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M.Sc. – I (Semester – I) Examination, 2015
BOTANY (New CBCS) (Paper – I)
Biology and Diversity of Fungi, Bacteria, Viruses and Lichens

Day and Date : Monday, 16-11-2015

Max. Marks : 70

Time : 10.30 a.m. to 1.00 p.m.

- Instructions:**
- i) Attempt totally **five** questions.
 - ii) Question no. **1** is **compulsory**.
 - iii) Attempt **any two** questions from question no. **2** to **4**.
 - iv) Attempt **any two** questions from question no. **5** to **7**.
 - v) Figure to the **right** indicate **full** marks.

1. Select the correct answer :

14

- 1) Cladonia is the example of _____ lichens.
 - a) fruticose
 - b) foliose
 - c) crustose
 - d) all of these
- 2) The scientific Luria in _____ states that viruses are submicroscopic in nature.
 - a) 1954
 - b) 1953
 - c) 1952
 - d) 1951
- 3) In Eubacteria, generally reproduction takes place by _____ method.
 - a) Fragmentation
 - b) Budding
 - c) Fission
 - d) All of these
- 4) The order Sphaeropsidales belongs to the subdivision
 - a) Basidiomycotina
 - b) Ascomycotina
 - c) Zygomycotina
 - d) Deuteromycotina
- 5) The order Melanconiales includes about _____ genera.
 - a) 120
 - b) 121
 - c) 122
 - d) 123

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- 6) _____ in 1919 introduced the term Coelomycetes to accommodate in a single category.
 - a) Mrove
 - b) Grove
 - c) Drove
 - d) Trove
- 7) The order Tuberculariales belongs to the subdivision
 - a) Deuteromycotina
 - b) Zygomycotina
 - c) Ascomycotina
 - d) Basidiomycotina
- 8) The order Hyphomycetales is also known as order
 - a) Triniliales
 - b) Biniliales
 - c) Moniliales
 - d) Miniliales
- 9) The class hyphomycetes contains near about _____ genera.
 - a) 1060
 - b) 1050
 - c) 1040
 - d) 1030
- 10) The order Nidullariales also known as the _____ fungi.
 - a) bird's nest
 - b) human nest
 - c) animal nest
 - d) plant nest
- 11) The order Agaricales commonly called as gill fungi contains _____ genera.
 - a) 270
 - b) 271
 - c) 272
 - d) 273
- 12) The order Ustilaginales belongs to the subdivision
 - a) Ascomycotina
 - b) Basidiomycotina
 - c) Zygomycotina
 - d) Deuteromycotina
- 13) The order Uredinales are popularly known as _____ fungi.
 - a) rust
 - b) smut
 - c) gill
 - d) bird
- 14) In subdivision Basidiomycotina bears class
 - a) Discomycetes
 - b) Coelomycetes
 - c) Tiliomycetes
 - d) Zygomycetes



2. Answer the following questions **any two** from question number 2 to 4 :
 - a) What is Fungi ? Explain the fructification and spore forming structure of fungi. 7
 - b) Explain the class Loculoascomycetes studied by you. 7
 3. a) Define parasexuality and explain the economic importance of fungi. 7
b) Describe the class Discomycetes and order Pezizales. 7
 4. a) What is virus ? Describe the ultrastructure of virus. 7
b) Write a note on order Xylariales and Meliales. 7
 5. a) Give the general character of Archabacteria. 5
b) Explain the order Eurotiales. 5
c) Write a note on class Pyrenomycetes. 4
 6. a) Explain the sexual reproduction of fungi. 5
b) Describe the class Plectomycetes studied by you 5
c) Write economic importance of lichens. 4
 7. Write short notes on **any three** : 14
 - a) Taphrinales
 - b) Mucorales
 - c) Stemonitales
 - d) Nutrition of fungi.
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M.Sc. (Part – I) (Semester – I) Examination, 2015
BOTANY (Paper – II)
Biology and Diversity of Algae, Bryophytes and Pteridophytes
(New CBCS Pattern)

Day and Date : Wednesday, 18-11-2015
Time : 10.30 a.m. to 1.00 p.m.

Max. Marks : 70

- Instructions:**
- i) **All Sections are compulsory.**
 - ii) Attempt **any two** questions from Section – II and **any two** from Section – III.
 - iii) Answer to **all the three** sections should be written in the **same** answer book.
 - iv) Draw neat and labeled diagrams **wherever** necessary.
 - v) Figures to the **right** indicate **full** marks.

SECTION – I

1. Select the correct answer from the given alternatives and rewrite the sentences. **14**
- 1) *Mesipteris* belongs to the class _____
 - a) Lycopside
 - b) Pteropsida
 - c) Sphenopsida
 - d) Psilopsida
 - 2) _____ occurs as free floating fern in India.
 - a) *Azolla pinnata*
 - b) *Selaginella sp.*
 - c) *Angiopteris sp.*
 - d) *Ophioglossum sp.*
 - 3) According to the age of sporangia in sori, Bower (1935) has classified the sori into _____
 - a) gradate
 - b) mixed
 - c) simple
 - d) all the above
 - 4) _____ is a heterosporous fern.
 - a) *Azolla sp.*
 - b) *Ophioglossum sp.*
 - c) *Equisetum sp.*
 - d) *Psilotum sp.*



- 5) The cell organelles are absent from the cells of _____
a) *Nostoc* b) *Volvox* c) *Euglena* d) *Chara*
- 6) Among the bryophytes, the members of order _____ are primitive as per upgrade evolution.
a) Marchantiales b) Anthocerotales
c) Funariales d) Jungermanniales
- 7) Most members of the class Chlorophyceae generally show _____ types of sexual reproduction.
a) isogamous b) anisogamous
c) oogamous d) all the above
- 8) The sporophyte of the members of _____ are without columella.
a) Marchantiales b) Polytrichales
c) Anthocerotales d) Sphagnales
- 9) Chlorophyll _____ is present in the members of all classes of algae.
a) a b) b c) c d) d
- 10) The process by which the female gamete develops in to zygote without fusion with male gamete is called _____
a) aplanogamy b) hologamy
c) parthenogenesis d) none of these
- 11) Photosynthetic prokaryotes are the members of the class _____
a) Chlorophyceae b) Euglenophyceae
c) Cyanophyceae d) Rhodophyceae
- 12) *Amylum* stars are concerned with _____ reproduction.
a) asexual b) sexual c) vegetative d) none of these
- 13) Cronquist, Takhtajan and Zimmermann (1966) divided pteridophytes in to _____ divisions.
a) seven b) five c) nine d) eleven
- 14) Fertile spike is formed by _____
a) *Mesipteris* b) *Ophioglossum*
c) *Pteris* d) all the above



SECTION – II

- 2. A) Give the salient features of the class Rhodophyceae and state the inter-relationship between Chlorophyceae and Rhodophyceae. 7
- B) Add a note on the pigments in algal cell with role. 7
- 3. A) Explain the diversity in reproduction and the interrelationship between the order Anthocerotales and Sphagnales. 7
- B) Explain the telome concept in Pteridophyte with respect to the evolution of sporophyte. 7
- 4. A) Give an account of habitats of algae you studied. 7
- B) State the salient features of Marchantiales and add a note on phylogeny of polytrichales. 7

SECTION – III

- 5. A) Give the comparative account of reproduction in *Psilotum* and *Lycopodium*. 5
 - B) Give an account of reproduction in Jungermaniales. 5
 - C) Describe the sexual reproduction in algae. 4
 - 6. A) Add a note on the current trends of research in pteridophytes. 5
 - B) Describe account of sexual reproduction in *Glichenia*. 5
 - C) Give the salient features of the class Xanthophyceae. 4
 - 7. A) Give an account of multicellular thalli of algae. 5
 - B) Describe the modern trends of classification of bryophytes. 5
 - C) Describe the morphology of sporophyte of *Azolla*. 4
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M.Sc. – I (Semester – I) Examination, 2015
BOTANY (Paper – III)
Plant Ecology (New CBCS)

Day and Date : Friday, 20-11-2015
Time : 10.30 a.m. to 1.00 p.m.

Max. Marks : 70

- Instructions:** i) Attempt totally **five** questions.
ii) Question No. **1** is **compulsory**.
iii) Attempt **any two** questions from question No. **2** to **4**.
iv) Attempt **any two** questions from question No. **5** to **7**.
v) Figures to the **right** indicate **full** marks.

1. Choose the correct answer from given alternatives :

14

- 1) Biosphere reserve is an activity under _____ programme.
a) IUCN b) UNESCO c) SSC d) MAB
- 2) A group of individuals of any one kind of organisms is called _____.
a) Community b) Ecosystem
c) Population d) Set of organism
- 3) The niche of a population is the _____.
a) Set of conditions and resources it uses
b) Place where it lives
c) Geographical area it uses
d) All of above
- 4) World Environmental Day is celebrated on _____.
a) 5th June b) 14th November
c) 2nd October d) 28th October
- 5) Which of the following gases are involved in photochemical reactions ?
a) CO and SOX b) CO and NOX
c) CO and C12 d) None of the above



- 6) DDT is _____
- a) Dichloro diphenyl 1 trichloro ethane
 - b) Dichloro eldrin trichloro ethane
 - c) Dichloro diethane
 - d) Dichlocloro diphenoxy ethane
- 7) Water hyacinth indicates _____ pollution.
- a) Oil
 - b) Sewage
 - c) Radioactive
 - d) None of the above
- 8) The organisms swimming against the water currents are _____
- a) Nekton
 - b) Plankton
 - c) Neuston
 - d) Periphyton
- 9) What determines the limits of a biome ?
- a) Type of soil
 - b) Altitude and latitude
 - c) Temperature
 - d) Rainfall
- 10) The energy pyramid is always _____
- a) Upright
 - b) Inverted
 - c) Irregular
 - d) All the above
- 11) The process of eutrophication results with _____ in BOD values.
- a) Increase
 - b) Decrease
 - c) Stable
 - d) Zero
- 12) Red data book gives information about _____
- a) Biodiversity
 - b) IUCN categorization
 - c) Extinction
 - d) Species
- 13) The process of secession is _____
- a) National
 - b) Binational
 - c) International
 - d) Universal
- 14) EIA is done by _____
- a) Botanists
 - b) Industrialists
 - c) Team of scientists from different subject
 - d) Government



2. a) Describe briefly lentic water ecosystem. 7
b) Explain the characteristics of wetlands. 7
 3. a) Write the causes and consequences of climate change. 7
b) Explain the phenomenon of bioaccumulation with suitable example. 7
 4. a) Highlight the fundamentals of remote sensing technique. 7
b) Differentiate between allogenic and autogenic succession. 7
 5. Write briefly on :
 - a) EIA. 5
 - b) Effect of air pollutants on vegetation. 5
 - c) Ecotoxicology. 4
 6. a) Give the components of marine ecosystem. 5
b) Represent the causes of ozone depletion. 5
c) Estuarine ecosystems are more productive: Justify. 4
 7. Write notes on **any three** : 14
 - a) Phytovolatilization
 - b) Phytoplankton
 - c) Concept of climax
 - d) Aerial photography.
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**M.Sc. (Part – I) (Semester – I) Examination, 2015
BOTANY (Paper – IV) (CBCS New)
Tools and Techniques in Botany**

Day and Date : Monday, 23-11-2015

Max. Marks : 70

Time : 10.30 a.m. to 1.00 p.m.

- Instructions:**
- i) Attempt totally **five** questions.
 - ii) Question no. **1** is **compulsory**.
 - iii) Attempt **any two** questions from question no. **2** to **4**.
 - iv) Attempt **any two** questions from question no. **5** to **7**.
 - v) Figures to the **right** indicate **full** marks.

1. Write the correct answer.

14

1) Buffer solutions

- a) will always have a pH of 7
- b) are rarely found in living systems
- c) cause a decrease in pH when acids are added to them
- d) tend to maintain a relatively constant pH

2) The pH of a solution is determined by

- a) concentration of salt
- b) relative concentration of acids and bases
- c) dielectric constant of the medium
- d) environmental effect

3) In _____ distribution probability of success remains constant from trial to trial.

- a) Normal
- b) Poisson
- c) Binomial
- d) None of these



- 4) Chi square is zero when
- expected frequency is lesser than the observed frequency
 - expected frequency is equal to the observed frequency
 - expected frequency is double that of the observed frequency
 - expected frequency is greater than the observed frequency
- 5) Living, unstained cells and organisms can be observed best using
- Fluorescent microscopy
 - TEM
 - Phase contrast microscopy
 - Scanning electron microscope
- 6) Transmission electron microscopy is best for high magnification viewing of
- internal structure of fixed cells
 - internal structure of live, motile cells
 - surface structure of fixed cells
 - surface membranes of live, motile cells
- 7) The ultracentrifuge method for determining the molecular weights of proteins was developed by
- | | |
|--------------|-------------|
| a) Svedberg | b) Tiselius |
| c) Schraiber | d) Bouguer |
- 8) _____ is the most suitable gas to use as a carrier gas in a gas chromatogram.
- | | |
|------------|-------------------|
| a) Helium | b) Oxygen |
| c) Methane | d) Carbon dioxide |
- 9) The basic theory of atomic absorption states that
- The incident light intensity is directly proportional to atom concentration
 - Light is absorbed by ground-state electrons
 - The transmitted light is proportional to the ground state atoms
 - Absorption results in the lowering of energy levels of most atoms



- 10) Which of the statements is correct ?
- a) Gas chromatography is used to analyse gases
 - b) Gas chromatography is used to analyse solids
 - c) Gas chromatography is used to analyse gases, solutions and solids
 - d) All of the above
- 11) A Geiger-Muller counter is able to provide an indirect measure of radioactivity because radiation has a property of
- a) ionization
 - b) making matter glow in the dark
 - c) fogging photographic film
 - d) attracting electrons
- 12) Which of the following is a cytoplasmic stain ?
- a) Eosin
 - b) Crystal violet
 - c) Carmine
 - d) Orcein
- 13) _____ is the application of information sciences to increase our understanding of biology.
- a) Bioinfotech
 - b) Bioinformatics
 - c) Biophysics
 - d) Bioinfosis
- 14) Radioactivity is emission of radiation which is
- a) always accompanied by a chemical process
 - b) always preceded by a chemical process
 - c) initiated by absorption of radiation
 - d) spontaneous
2. a) Describe coefficient of variation. 7
- b) Explain student's test. 7
3. a) Explain the principle and application of phase contrast microscopy. 7
- b) Describe photomicrography. 7



4. a) Explain flame spectrophotometry. 7
b) Give an account on gas chromatography. 7
5. a) Describe the ESR spectroscopy. 5
b) Describe standard units of expression. 5
c) Write a note on different types of stain and its preparation. 4
6. a) Explain half-life of radioisotopes. 5
b) Describe herbarium technique. 5
c) Write a note on effect of radiation on biological system. 4
7. Write short notes on **any three** of the following : 14
a) HPLC
b) Ultracentrifugation
c) Buffers and its types
d) Important herbaria in India.
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M.Sc. – I (Semester – I) Examination, 2015
BOTANY (CGPA Old)
Paper – IV : Tools and Techniques in Botany

Day and Date : Monday, 23-11-2015

Max. Marks : 70

Time : 10.30 a.m. to 1.00 p.m.

- Instructions :** i) Attempt totally **five** questions.
ii) Question no. **1** is **compulsory**.
iii) Attempt **any two** questions from question no. **2** to **4**.
iv) Attempt **any two** questions from question no. **5** to **7**.
v) Figures to the **right** indicate **full** marks.

1. Choose the correct alternative and rewrite the sentences.

14

1) A basic principle of AAS may be expressed by the statement

- a) All atoms emit light
- b) All atoms produce light
- c) All atoms absorb light
- d) All atoms produce light of a specific wavelength

2) _____ is the most suitable gas to use as a carrier gas in a gas chromatogram.

- a) Helium
- b) Oxygen
- c) Methane
- d) Carbon dioxide

3) High performance liquid chromatography (HPLC) cannot be used to

- a) separate types of organic pesticides
- b) determine the mercury content of a fish sample
- c) identify the various pigments from a leaf extract
- d) determine the caffeine content of coffee samples

4) Which would be best to separate a protein that binds strongly to its substrate ?

- a) Gel filtration
- b) Affinity chromatography
- c) Cation exchange
- d) Anion exchange

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- 5) Isotopes of an element
 - a) may or may not be radioactive
 - b) have the same atomic number but differing atomic masses
 - c) may be used for human disease diagnostics
 - d) All of the above

- 6) The main advantages of fluorescence over UV-Vis spectroscopy is
 - a) Its sensitivity
 - b) Its compatibility with separation techniques
 - c) Its compatibility with most analysts
 - d) None of the above

- 7) Chi square test (X^2) is
 - a) measure the degree of deviation of the experimental result from the expected result
 - b) to test the closeness of observed and expected frequency
 - c) to test the population variance and sample variance
 - d) all of these

- 8) Living, unstained cells and organisms can be observed best using
 - a) Fluorescent microscopy
 - b) TEM
 - c) Phase contrast microscopy
 - d) Scanning electron microscope

- 9) Scanning electron microscopy (SEM) is best used to study
 - a) small internal cell structures
 - b) internal structure of live, motile cells
 - c) surface morphology
 - d) all of the above

- 10) A Geiger-Muller counter is able to provide an indirect measure of radioactivity because radiation has a property of
 - a) ionization
 - b) making matter glow in the dark
 - c) fogging photographic film
 - d) attracting electrons



- 11) In _____ distribution probability of success remains constant from trial to trial.
a) Normal b) Poisson c) Binomial d) None of these
- 12) The biggest herbarium in India is
a) I.A.R.I. Delhi
b) Central National Herbarium, Calcutta
c) St. Xavier's Herbarium, Bombay
d) Forest Research Institute, Dehradun
- 13) _____ chemical is used for poisoning the specimens in herbarium technique.
a) FAA b) AgNO_3 c) HCl d) HgCl_2
- 14) Which of the following identifies three types of sources used in AAS ?
a) Hollow Cathode Lamp (HCL), Electrodeless Discharge Lamp (EDL), Argon lamp
b) Electrodeless Discharge Lamp (EDL), Deuterium (D2) lamp, Hollow Cathode Lamp (HCL)
c) Deuterium (D2) lamp, plasma, flame
d) Neon lamp, Acetylene torch, Tungsten lamp
2. a) Describe binomial distribution. 7
b) Explain Student's 't' test. 7
3. a) Explain the principle and application of phase contrast microscopy. 7
b) Describe photomicrography. 7
4. a) Explain ion exchange and affinity chromatography. 7
b) Give an account on gas chromatography. 7
5. a) Describe the ESR spectroscopy. 5
b) Describe the technique of O-banding. 5
c) Write a note on radioactivity counting system. 4



- | | |
|---|----|
| 6. a) Explain half-life of radioisotopes. | 5 |
| b) Describe herbarium technique. | 5 |
| c) Write a note on dosimetry. | 4 |
| 7. Write notes on any three . | 14 |
| a) Important herbaria in India | |
| b) NMR spectroscopy | |
| c) Ultracentrifugation | |
| d) Application of computer in life science. | |
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M.Sc. – I (Semester – II) Examination, 2015
BOTANY (Paper – VI) (CGPA) (New)
Taxonomy of Angiosperms

Day and Date : Thursday, 19-11-2015

Max. Marks : 70

Time : 10.30 a.m. to 1.00 p.m.

- Instructions:** i) Attempt totally **five** questions.
ii) Question no. **1** is **compulsory** (Section – I).
iii) Attempt **any two** questions from question no. **2 to 4** (Section – II).
iv) Attempt **any two** questions from question no. **5 to 7** (Section – III).
v) Figures to the **right** indicate **full** marks.

SECTION – I

1. Rewrite the following sentences by choosing correct alternative : **14**
- 1) Name of the family has the suffix
a) -oideae b) -aceae c) -eae d) -inae
- 2) Spot out the statement applicable to Caryophyllaceae
a) Zygomorphic flower b) Inferior ovary
c) Cincinnus inflorescence d) Winged fruits
- 3) _____ is the newly described taxon from Solapur district of Maharashtra, India by Gaikwad *et al.* in 2014.
a) *Vigna yadavii* b) *Crinum solapurense*
c) *Astrea lobata* d) *Dremaea congesta*
- 4) Urticaceae belongs to order
a) Personales b) Unisexuales
c) Aclamydosporeae d) Gentianales



- 5) In Cronquist system of classification Monocotyledons is replaced by
- a) Magnoliopsida
 - b) Liliopsida
 - c) Liliaceae
 - d) Dilleniaceae
- 6) _____ taxa form important units for identifying and prioritizing protected area.
- a) Endemic
 - b) Rare
 - c) Threatened
 - d) Endangered
- 7) 'Labellum' petal is present in the family _____
- a) Moraceae
 - b) Onagraceae
 - c) Orchidaceae
 - d) Poaceae
- 8) Genetic diversity represents the _____ variation within and between populations of organisms.
- a) Species
 - b) Heritable
 - c) Endemic
 - d) None of these
- 9) *Ficus krishnae* C. DC. is altered to the rank variety as *Ficus benghalensis* L. var. *krishnae* by Corner; what will be the correct citation for such taxon ?
- a) *Ficus krishnae* C.DC. var. *benghalensis* (L.) Corner
 - b) *Ficus benghalensis* L. var. *krishnae* (C. DC.) Corner
 - c) *Ficus benghalensis* L. var. *krishnae* (L.) Corner
 - d) *Ficus benghalensis* Corner, var, *krishnae* (L.) C. DC.
- 10) In Cronquist system of classification _____ in dicotyledons and _____ in monocotyledons are generally regarded as advanced families.
- a) Winteraceae, Liliaceae
 - b) Magnoliaceae, Burmanniaceae
 - c) Asteraceae, Orchidaceae
 - d) Primulaceae, Irideae
- 11) Specific epithet '*arvensis*' concern with
- a) in water
 - b) of cultivated field
 - c) cordate leaved
 - d) of barren land
- 12) Mucilage cells are found both in the pith and cortical regions of the members of family
- a) Cactaceae
 - b) Malvaceae
 - c) Tiliaceae
 - d) Gentianaceae.



- 13) In Bessey's system of classification _____ class represent Monocotyledons.
- a) Oppositifoliae
 - b) Liliopsida
 - c) Magnoliopsida
 - d) Alternifoliae
- 14) _____ is biotechnological method for ex-situ plant conservation which is applicable for long term storage of plant genetic material.
- a) Somatic embryogenesis
 - b) Cryopreservation
 - c) Organogenesis
 - d) Plant tissue culture

SECTION – II

- 2. a) Discuss evolutionary trends in Androecium. 7
- b) Outline of Bessey's system of classification. 7
- 3. a) Give an account of evolutionary trends in inflorescence. 7
- b) Principles of ICBN. 7
- 4. a) Write an essay on species concept. 7
- b) Discuss salient features and morphological diversity of family Commelinaceae. 7

SECTION – III

- 5. a) OTUs. 5
 - b) Chemotaxonomy. 5
 - c) Functions of taxonomy. 4
 - 6. a) Evolutionary trends in leaf structure. 5
 - b) Economic value of Biodiversity. 5
 - c) Orchid flower. 4
 - 7. Write notes on **any three** : 14
 - a) Rejection of names.
 - b) Salient features of Urticaceae.
 - c) Natural classification.
 - d) Salient features of Sapotaceae.
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M.Sc. I (Semester – II) (CGPA) Examination, 2015
BOTANY (New)
Paper – VII : Cell and Molecular Biology of Plants

Day and Date : Saturday, 21-11-2015
Time : 10.30 a.m. to 1.00 p.m.

Max. Marks : 70

- Instructions :** i) Attempt totally **five** questions.
ii) Question No. **I** is **compulsory**.
iii) Attempt **any two** questions from Question No. **II to IV**.
iv) Attempt **any two** questions from Question No. **V to VII**.
v) Figures to the **right** indicate **full** marks.

I. a) Choose the correct answer :

7

- 1) Plant mitochondrial DNAs are much ____ than animal mitochondrial DNA.
a) larger b) smaller c) interior d) superior
- 2) Expressed regions of the DNA are called as
a) introns b) exons c) sat-DNA d) r-RNA
- 3) Which of the following is a cytoskeletal filament involved in mechanical support of the cell ?
a) Microtubules b) IF
c) Actin d) Mitotic Spindle
- 4) M phase kinase has _____ as a submit.
a) RNA b) DNA c) Cyclin d) PO₄
- 5) The unit membrane model was put forward by
a) Robertson (1953) b) Harvey and Cole (1931)
c) Benson (1966) d) Linard and Singer (1967)
- 6) Water-loving domains of plasma membrane are known as
a) hydrophobic b) hydrophilic c) hygrosopic d) lithophilic
- 7) Maintenance of turgor is an important function of
a) Cellwall b) Nucleus c) ER d) Vacuoles

P.T.O.



- b) Fill in the blanks : 7
- 1) The long form of PFGE is _____
 - 2) DNA tightly bound an equal mass of histones, which serve to form repeating array of 'DNA-protein particles' are called _____
 - 3) Genetic code was deciphered through the experiments of scientist _____
 - 4) The newly synthesized segments of the DNA strand are linked to the main strand by a joining enzyme _____
 - 5) The major protein of chloroplast is _____
 - 6) _____ is a termination codon.
 - 7) _____ are small granular or filamentous bodies which are called the powerhouse of the cell.
- II. Write in short about :
- a) Plasma membrane 7
 - b) Structure of Plasmodesmata 7
- III. Discuss in short about :
- a) Chloroplast genome 7
 - b) Mitochondrial genome 7
- IV. Explain briefly :
- a) Structure of vacuole and ATPases 7
 - b) Types of DNA 7
- V. Comment upon :
- a) Function of microfilaments 5
 - b) Genetic code 5
 - c) Golgi bodies 4
- VI. Comment upon :
- a) Cell cycle control 5
 - b) Programmed cell death 5
 - c) ELISA 4
- VII. Write notes on **any three** of the following : 14
- a) Retinoblastoma
 - b) Enzyme kinetics
 - c) Confocal microscopy
 - d) FISH.
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M.Sc. – II (Sem. – IV) (CGPA) Examination, 2015
BOTANY (Paper – XVI)
Crop Physiology

Day and Date : Tuesday, 24-11-2015
Time : 2.30 p.m. to 5.00 p.m.

Max. Marks : 70

- Instructions :** i) Attempt **totally five** questions.
ii) Question no. **1** is **compulsory**.
iii) Attempt **any two** questions from question no. **2** to **4**.
iv) Attempt **any two** questions from question no. **5** to **7**.
v) Figures to the **right** indicate **full** marks.

1. Rewrite the following sentences by choosing correct alternative. **14**
- 1) The credit of discovery that during light induced bending of stem, the apex produces a diffusible chemical, goes to _____
 - a) Charles Darwin
 - b) Boysen-Jensen and Paal
 - c) Went
 - d) Van Overbeek
 - 2) In which of the following nitrogen is present in organic form _____
 - a) Atmospheric nitrogen
 - b) Nitrates and nitrites
 - c) Ammonia
 - d) None of the above
 - 3) The transfer of sugars from mesophyll cell to sieve tube elements in leaf is called as _____
 - a) Phloem loading
 - b) Phloem unloading
 - c) Both a) and b)
 - d) None of the above
 - 4) Substances used to kill weeds known as _____
 - a) Weedicides
 - b) Fungicides
 - c) Bactericides
 - d) None of the above
 - 5) The long day plant is _____
 - a) Tomato
 - b) Potato
 - c) Cotton
 - d) Spinach



- 6) Chemical substance, when added to plant, retards or reduces the transpiration is _____
 - a) Florigen
 - b) Vernalin
 - c) Antitranspirant
 - d) Fungicide

- 7) Correct sequence of different phases of growth is _____
 - a) Cell division → cell differentiation → cell elongation
 - b) Cell differentiation → cell division → cell elongation
 - c) Cell elongation → cell division → cell differentiation
 - d) Cell division → cell elongation → cell differentiation

- 8) Which of the following is gaseous growth regulator _____
 - a) IAA
 - b) NAA
 - c) IBA
 - d) ethylene

- 9) CAZARI is located at _____
 - a) Mumbai
 - b) Pune
 - c) Jodhapur
 - d) Bangalore

- 10) Most frequently occurring organic acids in fruit cells are _____
 - a) Malic acid
 - b) Citric acid
 - c) Both a) and b)
 - d) Tartaric acid

- 11) Flowering dependent on cold treatment is _____
 - a) Cryotherapy
 - b) Cryogenics
 - c) Cryoscopy
 - d) Vernalization

- 12) NAR is nothing but _____
 - a) Net Assimilation Rate
 - b) Net Absorption Ratio
 - c) Net Agricultural Rate
 - d) None of the above

- 13) In root nodules of legumes leghaemoglobin is found in _____
 - a) Bacteroids
 - b) Cystol
 - c) Cystol of uninfected nodule cells
 - d) All of the above

- 14) Stress hormone is _____
 - a) Auxin
 - b) GA
 - c) Ethylene
 - d) ABA



2. a) Define plant hormones. Enlist its types and write in brief the physiological role of hormones (Any two). 7
b) Explain in details fruit physiology of any two plants studied by you. 7
 3. a) Write an essay on post-harvest technology of any two studied plants with respect to market strategy from field to consumer. 7
b) Define the term – Fertilizer. Give its classification and add a note on contribution of fertilizer in agriculture. 7
 4. a) Describe fruit physiology of Ber. 7
b) Write an essay on phloem transport during vegetative and reproductive phases. 7
 5. Describe briefly :
a) Role of BARC research centre in agriculture. 5
b) Vernalization. 5
c) Enlist the factors affecting on source and sink relationship. 4
 6. Write on :
a) Mode of action of any two weedicides. 5
b) Difference between SDP and LDP. 5
c) Importance of crop physiology in agriculture. 4
 7. Write short notes on **any three** of the following : 14
a) Role of Research Centre (CSSSRL) Karnal
b) Physiological basis of yield of Jowar
c) Harvest index and NAR
d) Effect of organic fertilizer on soil health.
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Seat No.	
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M.Sc. (Part – II) (Semester – III) (CGPA) (New) Examination, 2015
BOTANY (Paper – IX)
Plant Embryology and Palynology

Day and Date : Monday, 16-11-2015
Time : 2.30 p.m. to 5.00 p.m.

Total. Marks : 70

- Instructions :** i) Attempt totally **five** questions.
ii) Question no. **1** is **compulsory**.
iii) Attempt **any two** questions from question no. **2** to **4**.
iv) Attempt **any two** questions from question no. **5** to **7**.
v) Figures to the **right** indicate **full** marks.

1. Choose the correct answer from given alternatives.

14

- 1) _____ plays important role in the formation of pollen wall.
- a) Endothecium b) Middle layer
c) Epidermis d) Tapetum
- 2) Curious rounded bodies of lipid nature, present in the tapetum are known as _____ bodies.
- a) Proubisch b) Ubisch
c) Albuminous d) Lipophytic
- 3) _____ act as the director for pollen tube growth.
- a) Style b) Stigma
c) Vegetative nucleus d) Generative cell
- 4) Pollen grains with elongated germ pores are described as
- a) Colpate b) Porate
c) Colporate d) Pororate
- 5) _____ is the study of fossil pollens and spores.
- a) Aeropalynology b) Agropalynology
c) Paleopalynology d) Palynotaxonomy

P.T.O.



- 6) Melittopalynology is the study of spores and pollens in
- a) Fossil
 - b) Honey
 - c) Air
 - d) Excretory matter
- 7) Monad consists of _____ pollen grain.
- a) One
 - b) Two
 - c) Three
 - d) Four
- 8) NPC system was described by
- a) P.K.K. Nair
 - b) Wood house
 - c) Grew
 - d) Erdtman
- 9) Formation of diploid female gametophytes is known as
- a) Apospory
 - b) Diplospory
 - c) Parthenocarpy
 - d) All of the above
- 10) Nuclear polyembryony is found in
- a) Citrus
 - b) Parthenium
 - c) Cedrus
 - d) None of the above
- 11) The branch that gives us the information about pollen and spore, causing allergy is known as
- a) Forensic palynology
 - b) Copropalynology
 - c) Melittopalynology
 - d) Latropalynology
- 12) The outer wall of pollen is composed of
- a) Lignin
 - b) Cutin
 - c) Sporopollenin
 - d) Suberin
- 13) When the apertures of pollen are present on equatorial plane, it is described as
- a) Catatreme
 - b) Zonal
 - c) Panto
 - d) Anacatatreme
- 14) Pollen calender is related to
- a) Paleopalynology
 - b) Melittopalynology
 - c) Agropalynology
 - d) Latropalynology



2. Describe in detail protoplast isolation, purification and add a note on regeneration. 14
 3. What is Agropalynology ? Discuss its applications. 14
 4. Give an account of the following :
 - a) Applications of Melittopalynology in Crop productivity. 7
 - b) Describe different types of styles and their structure in Angiosperms. 7
 5. Describe :
 - a) Embryo culture and its significance. 7
 - b) Microfossils and oil exploration. 7
 6. Write in brief :
 - a) Causes and significance of Apomixis. 7
 - b) Techniques in Aeropalynology. 7
 7. Write notes on **any three** of the following : 14
 - a) Chemotropism
 - b) Pollen viability
 - c) Types of Honey
 - d) Generative Cell.
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Seat No.	
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M.Sc. (Part – II) (Sem. – III) Examination, 2015
BOTANY (New) (CGPA)
Paper – X : Cytogenetics, Plant Breeding and Genetic Engineering

Day and Date : Wednesday, 18-11-2015

Max. Marks : 70

Time : 2.30 p.m. to 5.00 p.m.

Note : 1) *Section – I compulsory.*

2) *Answer any four questions from Section – II.*

SECTION – I

1. Rewrite the sentence after choosing the correct answer from the given alternatives :
- 1) The size of chromosome is measured during
 - a) Prophase
 - b) Metaphase
 - c) Anaphase
 - d) All of these
 - 2) A functional chromosome has
 - a) Centromere
 - b) Telomere
 - c) Origine of replication
 - d) All of these
 - 3) Crossing over in diploid organism is responsible for
 - a) Dominance of genes
 - b) Segregation of alleles
 - c) Recombination of linked genes
 - d) Linkage between genes
 - 4) Gene conversions refers to
 - a) DNA segment being reserved in a chromosome
 - b) Insertion of a transposon that alters the reading frame
 - c) Alterations in homologous as mismatch pair errors are corrected
 - d) Formation of plasmids from a bacterial genome
 - 5) Transposition can facilitate
 - a) Insertional activation
 - b) Gene amplification
 - c) Gene mobilization
 - d) Insertional reversion

14

P.T.O.



- 6) Molecular markers include
- a) RFLP
 - b) RAPD
 - c) AFLP
 - d) All of these
- 7) Compared to physical map genetic map
- a) Is more accurate
 - b) Is less accurate
 - c) Is equally accurate
 - d) Measures different things
- 8) The process of transfer of genetic material from DNA to RNA
- a) Transversion
 - b) Transcription
 - c) Translation
 - d) Translocation
- 9) The genetic factors _____ during the formation of the gametes
- a) Combine
 - b) Duplicate many times
 - c) Segregate
 - d) Disappear
- 10) The most widely used chemical for protoplast fusion as fusogen is
- a) Mannitol
 - b) Sorbitol
 - c) Mannol
 - d) Poly ethylene glycol (PEG)
- 11) Cybrids are produced by
- a) Fusion of two different nuclei from two different species
 - b) Fusion of two same nuclei from two same species
 - c) Nucleus of one species but cytoplasm from both parent species
 - d) None of these
- 12) The term 'Intellectual Property Rights' covers
- a) Copyrights
 - b) Know-how
 - c) Trade dress
 - d) All of the above
- 13) Which of the following is a protein sequence database
- a) DDBJ
 - b) EMBL
 - c) Gen Bank
 - d) PIR
- 14) A comprehensive database for the study of human genetics and molecular biology is
- a) PDB
 - b) STAG
 - c) OMIM
 - d) PSD



SECTION – II

2. Explain variation in genome size and its organization in eukaryotes. 14
 3. Describe with suitable example independent assortment, add a note on crossing over. 14
 4. What is somatic hybridization ? Explain protoplast regeneration and add a note on hybrids. 14
 5. Answer **any two** of the following : 14
 - a) Write a note on Bioinformatics resources on internet.
 - b) Write a note on ecological risks of IPR
 - c) Describe protoplast isolation.
 6. Write short notes on **any two** of the following : 14
 - a) Write a note on gene families.
 - b) Describe correlation of genetic and physical map.
 - c) Write a note on amplification.
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Seat No.	
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M.Sc. (Part – II) (Semester – III) (CGPA New) Examination, 2015
Paper – XI : BOTANY
Advances in Plant Metabolism and Biochemistry

Day and Date : Friday, 20-11-2015
Time : 2.30 p.m. to 5.00 p.m.

Total Marks : 70

- Instructions :** i) Attempt totally **five** questions.
ii) Question No. **1** is **compulsory**.
iii) Attempt **any two** questions from question no. **2** to **4**.
iv) Attempt **any two** questions from question no. **5** to **7**.
v) Figures to the **right** indicate **full** marks.

1. Choose the correct answer from given alternatives : **14**
- 1) 'S' state mechanism or water oxidising clock for photo-oxidation of water was given by _____
a) KOK et.al. b) Warburg c) Robert Hill d) Emerson
 - 2) Carotenoids are _____
a) Hydrocarbons b) Insoluble in water
c) Absorb blue and green light d) All of these
 - 3) Activation of sulphate is brought about by _____
a) ATPase b) ATP transulphurylase
c) APS sulphotransferase d) Sulphite reductase
 - 4) Substrate level phosphorylation is seen during the conversion of _____
a) Isocitrate to ketoglutarate b) Ketoglutarate to succinyl CO-A
c) Succinyl CO-A to succinate d) Malate to OAA
 - 5) Unique function of phosphate in metabolism is its formation of _____ bonds which allow energy transfer.
a) Phosphodiester b) Pyrophosphate
c) Monophosphate d) Triphosphate



- 6) Isoprene units are synthesized plants from acetyl COA through _____ pathway.
- | | |
|-------------------|------------------|
| a) Malonic acid | b) Shikimic acid |
| c) Mevalonic acid | d) Malic acid |
- 7) Sugarcane belongs to _____ type of plant.
- | | |
|----------------|-----------------------|
| a) NAD-ME C4 | b) NADP-ME C4 |
| c) PCK type C4 | d) C3-C4 intermediate |
- 8) Photorespiration is present in C3 plants to protect them from excess of _____
- | | | | |
|-------------------|--------------------|--------------------|----------------------------------|
| a) O ₂ | b) CO ₂ | c) NO ₂ | d) H ₂ O ₂ |
|-------------------|--------------------|--------------------|----------------------------------|
- 9) _____ is found in the cell walls of different types of tracheids and vessels.
- | | | | |
|-----------|------------|-----------|-----------|
| a) Starch | b) Sucrose | c) Lignin | d) Tannin |
|-----------|------------|-----------|-----------|
- 10) _____ is rich in ascorbic acid content.
- | | |
|----------------------|-----------------|
| a) Green lemon fruit | b) Chillies |
| c) Awala fruit | d) All of these |
- 11) In photosynthesis, CO₂ is _____ to sugars.
- | | | | |
|-------------|------------|-------------|-----------------|
| a) Oxidised | b) Reduced | c) Hydrated | d) Carboxylated |
|-------------|------------|-------------|-----------------|
- 12) _____ is the most abundant structural polysaccharide in plants.
- | | | | |
|--------------|-----------|-----------|-------------------|
| a) Cellulose | b) Starch | c) Lignin | d) Hemicelluloses |
|--------------|-----------|-----------|-------------------|
- 13) Alternate oxidase is involved in _____ respiration.
- | | |
|-------------------|--------------|
| a) Aerobic | b) Anaerobic |
| c) CN insensitive | d) Photo |
- 14) Phosphorus is available in soil almost exclusively in the form of _____
- | | |
|-------------------|--------------------|
| a) Pyrophosphates | b) Orthophosphates |
| c) Metaphosphates | d) Phosphoric acid |



2. Give an account of :
 - a) Terminal oxidation and phosphorylation in mitochondria. 7
 - b) Biosynthesis of starch and its regulation. 7
 3. Explain :
 - a) Mechanism of C₄ pathway of photosynthesis. 7
 - b) Classification of C₄ plants. 7
 4. Describe :
 - a) Role of organic acids in plants studied by you. 7
 - b) Sulphate reduction or sulphur assimilation. 7
 5. a) Enlist the pyrophosphates and their role in plants. 5
 - b) Give the steps of shikimic acid pathway. 5
 - c) Give significance of photorespiration. 4
 6. a) Give schematic representation of cyclic and non-cyclic electron transfer in photosynthesis. 5
 - b) Give an account of phenolic compounds in plants. 5
 - c) Give characteristics of CAM plants and their classification. 4
 7. Write short notes on **any three** : 14
 - a) VAM and their role in P nutrition
 - b) Photosynthetic pigments
 - c) Respiratory inhibitors
 - d) Glutathion.
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Seat No.	
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M.Sc. (Part – II) (Semester – III) (CGPA New) Examination, 2015
BOTANY (Paper – XII)
Physiology of Plant Growth and Development

Day and Date : Monday, 23-11-2015
Time : 2.30 p.m. to 5.00 p.m.

Total Marks : 70

- Instructions:** i) Attempt totally **five** questions.
ii) Question no. **1** is **compulsory**.
iii) Attempt **any two** questions from question no. **2 to 4**.
iv) Attempt **any two** questions from question no. **5 to 7**.
v) Figures to the **right** indicate **full** marks.

1. Choose the correct answer from given alternatives.

14

1) The growth in plants is _____

- | | |
|----------------|------------------|
| a) limited | b) unlimited |
| c) unlocalised | d) none of these |

2) Fruit drop is caused by _____

- a) more auxin in the fruit than in the stem
- b) less auxin in fruit than in stem
- c) equal distribution of auxin in stem and fruit
- d) absence of auxin in stem and fruit

3) In the reaction Pr to Pfr, what is expressed as A and B _____

- | | |
|--------------------------|--------------------------------|
| a) A-light B-dark | b) A-dark B-light |
| c) A-far red B-red light | d) A-red light B-far red light |

4) The term phytochrome was introduced by _____

- | | |
|--------------|----------------------------|
| a) Borthwick | b) Borthwick and Hendricks |
| c) Moore | d) Garner and Allard |

P.T.O.



- 5) Pollen grains do not germinate on the stigma of the same flower. This phenomenon is known as _____
a) perpotency b) self sterility c) dicliny d) dichogamy
- 6) Programed cell death is scientifically known as _____
a) automy b) cell lysis c) apoptosis d) none of these
- 7) Growth regulator which retards senescence _____
a) auxin b) GA c) cytokinin d) ABA
- 8) Seed dormancy can be broken by _____
a) ABA and ethylene b) Auxin and GA
c) GA and cytokinin d) Auxin and ABA
- 9) Metabolic precursor for the synthesis of ethylene is _____
a) citric acid b) alpha keto glutric acid
c) methionine d) succinic acid
- 10) Jasmonate plays role in _____
a) inhibition of growth of plants b) enhancement of growth of plants
c) root initiation d) breaking of seed dormancy
- 11) CCC is inhibitor of _____
a) GA biosynthesis b) auxin biosynthesis
c) kinetin biosynthesis d) none of the above
- 12) Callus is _____
a) differentiated mass of tissue b) undifferentiated mass of tissue
c) injured tissue d) none of the above
- 13) Ripening of fruits can be fastened by treatment of _____
a) GA b) Cytokinin c) Ethylene d) Auxin
- 14) Which ion play an important role in pollen tube growth _____
a) Calcium b) Zinc
c) Nickel d) None of the above



2. Give in detail the properties and mechanism of action of phytochrome. 14
 3. Define the term senescence. Explain in detail the biochemical changes in leaves and petiole during senescence. 14
 4. A) Write note on metabolic changes occur during seed germination. 7
B) What is meant by secondary messengers ? Explain with suitable example. 7
 5. A) Describe the mechanism of any one growth retardant. 7
B) Add a note on usefulness of growth retardants in agriculture. 7
 6. A) Describe the phases of growth. 7
B) Give an account of fruit ripening. 7
 7. Write short notes on **any three** of the following : 14
 - A) Physiology of seed development.
 - B) Metabolism of stored seeds.
 - C) Brief idea about discovery of Jasmonates and Polyamines.
 - D) Phototropins.
-