(a) Nullisomy (b) Trisomy (c) Monosomy (d) Triploidy
 - (ix) Turner's syndrome is due to
(a) Monosomy (b) Tetrasomy (c) Nullisomy (d) Trisomy
 - (x) If haploid number of chromosome in a cell is 12, the monosomic number will be
(a) 24 (b) 25 (c) 23 (d) 21
 - (xi) Which does determine the sequence of amino acids in protein?
(a) t RNA (b) Genetic code (c) r RNA (d) Gene
 - (xii) Plasmids that can integrate into the bacterial DNA are called
(a) Virion (b) Hyposome (c) Episome (d) Nucleoids
 - (xiii) Restriction enzymes are found in
(a) Liver cell (b) Virus (c) Bacteria (d) Amoeba
 - (xiv) Bacteriophage is a
(a) Protozoa (b) Bacterium (c) Fungus (d) Virus
 - (xv) 'Nif' gene altogether constitute a set of
(a) 15 genes (b) 20 genes (c) 30 genes (d) 50 genes
 - (xvi) Which of the following techniques is used by forensic laboratory in crime detection?
(a) DNA sequencing (b) DNA nicking (c) Gene therapy (d) DNA finger printing
2. What is epistasis? Explain it with suitable example.
3. What is mutation? Discuss point mutation.
4. What do you mean by polyploidy? Discuss its role in evolution.
5. Describe different types and causes of chromosomal diseases in man.
6. Give an account of the chief methods of genetic counselling.
7. Give an account of gene replacement therapy.
8. Discuss the methods of germplasm conservation.
9. Write an essay on human genetics.
10. Write notes on any *two* of the following:
 - (a) Mutation breeding (b) Raphanobrassica (c) Duplicate gene (d) DNA bank.

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