

**Nalanda Open University**  
**Annual Examination - 2016**  
**B.Sc. Botany (Honours), Part-I**  
**Paper-I**

**Time: 3.00 Hrs.**

**Full Marks: 80**

*Answer any Five questions. All questions carry equal marks.*

1. Describe the structure and reproduction of *Chlamydomonas*.
2. Give an account of the structure of *Oedogonium* thallus and also mention the mode of reproduction.
3. Describe the structure and mode of reproduction of *Albugo*.
4. Describe the structure of reproductive organs of *Marchantia*.
5. Compare the following:
  - (a) Vertical section of the thallus of *Marchantia* and *Anthoceros*.
  - (b) Sporogonium of *Sphagnum* and *Anthoceros*.
6. Describe the types of stele in Pteridophyta.
7. Describe the salient features of *Psilotum*. Also describe the structure of synangium with the help of a suitable diagram.
8. Write about two of the following:
  - (a) Zoospores in fungi you have studied.
  - (b) Fruiting bodies in *Erysiphe* and *Peziza*.
  - (c) Types of Lichen
9. Describe the structure of sporocarp of *Marsilea*.
10. Write notes on any **Four** of the following :

(a) Reproduction in <i>Nostoc</i>	(b) Nucule
(c) Sporangia in <i>Ectocarpus</i>	(d) Conceptacle
(e) Teliospore of <i>Puccinia</i>	(f) L.S. Cone of <i>Selaginella</i>



**Nalanda Open University**  
**Annual Examination - 2016**  
**B.Sc. Botany (Honours), Part-I**  
**Paper-II**

**Time: 3.00 Hrs.**

**Full Marks: 80**

*Answer any Five questions. All questions carry equal marks.*

1. Describe the economic importance of Gymnosperm.
2. What is a gametophyte? Describe the development of male gametophyte of *Pinus*.
3. Give details of the development of the female gametophyte of *Taxus*.
4. Describe the angiospermic characters of *Gnetum*.
5. "*Rhynia* is the most primitive vascular plant". Discuss.
6. Give an account of the structure of strobilus of *Lepidodendron*.
7. Write short notes on *any Four* of the following :
  - (a) Xerophytic characters of *Pinus* needle
  - (b) Petrification
  - (c) Fossil flora of Rajmahal hills
  - (d) *Calamites*
  - (e) Strobilus of *cycadeoidea*
  - (f) Palezoic Period
8. Describe the floral characters of the family Lamiaceae giving floral formula and floral diagram.
9. Give an account of the floral characters of cucurbitaceae giving floral formula and floral diagram. Give the english name and botanical name of any two plants of this family.
10. Assign the following terms to their respective family.
  - (a) Apocarpous
  - (b) Cyathium inflorescence
  - (c) Free central placentation
  - (d) Inferior ovary
  - (e) Spikelet inflorescence
  - (f) Pollinium
  - (g) Sagittate anther
  - (h) Scorpioid cyme.

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**Nalanda Open University**  
**Annual Examination - 2016**  
**B.Sc. Botany (Subsidiary), Part-I**  
**Paper-I**

**Time: 3.00 Hrs.**

**Full Marks: 80**

*Answer any Five questions. All questions carry equal marks.*

1. Describe the economic importance of Bacteria.
2. Describe the life cycle of *Vaucheria*.
3. Describe the life cycle of *Puccinia graminis*.
4. Give an account of the reproduction in Lichens.
5. Describe the mode of reproduction in *Anthoceros*.
6. Give an account of reproduction in *Selaginella*.
7. Describe anatomical Structure of the stem of *Equisetum*.
8. Give an account of the development of male gametophyte of *Pinus*
9. Describe Hutchinson's ten major principles for the purpose of classification of Angiosperms.
10. Write the floral characters floral formula and floral diagram of the family *cucurbitaceae*.



# Nalanda Open University

Annual Examination - 2016

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

Paper-III

Time: 3.00 Hrs.

Full Marks: 80

*Answer Five questions, selecting atleast one question from each group A, B and C.*

*All questions carry equal marks.*

## **Group - A (Microbiology)**

1. Describe the structure and life cycle of bacteriophage.
2. Give the detailed account of the structure of a bacterial cell.
3. For what purpose the Fungi are used in industry?

## **Group - B (Plant Pathology)**

4. Describe role of pathogen secreted enzymes in pathogenesis.
5. What are prohibitins? Describe their role in defence against pathogen.
6. Give the symptom etiology and control of loose smut of wheat.
7. Write in brief about four of the following.
  - (a) Mycotoxin
  - (b) Contribution of Robert Koch
  - (c) Symptom of wart disease of potato
  - (d) Telentospore of Melampsora
  - (e) Transmission of TMV
  - (f) Incubation period

## **Group - C (Embryology)**

8. Give an account of megaspore formation in Angiosperm.
9. Describe the induced parthenocarpy.
10. Define endosperm and also describe its origin, type and functions.



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Annual Examination - 2016

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

Paper-IV

Time: 3.00 Hrs.

Full Marks: 80

*Answer Five questions, selecting atleast one question from each group A, B and C.*

*All questions carry equal marks.*

## Group - A (Anatomy)

1. What do you mean by mechanical tissue? Describe different types of mechanical tissue.
2. What are the anatomical characteristics of hydrophytes?
3. What is abnormal secondary growth? Describe the abnormal secondary growth in Boerhaavia.

## Group - B (Cell Biology)

4. Describe the detailed structure of chloroplast.
5. Give an account of the structure of DNA.
6. What do you mean by carbohydrates? Describe their function.
7. Define secondary metabolite and also mention their role in plants.
8. Describe the regulation of protein synthesis in prokaryotes.

## Group - C (Economic Botany)

9. Give an account of oil yielding plants of Bihar State.
10. Write the botanical name of.
  - (a) Two fibre yielding plants.
  - (b) Three medicinal plants.
  - (c) Three pulses yielding plants
  - (d) three vegetable, yielding plants
  - (e) Two fruit yielding plants
  - (f) Three spices yielding plants

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**Nalanda Open University**  
**Annual Examination - 2016**  
**B.Sc. Botany (Subsidiary), Part-II**  
**Paper-II**

**Time: 3.00 Hrs.**

**Full Marks: 80**

*Answer any Five questions. All questions carry equal marks.*

1. How does the anomalous secondary growth differ from normal secondary growth? Describe the anomalous secondary growth in *Boerhaavia*.
2. Give an account of pollen grain formation.
3. Describe prophase of Meiosis I.
4. Describe the structure of DNA.
5. Define crossing over and discuss various views to explain the mechanism of recombination.
6. Describe the C<sub>3</sub> pathway of CO<sub>2</sub> fixation.
7. What do you mean by Nitrogen fixation? Describe biological Nitrogen fixation.
8. What is environmental pollution? Describe the sources of air pollution and suggest the methods of its control.
9. Name some common oil yielding crops of Bihar state and write the methods of their cultivation in brief.
10. Write notes on any four of the following:
  - (a) Nucleolus.
  - (b) Cell cycle.
  - (c) Beverage.
  - (d) Stages of hydrosere.
  - (e) Role of decomposers in ecosystem.
  - (f)  $\beta$  - chromosome.

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**Nalanda Open University**  
**Annual Examination - 2016**  
**B.Sc. Botany (Honours), Part-III**  
**Paper-V (Physiology and Biochemistry)**

**Time: 3.00 Hrs.**

**Full Marks: 80**

*Answer any five questions. Questions No. 1 is compulsory.  
All questions carry equal marks.*

1. Multiple choice questions :
  - (i) Ions uptake is called active because :
    - (a) Ions are active
    - (b) Ions move freely
    - (c) Ions move positively
    - (d) Energy is spent
  - (ii) The Process of transpiration helps in :
    - (a) Absorption of CO<sub>2</sub> from atmosphere
    - (b) upward conduction of water
    - (c) Opening of stomata
    - (d) Absorption of O<sub>2</sub> from atmosphere
  - (iii) In C<sub>4</sub> pathway of CO<sub>2</sub> fixation the first stable product is :
    - (a) Pyruvic acid
    - (b) Phosphoenol pyruvic acid
    - (c) Phosphoglyceric acid
    - (d) None of these
  - (iv) Krebs cycle takes place in :
    - (a) ER
    - (b) Mitochondria
    - (c) Ribosome
    - (d) Chloroplast
  - (v) One of the following is not a product in Calvin cycle of photosynthesis:
    - (a) Ribose Phosphate
    - (b) Dihydroxy acetone phosphate
    - (c) Xylulose Phosphate
    - (d) Oxaloacetic acid
  - (vi) Pyruvic acid before combining with oxaloacetic acid of Krebs cycle change into:
    - (a) Cis-aconitic acid
    - (b) Acetoacetic acid
    - (c) Lactic acid
    - (d) Acetyl CoA
  - (vii) Fat can be synthesized from carbohydrate via :
    - (a) Oxalosuccinic acid
    - (b) Malic acid
    - (c) Citric acid
    - (d) Acetyl CoA
  - (viii) Free living N<sub>2</sub> fixing are found in :
    - (a) Soil
    - (b) Air
    - (c) Root nodule
    - (d) None of these
2. Give an account of fluid mosaic model of plasmamembrane.
3. Describe the process of absorption of water in land plants.
4. Describe C<sub>3</sub> cycle of Co<sub>2</sub> fixation in photosynthesis.
5. Give details of glycolysis.
6. What are growth hormones? Describe the role of gibberellins in the physiology of plants.
7. Describe the role of Nitrogen, Phosphorus, Potassium and Zinc in the Physiology of plants..
8. Give an account of Nitrogen cycle.
9. Define tropic movement. Describe the mechanism of phototropism.
10. Write notes on any *Two* of the following :
  - (a) Role of cytokinins in plant physiology
  - (b) Non-cyclic photophosphorylation
  - (c) Electron Transport system
  - (d) Osmosis



**Nalanda Open University**  
**Annual Examination - 2016**  
**B.Sc. Botany (Honours), Part-III**  
**Paper-VI (Environmental Biology)**

**Time: 3.00 Hrs.**

**Full Marks: 80**

*Answer any five questions. Questions No. 1 is compulsory. All questions carry equal marks.*

1. Multiple choice questions :
  - (i) In which category the phytoplanktons will be placed?  
(a) Producer (b) Consumer  
(c) Decomposer (d) None of these
  - (ii) Nitrifying bacteria produce :  
(a)  $\text{NO}_3^-$  to  $\text{N}_2$  (b)  $\text{NH}_3$  to  $\text{NO}_3^-$   
(c) Protein to  $\text{NH}_3$  (d) None of these
  - (iii) Cycling of mineral elements in an ecosystem is called :  
(a) Biological cycle (b) Chemical cycle  
(c) Geological cycle (d) Biogeochemical cycle
  - (iv) Acid rain is formed due to the union of water with :  
(a)  $\text{SO}_2$  (b) Dust (c)  $\text{N}_2$  (d) None of these
  - (v) Sunken stomata are found in :  
(a) *Casuarina* (b) *Hydrilla* (c) *China rose* (d) *Orchid*
  - (vi) Pioneer of plant succession on rock is :  
(a) Bryophyta (b) Pteridophyta (c) Moss (d) Lichen
  - (vii) Viviparous germination is found in :  
(a) Xerophytes (b) Hydrophytes  
(c) Halophytes (d) Mesophytes
  - (viii) *Rhizophora* occurs in :  
(a) Alpine zone (b) Jammu and Kashmir  
(c) Central India (d) Andaman and Nicobar
2. Give details of biogeochemical cycle. Describe the nitrogen cycle in nature.
3. Give an account of sources of air pollution and describe its control measure.
4. What do you mean by phytogeography? Describe the major phytogeographical regions of India in brief.
5. Describe the analytical character of community.
6. What do you mean by biological diversity?
7. Describe the morphological, anatomical and physiological characteristics of Xerophytes.
8. Explain succession and describe succession of plant on bare rock.
9. Describe different categories of natural resources.
10. Write notes on *any Two* of the following :
  - (a) Green house effect (b) Primary productivity
  - (c) Vivipary (d) Forest ecosystem





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**B.Sc. Botany (Honours), Part-III**  
**Paper-VII (Cytogenic and Molecular Biology)**

**Time: 3.00 Hrs.**

**Full Marks: 80**

*Answer any five questions. Questions No. 1 is compulsory. All questions carry equal marks.*

1. Multiple choice questions :
  - (i) Somatic cell division includes :
    - (a) Cytokinesis only
    - (b) Karyokinesis only
    - (c) Cytokinesis followed by Karyokinesis
    - (d) Karyokinesis followed by Cytokinesis
  - (ii) Double helix model of DNA was proposed by :
    - (a) Lamark and Darwin
    - (b) Hugo de Vries
    - (c) Fisher and Heldane
    - (d) Watson and Crick
  - (iii) DNA replication occurs during :
    - (a) S period
    - (b) G1 period
    - (c) G2 period
    - (d) Prophase
  - (iv) Extranuclear genes occur in :
    - (a) Mitochondria and cytoplasm
    - (b) ER and cytoplasmic
    - (c) Cytoplasm and Ribosome
    - (d) Cytoplasm only
  - (v) Crossing over takes place in :
    - (a) Pachytene
    - (b) Zygotene
    - (c) Diplotene
    - (d) Diakinesis
  - (vi) Two strands of DNA are attached by H-bond between
    - (a) A-T, G-C
    - (b) A-C, G-T
    - (c) A-G, T-C
    - (d) A-U, G-C
  - (vii) Chromosomes other than autosomes of a cell are :
    - (a) Sex Chromosome
    - (b) Giant Chromosome
    - (c) Episome
    - (d) Plasmids
  - (viii) The nucleus is separated from surrounding cytoplasm by a nuclear membrane which is:
    - (a) Double and non-porous
    - (b) Double and porous
    - (c) Single and porous
    - (d) Single and non-porous
2. What is mutation breeding? Describe the procedure of mutation breeding.
3. What is meiosis? Describe meiosis I in details.
4. Explain chromosomal aberrations. Also describe their different types.
5. Describe the extranuclear inheritance in prokaryotes.
6. Describe the detailed structure of nucleus of Eukaryotes.
7. Explain genetic code. Describe its nature and properties.
8. Give the meaning of plant introduction and acclimatization. Also describe their process.
9. Write notes on *any Two* of the following :
  - (a) Hybrid Vigour
  - (b) Cell cycle
  - (c) Crossing over
  - (d) Application of genetic engineering
10. Give an account of conservation of germ plasm.



# Nalanda Open University

Annual Examination - 2016

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

Paper-VIII (Genetics)

Time: 3.00 Hrs.

Full Marks: 80

Answer any five questions. Questions No. 1 is compulsory. All questions carry equal marks.

1. Multiple choice questions :
  - (i) A ratio of 9 : 3 : 3 : 1 is modified due to inhibitory factor to :  
(a) 15 : 1                      (b) 13 : 3                      (c) 9 : 6 : 1                      (d) 12 : 3 : 1
  - (ii) Additive factor or polymerism contains modified ratio as :  
(a) 1 : 4 : 6 : 4 : 1              (b) 12 : 3 : 1                      (c) 9 : 3 : 4                      (d) 9 : 6 : 1
  - (iii) A trisomic individual has a chromosome number of :  
(a)  $2n - 1$                       (b)  $2n + 2$                       (c)  $2n + 1$                       (d)  $2n + 3$
  - (iv) The genetic information is coded in the form of :  
(a) ATP                              (b) DNA                              (c) Histone                              (d) Protein
  - (v) 'Nif' gene altogether constitute a set of :  
(a) 15 genes                      (b) 20 genes                      (c) 30 genes                      (d) 50 genes
  - (vi) Which is an example of cytoplasmic inheritance?  
(a) Flower colour in Pea                      (b) Sterile pollen  
(c) Eye colour in Drosophila                      (d) Height in pea
  - (vii) Turner's syndrome is due to :  
(a) Monosomy                      (b) Tetrasomy                      (c) Nullisomy                      (d) Trisomy
  - (viii) Which one of the following techniques is used by forensic scientist in the detection of crime?  
(a) DNA finger printing                      (b) DNA nicking  
(c) DNA sequencing                      (d) Gene therapy
2. Write about the lethal factors? How do the lethal factors modify the monohybrid ratio?
3. Explain genetic code and describe the characteristics of genetic code.
4. Define mutation and discuss its role in crop improvement.
5. Give an account of PCR methodology for gene amplification.
6. Define the interaction of gene. Explain the polygenic inheritance in wheat.
7. Explain genetic counselling and describe its significance and role in human life.
8. Describe the different tools employed in genetic engineering.
9. Discuss the aims and findings of human genome project.
10. Write notes on *any Two* of the following :
  - (a) Turner's Syndrome
  - (b) Wobble hypothesis
  - (c) Exonuclease
  - (d) mRNA