

**Nalanda Open University**  
**Annual Examination - 2012**  
**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 structure and reproduction of Nostoc.
2. Give an account of life cycle of *Vaucheria*.
3. Describe the life cycle of *Erysiphe*.
4. Write short notes on any four of the following:
  - (a) Structure of the Colony of *Volvex*
  - (b) Palmella stage
  - (c) Vertical section of the apothecium of *Peziza*
  - (d) Germination of Telentospore of *Puccinia*.
  - (e) Obligate parasites
  - (f) Wort of potato
5. Compare the structure of the thalli of Marchantia and Anthoceros.
6. Give an account of reproduction in *Pellia*.
7. Describe the types of steles found in Pteridophyta.
8. Describe the sexual reproduction in *Psilotum*.
9. Give an account of the structure of the sporocarp of Marsilea.
10. Write notes on any two of the following:
  - (a) Structure of sporogonium of *Sphagnum*
  - (b) Leaf trace and leaf gap
  - (c) Heterospory
  - (d) L. S. Cone of Equisetum.

**Nalanda Open University**  
**Annual Examination - 2012**  
**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. How can you say that the Gymnosperms are economically important.
2. Write the development of the female gametophyte of *Taxus*.
3. What is male gametophyte? Describe the development of *Pinus*.
4. What you mean by female gametophyte? Give an account of the development of female gametophyte of *Gnetum*.
5. What is fossil? Describe the conditions under each the fossils are formed.
6. How will you say that *Phynia* is a primitive plant?
7. Describe the structure of strobilus of *Lepidodendron*.
8. Describe the modern trends of Taxonomy in the identification of Angiosperm.
9. Describe the floral characters of cucurbitaceae with floral formula and floral diagram. Give the botanical name of two plants of economic importance.
10. Describe the floral characters of Lamiaceae with floral formula and floral diagram. Give the botanical name of two plants of economic importance.

**OR**

Assign the following terms to their respective family.

- |                |                    |
|----------------|--------------------|
| (a) Apocarp    | (b) Diplostemonous |
| (c) Cyathium   | (d) Parietal       |
| (e) Didynamous | (f) Verticillaster |
| (g) Spikelet   | (h) Pollinium      |

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**Programme of B.Sc. Part-I Botany (Hons.) Practical  
Counselling Classes and Examination 2012**

**Practical Counselling Class**

<i>Date</i>	<i>Papers</i>	<i>Time</i>	<i>Venue</i>
20.04.12 to 21.04.2012	I & II	11:15 A.M. to 03:15 P.M.	4th Floor, Biology Lab Biscomaun Bhawan.

**Practical Examination**

<i>Date</i>	<i>11:15 A.M. to 02:15 P.M.</i>	<i>02:30 P.M. to 05:30 P.M.</i>	<i>Venue</i>
23.04.12	Paper-I	Paper- II	4th Floor, Biology Lab Biscomaun Bhawan.

**Nalanda Open University**  
**Annual Examination - 2012**  
**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 economic importance of bacteria.
2. Describe the vegetative structure of *Vaucheria* and its life cycle.
3. Give an account of the reproductive structure of *Chara* and its life cycle.
4. Mention the life cycle of *Puccinia Graminis*.
5. Describe the structure of the gametophyte and sporophyte of *Anthoceros*.
6. Give an account of the stele in Pteridophyte.
7. Write the development of male gametophyte of *Pinus*.
8. Describe the classification proposed by Bentham and Hooker. Also mention the merits and demerits of this classification.
9. What is ICBN? Mention its important rules.
10. Describe the characteristic feature of the family cucurbitaceae. Write the floral formula, floral diagram and botanical name of the two plants of economic importance.

**OR**

Write the meaning of the any four of the following terms and assign them to their respective family.

- |                    |               |
|--------------------|---------------|
| (a) Verticillaster | (b) Cyathium  |
| (c) Apocarpous     | (d) Gynobasic |
| (e) Zygomorphic    | (f) Spikelet  |

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**Nalanda Open University**  
**Annual Examination - 2012**  
**B.Sc. Botany (Honours), Part-II**  
**Paper-III**

**Time: 3.00 Hrs.**

**Full Marks: 80**

**Answer any *Five* Questions, selecting at least one question from each group A, B and C.**

**All questions are of equal value.**

**Group-A (Microbiology)**

1. Describe the structure and life cycle of bacteriophage.
2. Give an account of a bacterial cell.
3. Discuss the role of microbes in nitrogen fixation.

**Group-B**

4. Give an account of the role of enzymes in pathogenesis.
5. What are Prohibitins? Describe the role of prohibitins in defence against pathogens in host.
6. Write notes on any *two* of the following:
  - (a) Citrus canker
  - (b) Mycotoxins
  - (c) Wart disease of potato
  - (d) Etiology and symptom of rust of linseed
7. Describe the symptoms, etiology and control of measures of loose smut of wheat.

**Group-C**

8. Give an account of megasporogenesis in Angiosperm.
9. Describe the origin, function and morphological nature of endosperm.
10. Give an account of the development of embryo in dicot plants.

**Nalanda Open University**  
**Annual Examination - 2012**  
**B.Sc. Botany (Honours), Part-II**  
**Paper-IV**

**Time: 3.00 Hrs.**

**Full Marks: 80/75**

Answer any three questions. Selecting at least one question from each  
Group-A, B and C. All questions carry equal marks.

**Group-A**

1. Define ecological adaptation. Give an account of anatomical characteristics of Hydrophytes.
2. What is mechanical tissue? Describe the structure, distribution and function of mechanical tissue.
3. What is anomalous secondary growth? Describe the anomalous secondary growth in Boerhaavia.

**Group-B**

4. Describe the structure of chloroplast.
5. Discuss the structure of DNA.
6. Give an account of carbohydrates with their functions.
7. Discuss the role of Vitamins in nutrition.
8. Discuss the regulation of protein synthesis.

**Group-C**

9. Give an account of the plants that yield fatty oil in Bihar state.
10. Write short notes on any four of the following:
  - (a) Narcotics
  - (b) Gum
  - (c) Essential Oil
  - (d) Ginger
  - (e) Rubber
  - (f) Biogas resource

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**Nalanda Open University**  
**Annual Examination - 2012**  
**B.Sc. Botany (Subsidiary), Part-II**  
**Paper-II**

**Time: 3.00 Hrs.**

**Full Marks: 80/75**

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

1. What is meristem? Describe the apical meristem in root.
2. What is secondary growth? Describe the anomalous secondary growth in Boerhaavia.
3. Describe the development of male gametophyte in Angiosperm.
4. Give an account of meiosis.
5. Explain the structure of chromosome.
6. Describe the structure of DNA.
7. Describe the reaction of glycolysis.
8. Give an account of hydrosere.
9. What is water pollution? Describe the sources of water pollution and possible methods of its control.
10. Write short notes on any *four* of the following:
  - (a) Double fertilization
  - (b) Induced parthenocarpy
  - (c) Chiasma
  - (d) Symbiotic nitrogen fixation
  - (e) Acid rain
  - (f) Cereals
  - (g) Fibre

**Nalanda Open University**  
**Annual Examination - 2012**  
**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) During Osmosis which of the following side will loose water.  
(a) Hypotonic                      (b) Isotonic                      (c) Hypertonic                      (d) None
  - (ii) In rainy season wooden door swells by the process of  
(a) End-Osmosis                      (b) Ex-Osmosis                      (c) Inhibition                      (d) All the above
  - (iii) Ion uptake is called active because  
(a) Ions are active                      (b) Ions move freely  
(c) Energy is expended                      (d) Ions move positively
  - (iv) VAM is  
(a) Endomycorrhizae                      (b) Ectomycorrhizae                      (c) Ectendomycorrhizae                      (d) All of these
  - (v) The process of transpiration in plants 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
  - (vi) Stomatal closure is induced by  
(a) Kinetin                      (b) Abscissic acid                      (c) Gibberellic acid                      (d) Indole acetic acid
  - (vii) Opening of stomata is due to:  
(a) Turgidity of guard cell                      (b) Size of guard cell  
(c) Number of guard cells                      (d) Amount of CO<sub>2</sub> in atmosphere
  - (viii) In C<sub>4</sub> - path way of carbon fixation, the first stable product formed is:  
(a) Phosphoglyceric acid                      (b) Phosphoenol pyruvic acid  
(c) Pyruvic acid                      (d) Oxaloacetic acid
  - (ix) Light reaction of photosynthesis takes place in:  
(a) Grane of chloroplast                      (b) Stroma of chloroplast  
(c) Thylakoid membrane                      (d) All the above
  - (x) One of the following is not a product in Calvin cycle of photosynthesis.  
(a) Oxaloacetic acid                      (b) Dihydroxy acetone phosphate  
(c) Xylulose phosphate                      (d) Ribose phosphate
  - (xi) Oxygen and Carbon atom present in carbohydrate belong to:  
(a) H<sub>2</sub>O and CO<sub>2</sub> respectively                      (b) CO<sub>2</sub> only  
(c) H<sub>2</sub>O and organic substance only                      (d) CO<sub>2</sub> and methane respectively
  - (xii) Krebs cycle takes place in  
(a) Ribosome                      (b) Chloroplast  
(c) Mitochondria                      (d) Endoplasmic reticulum
  - (xiii) Pyruvic acid before combining with oxalo acetic acid of Krebs cycle changes into:  
(a) Lactic acid                      (b) Aceto acetic acid                      (c) Cis - aconitic acid                      (d) Acetyl CoA
  - (xiv) Gibberellic acid was first of all obtained from  
(a) Alga                      (b) Fungus                      (c) Bacteria                      (d) Lichen
  - (xv) Stimulation of cell division is mainly associated with  
(a) Auxin                      (b) Gibberellins                      (c) Cytokinins                      (d)Florigen
  - (xvi) Denitrifying bacteria are capable of converting  
(a) Atmospheric nitrogen to ammonia                      (b) Ammonia into nitrate  
(c) Nitrate to nitrate                      (d) Nitrate to nitrogen
2. Describe the fluid mosaic model of plasma membrane.
3. Explain the process of absorption of water in land plants.

4. Give an account of Calvin Cycle.
5. Write about glycolysis.
6. Describe the physiological response and mechanism of action of gibberellins.
7. Write an essay on photoperiodism.
8. How the growth can be measured? Discuss it in detail.
9. What are various nitrogen sources for plants? Describe biological nitrogen fixation.
10. Write the physiological role of nitrogen, phosphorus, potassium and zinc.

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**Nalanda Open University**  
**Annual Examination - 2012**  
**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) The study of an individual with reference to its environment is known as:  
(a) Synecology            (b) Genecology            (c) Autecology            (d) Phytogeography
  - (ii) Shade loving plants are known as:  
(a) Halophytes            (b) Sciophytes            (c) Heliophytes            (d) Oxalopytes
  - (iii) The root system in Xerophytes is  
(a) Absent            (b) Reduced            (c) Well developed            (d) All the above
  - (iv) The ultimate source of energy in an ecosystem is  
(a) Electrical energy   (b) Solar energy            (c) Heat energy            (d) Chemical energy
  - (v) Soil pollution may be caused by the use of  
(a) Fungicides            (b) Herbicides            (c) Insecticides            (d) All the above
  - (vi) Plant succession in water reservoir is known as  
(a) Hyrdosere            (b) Xerosere            (c) Lithosere            (d) Psammosere
  - (vii) Eichhornia is a hydrophyte because  
(a) The root has pocket            (b) The leaf is green  
(c) Flowers are attractive            (d) All the above
  - (viii) *Rhizophora* occurs in  
(a) Alpine Zone            (b) Central India  
(c) Jammu-Kashmir            (d) Andaman and Nicobar
  - (ix) Betla National Park is located in  
(a) Bihar            (b) Orissa            (c) Jharkhand            (d) Andra Pradesh
  - (x) Acid rain is formed due to union of water with  
(a) Nitrogen            (b) Dust            (c) Sulphur dioxide            (d) All the above
  - (xi) Sunken Stomata is found in  
(a) Orchids            (b) Hydrilla            (c) Mango            (d) Casuarina
  - (xii) The process of soil formation is known as  
(a) Pedogenesis            (b) Morphogenesis            (c) Biogenesis            (d) Plant succession
  - (xiii) Viviparous germination is found in  
(a) Xerophytes            (b) Hydrophytes            (c) Mesophytes            (d) Halophytes
  - (xiv) Soil erosion can be checked by  
(a) Afforestation            (b) Contour forming            (c) Mulching            (d) All the above
  - (xv) Periyar wildlife sanctuary is located in  
(a) Karnatak            (b) Kerala            (c) Andra pradesh            (d) Tamil Nadu
  - (xvi) *Populus deltooides* is the indicator of  
(a) Deep water table            (b) Mineral  
(c) Agriculture            (d) All the above

2. What is biogeochemical cycle? Describe nitrogen cycle in nature. What is the main source of nitrogen in Crop regions?
3. Describe in brief the analytical characters of community.
4. The air is said to be polluted. What are the sources and how these can be checked?
5. Describe the botanical regions of Indian in brief.
6. What is conservations? Describe the different modes of conservation.
7. Explain the ecological adaptations in Xerophytes.
8. Describe different types of biomass.
9. Write about any two of the following:  
(a) Depletion of Ozone layer  
(b) Green house effect  
(c) M A B programme  
(d) Plant indicator
10. What is social forestry? Give an account of social forestry. How it is beneficial to the society?

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**Nalanda Open University**  
**Annual Examination - 2012**  
**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 nucleus is separated from surrounding cytoplasm by a nuclear membrane which is
    - (a) Single and non-porous
    - (b) Double and non-porous
    - (c) Single and porous
    - (d) Double and porous
  - (ii) Chromosomes other than autosomes of a cell are
    - (a) Episomes
    - (b) Sex chromosomes
    - (c) Plasmids
    - (d) Giant chromosomes
  - (iii) The number of chromosomes in the root tip of garden pea is
    - (a) 7
    - (b) 7 pairs
    - (c) 10
    - (d) 12 pairs
  - (iv) The structural unit of chromosome is
    - (a) chromomere
    - (b) centromere
    - (c) centriole
    - (d) Nucleosome
  - (v) The number of chromosomes can increase or decrease due to
    - (a) Mutation
    - (b) Genetic replication
    - (c) Nondisjunction
    - (d) All the above
  - (vi) The activity of living cell is controlled by
    - (a) Nucleus
    - (b) Chloroplast
    - (c) Mitochondria
    - (d) Auxins
  - (vii) Nuclear membrane disappears during mitosis at
    - (a) Early prophase
    - (b) Anaphase
    - (c) Late prophase
    - (d) Telophase
  - (viii) The word chromosome was first given by
    - (a) Robert Hook
    - (b) Waldeyer
    - (c) Hofmeister
    - (d) Strasburger
  - (ix) Which is an example of cytoplasmic inheritance?
    - (a) Eye colour in *Drosophila*
    - (b) Flower colour in pea
    - (c) Height in pea
    - (d) Sterile pollen
  - (x) Essential gene material is
    - (a) DNA
    - (b) RNA
    - (c) Fat and protein
    - (d) Protein
  - (xi) Somatic cell division includes.
    - (a) Karyokinesis only
    - (b) Cytokinesis only
    - (c) Cytokinesis followed by Karyokinesis
    - (d) Karyokinesis followed by cytokinesis
  - (xii) Crossing over takes places in
    - (a) Zygotene
    - (b) Pachytene
    - (c) Diplotene
    - (d) Diakinesis
  - (xiii) DNA replication occurs during
    - (a) S period
    - (b) G<sub>1</sub> period
    - (c) G<sub>2</sub> period
    - (d) Prophase
  - (xiv) Double helix model of DNA was proposed by
    - (a) Fisher and Heldane
    - (b) Watson and Crick
    - (c) Hugo de Vries
    - (d) Lamark and Darwin
  - (xv) Two strands of DNA are attached by H-bond between
    - (a) A-G, G-C
    - (b) A-G, G-T
    - (c) A-G, T-C
    - (d) A-U, G-C
  - (xvi) In meiosis, the chromatids separate during
    - (a) Anaphase I
    - (b) Anaphase II
    - (c) Metaphase I
    - (d) Metaphase II
2. Define mutation. What are the factors that cause mutation? Also write the role of mutation in crop improvement.
3. What is genetic code? Describe its nature and properties.
4. Describe meiosis I in details.

5. Give an account of the conservation of germ plasm.
6. Describe the structure of nucleus.
7. Give an account of chromosomal aberration.
8. Describe the DNA replication.
9. What do you know about extranuclear inheritance in prokaryotes.
10. Write about two of the following:
  - (a) Cell cycle
  - (b) Application of genetic engineering
  - (c) Hybrid vigour
  - (d) Crossing over



### **MOST IMPORTANT NOTICE**

**: अत्यन्त महत्वपूर्ण सूचना :**

बी०एस०सी०(प्रतिष्ठा)पार्ट-III एवं मनोविज्ञान(प्रतिष्ठा)पार्ट- III के सभी विद्यार्थियों को सूचित करना है कि उनके सामान्य एवं पर्यावरणीय अध्ययन (**G.S**) की परीक्षा 2012 जो पूर्व से दिनांक-23.02.2012 को द्वितीय पाली समय 12 से 3 बजे, अपराह्न में निर्धारित थी, अब यह परीक्षा दिनांक **24.02.2012** को द्वितीय पाली समय 12 से 3 बजे, अपराह्न में संचालित होगी। तदनुरूप परीक्षा में उपस्थित हों।

**Nalanda Open University**  
**Annual Examination - 2012**  
**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) The epistatic factor shows motivated ratio as  
(a) 15 : 1                      (b) 12 : 3 : 1                      (c) 9 : 6 : 1                      (d) 9 : 3 : 4
  - (ii) 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
  - (iii) The variation in individual chromosome number of an organism is  
(a) Poly ploidy                      (b) Euploidy                      (c) Aneuploidy                      (d) Aberration
  - (iv) A trisomic condition is due to  
(a) Crossing over                      (b) Linkage                      (c) Non-disjunction                      (d) Segregation
  - (v) Colchicine is isolated from  
(a) Conium                      (b) Cochlearia                      (c) Colchium                      (d) Coleanthus
  - (vi) Genetic code is  
(a) universal                      (b) degenerate                      (c) non-overlapping                      (d) All the above
  - (vii) The genetic information is coded in the form of  
(a) DNA                      (b) ATP                      (c) Protein                      (d) Histone
  - (viii) Restriction enzymes are found in  
(a) Liver cell                      (b) Amoeba                      (c) Bacteria                      (d) Virus
  - (ix) Chemical Knives of DNA are  
(a) Poly merase                      (b) Endonuclease                      (c) Ligases                      (d) Transcriptase
  - (x) Plasmid vectors are  
(a) PBR 322                      (b) PUC Vector  
(c) F-factor based vector                      (d) All the above
  - (xi) 'Nif' gene altogether constitute a set of  
(a) 15 genes                      (b) 20 genes                      (c) 30 genes                      (d) 50 genes
  - (xii) Which one is an example of cytoplasmic inheritance?  
(a) Eye colour in Drosophila                      (b) Flower colour in pea  
(c) Height in pea                      (d) Sterile pollen
  - (xiii) Which one of the following techniques is used by forensic scientists in crime detection?  
(a) DNA Sequencing                      (b) DNA nicking                      (c) DNA finger printing                      (d) Gene therapy
  - (xiv) Genetic engineering aims at  
(a) Destroying wild gene                      (b) Preserving wild gene  
(c) Curing human diseases by introducing new genes                      (d) None of these
  - (xv) Turner's syndrome is due to  
(a) Monosomy                      (b) Tetrasomy                      (c) Nullisomy                      (d) Trisomy
  - (xvi) If haploid number of chromosomes in a cell is 12, the monosomic number will be  
(a) 24                      (b) 25                      (c) 23                      (d) 21
2. What are lethal factors? How do they modify the monohybrid ratio?
3. What do you mean by mutation? Discuss its role in crop improvement.
4. What is genetic code? Describe the characteristics of genetic code.
5. Define genetic counselling. Describe its significance and role in human life.
6. Describe the different tools employed in genetic engineering.

7. Describe PCR methodology for gene amplification purpose.
8. Discuss aim and findings of human genome project.
9. Define interaction of gene. Explain the polygenic inheritance in wheat.
10. Write about **two** of the following:
  - (a) Turner's syndrome
  - (b) m RNA
  - (c) Exonuclease
  - (d) Wobble hypothesis.

**Programme of B.Sc Part-III Botany (Hons.) Practical Counselling  
Class and Examination 2012**

**Practical Counselling Class**

<i>Date</i>	<i>Papers</i>	<i>Time</i>
<b>24.02.12 to 27.02.12</b>	<b>V to VIII</b>	<b>01:15 P.M. – 05:15 P.M.</b>

**Practical Examination**

<i>Date</i>	<i>11:15 A.M. – 02:15 P.M.</i>	<i>02:30 – 05:30 P.M.</i>
<b>01.03.12</b>	<b>Paper-V</b>	<b>Paper- VI</b>
<b>03.03.12</b>	<b>Paper-VII</b>	<b>Paper- VIII</b>

**Venue – Biscomaun Bhawan, 4<sup>th</sup> Floor, N.O.U. Patna**