BARASAT GOVERNMENT COLLEGE

DEPARTMENT OF BOTANY

MID TERM EXAMINATION- M.Sc. SEMESTER I, 2019

Departmental 2

(Diversity of Plant Life- Algae & Bryophytes)

Full marks-15 **Time-45 mins**

Answer to all the questions should be as far as practicable in own words. The figures in the margin represent the marks allotted for each question.

Q1. Answer *any five* of the following: **5X2=10**

a) What is Palmelloid? Explain with example.

b) What is lunularic acid? Write its significance in bryophyte ecology.

c) What is trans-esterification?

d) Write the scientific name of bryophyte in which sex chromosomes were first discovered.

e) What is alginate and mention its use?

f) Write the typical leaf character of class Sphagnopsida.

g) What are bisabolanes?

h) Name two microalgae commercially used for biodiesel production.

Q2. Write brief answer to *one* of the following:

a) Give a list of distribution of main phenolic compounds and the source obtained from algae. What are the steps of biodiesel production from microalgae. **2.5+2.5=5**

OR

b) Distinguish different classes of bryophyte on the basis of chromosome number with example. Give the taxonomic implication of bryophyte chemistry. **3 + 2=5**

BARASAT GOVERNMENT COLLEGE
DEPARTMENT OF BOTANY
MID TERM EXAMINATION- M.Sc. SEMESTER I, 2019
Departmental 3
(Fungal and Oomycete Biology)

Full marks-15 **Time-45 mins**

Answer to all the questions should be as far as practicable in own words. The figures in the margin represent the marks allotted for each question

Q1. Answer *any five* of the following: 5X2=10

a) What is Buller's drop?

b) Differentiate between cladistic and phenetic method of classification?

c) Why are *Phytophthora* and other Oomycota are not considered true fungi?

d) What are the functions of hydrophobins and glomalin in fungal cell wall?

e) What is woronin body?

f) Give example of fungal genera having prototunicate, unitunicate and bitunicate asci.

g) What is heterokaryosis?

h) Differentiate between perithecium and peudothecium?

Q2. Write brief answer to *one* of the following:

a) Enumerate the system of recognition and communication within fungi. Explain parasexual cycle in fungi. What is its significance? 2+2+1=5

OR

b) Describe types of septa with ultra-structure existing among major taxonomic groups of fungi. Enumerate spore dispersal mechanism of chasmothecium in *Phyllactinia* sp. 3+2=5

BARASAT GOVERNMENT COLLEGE

INTERNAL EXAMINATION

Departmental 1

INTEGRATED LIFE SCIENCES (ILS)

FULL MARKS-20

1. Protein A have two polypeptide chain. If you run protein A in native PAGE gel and SDS PAGE gel. How many bands you will expect in both the gel and why? 2
2. State the basic principle of 2D gel electrophoresis. 2
3. Mutation in gene x produces x" gene which is hyper activite than x protein and leads uncontrol cell division. Comment on class of x gene and x" gene in respect to cancer. What is metastasis? 2
4. Write down function of SDS and phenol chloroform isoamyl alcohol in DNA extraction from plant tissue. 2
5. How cancer cells differs from normal cells? 2
6. What is the MAXAM GILBERT method? 2
7. What do mean by genome alignment and assembly? 2
8. State the basic relation between molecular clock and phylogenetic analysis. 2
9. What are the major events of evolutionary timescale? 2
10. What are Submarine Vents? 2

BARASAT GOVERNMENT COLLEGE

BOTANY

M.Sc. SEMESTER-I CLASS TEST

DEPARTMENTAL: 2T

DIVERSITY OF PLANT LIFE- BRYOPHYTE

Time: 1 Hour | Full Marks: 15

Q1. Answer all questions. 1X5=5

a) What are pegged rhizoids?
b) Name a liverwort lacking air chamber.
c) What are retort cells?
d) How is *Sphaerocarpos* important from genetic point of view?
e) What is amphigastria?

Q2. Answer *any two* of the following. 2.5X2=5

a) Give salient features of order Lunulariales.
b) Write in short the implication of phytochemistry in taxonomy of bryophyte.
c) What are apigenin and luteolin.

Q3. Answer *any one* of the following. 5X1=5

a) Write note on association of bryophyte with basidiomycetes fungi.
b) Write note on cyto-taxonomy of bryophyte based on chromosome number.

Skill Enhancement Course

Plant Diversity and Human Welfare

Course code: BOTSSEC01M

FULL MARKS:-20

1. What is genetic and species diversity?
2. What do you mean by biodiversity loss?
3. Write the full form of UNESCO, WWF.
4. What is conservation of genetic diversity?
5. In the IUCN Red List (2004), what does 'Red' represent?
6. What is *ex situ* conservation?
7. Differentiate between the types of biodiversity.
8. What is Sustainable development?
9. What is Biosphere reserve?
10. What is a biodiversity hotspot?

BARASAT GOVERNMENT COLLEGE

BOTANY

M.Sc. SEMESTER-II CLASS TEST

DEPARTMENTAL: 8T

PLANT PATHOLOGY & CROP PROTECTION

Time: 1 Hour | Full Marks: 10

Q1. Answer *all* questions. 2X5=10

a) Define inoculum potential. Write down the factors affecting inoculum potential.

b) Write down the functions of PRPs beta 1,3, glucanase and chitinase.

c) Describe the structure of NLR.

d) Write down the causal organisms and symptoms of Anthracnose of jute.

e) What is hybrid necrosis?

Barasat Govt. College
PG Department of Botany
M.Sc Semester-II, 2021; Class Test

Date: 10.7.2021 **Time: 1 hr** **F.M: 20**

Answer all questions

Figures in the margin indicate full marks

1. Distinguish between binary and multistate characters. (2)

2. How does similarity co-efficient differ from that of Simple matching co-efficient ? (2)

3. What is homology? How homology differs from homoplasy? (1+2=3)

4. Define outgroup. What are sister groups? (1+1=2)

5. What do you mean by transformation series or morphocline? (2)

6. What is character weighting? How it is done? (1+2=3)

7. If someday an archaean cell is discovered whose small subunit (SSU)- rRNA sequence is more similar to that of humans than the sequence of mouse SSU-rRNA is to that of humans. How will you explain this apparent discrepancy? (2)

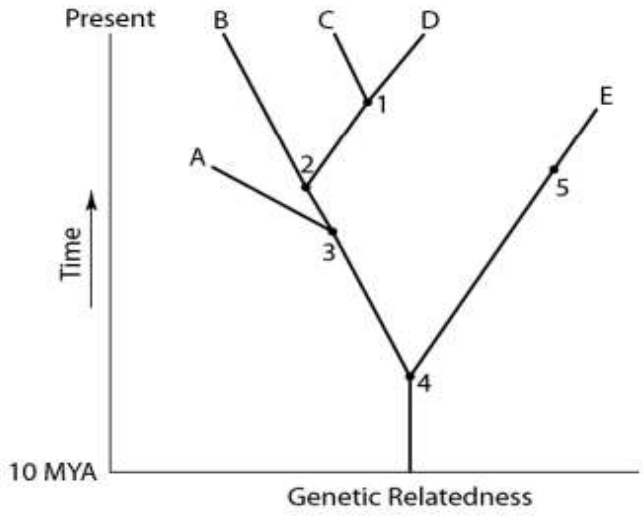
8. On the basis of the phylogenetic tree given below answer the following questions:

(a) The common ancestor for both C and D is located at what position number?

(b) Which two extant species are most closely related to one another?

(c) Can the extinct species be identified from the information provided in the tree? If yes, then identify them.

(1+1+2=4)



Barasat Govt. College
PG Department of Botany
M.Sc Semester-II, 2021; Class Test

Date: 19.6.2021 **Time: 1 hr** **F.M: 20**

Answer all questions

Figures in the margin indicate full marks

Q.1 State two major drawbacks of using *Ceratopteris richardii* as a model system. (2)

Q.2 Mention the chemical nature of fern antheridiogens. State two important biological roles played by antheridiogens in case of homosporous ferns. (1+1=2)

Q.3 Why fern spores exhibit auto fluorescence? Mention the factors which influence the spore germination process in ferns. (1+1=2)

Q.4 Why fern gametophytes are suitable materials for studies in areas of developmental biology and sexual reproduction? (1+1=2)

Q.5 Distinguish between meiotic and ameiotic type of apogamous life cycle. Name two ferns where ameiotic type of life cycle is observed. (1+1=2)

Q.6 How drought resistance differs from drought resilience? Why gymnosperms are more drought resistant in comparison to the angiosperms? (2+2=4)

Q.7 Distinguish between fertilization fluids and pollination drops. Name the major components present in the pollination drops of gymnosperms. (1+1=2)

Q.8 Why biflavonoids are absent from majority of the members belonging to Pinaceae family? (2)

Q.9 What is litter decomposition? Mention the nature and chemical composition of coniferous litter. (1+1=2)

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BARASAT GOVERNMENT COLLEGE

P.G.DEPARTMENT OF BOTANY

INTERNAL EXAMINATION 2021

SEMESTER-IV

(MOLECULAR GENETICS & ADVANCED CELL BIOLOGY)

&

(ADVANCED PLANT PHYSIOLOGY& BIOCHEMISTRY)

Departmental 16: DSE2

TIME-1HR 30 MINS **FULL MARKS-20**

1. What are ESTs? How the problem of clone chimerism is resolved? (2+3=5)
2. What are the basic differences between Roche 454 sequencing and Virtual terminator sequencing? What is NGS? What are the components of this technique? (2+1+2=5)
3. What is Genome annotation? Mention the basic approaches to genome annotation. (2+3=5)
4. What do you mean by pattern based gene finding? Do you think that HMM plays an important role in it? What is comparative Genomics? (3+1+1=5)

M.Sc. Semester III Plant Physiology and Biochemistry

Paper code: Departmental 12

Internal Examination, Theory, Full marks-10

1. Answer any two 2x1
   a. What are PIN proteins?
   b. What are statoliths and statocytes?
   c. Name the precursor molecule for biosynthesis of IAA through tryptophan independent pathway.

2. Answer any four 4x2

   a. Name three important proteins found in ethylene signaling that impinge on ABA signaling in seeds. Among these which one is the key protein that seems to be at crossroads of multiple hormone response pathways?
   b. Elucidate the pathway for IAA biosynthesis in bacterial system from tryptophan.
   c. Describe non-decarboxylation routes of IAA oxidative degradation diagrammatically.
   d. Experimentally prove that polar transport of auxin is gravity independent.
   e. Diagrammatically explain the model for activation of H+ATPase by ABP57 and auxin in plasma membrane.

BARASAT GOVERNMENT COLLEGE

P.G DEPARTMENT OF BOTANY

SEMESTER –IV

INTERNAL EXAMINATION-2021

Molecular Genetics & Advanced Cell Biology

Departmental 16-DSE-2

I. Answer the following Questions: - 2 Marks

1. Define repeat masking? (2)
2. Write the full form of SAGE and CMOS? (1+1=2)
3. What is gene tagging? (2)
4. State the types of Proteomics in brief. (2)
5. Mention two applications of RNAi. (2)

II. Answer the following Questions:- 5 Marks

1. What is SAM? Describe the Chemical breakdown method of DNA sequencing in brief. Mention the essential components of NGS techniques. (1+3+1=5)
2. What is transcript reconstruction? How ESTs are clustered and analyzed? (2+3=5)
3. What is PTGS? Mention the components of RNAi in brief. Describe the Cellular pathways of gene silencing by RNA interference with a suitable diagram. (1+1+3=5)

Barasat Govt. College
(Under West Bengal State University)
M.Sc. Semester-I Examination – 2022
BOTANY
(COURSE CODE:BOTPCOR01T)

(Part Questions from Jukta Adhikari and N. Das)

ILS (Immunology – Part)

1. Answer the Questions :
   i) What do you understand by 'Autoimmunity'? 2
   ii) What is memory cell? Mention their function. 2

   i) Answer the Questions :
   ii) Compare among MHC Class-I, MHC Class-II and MHC Class-III on the basis of their functions and expressions. 5
   iii) Draw the structure of IgG and label it. All BCRs are Igs but all Igs are not BCRs- Justify it. 1.5+1.5+2=5

BARASAT GOVT. COLLEGE

BOTANY

M.SC. SEMESTER –I INTERNAL EXAMINATION, 2022

Departmental-4

Time-1 Hour **Full Marks:20**

1. Answer any five 1x5=5

a) Who invented electron microscope?

b) What is the contribution of Semmelwise in Microbiology?

c) What is enrichment culture?

d). What do you mean by Auxotroph?

e) What are the difference of pili and fimbriae

f) RNA is readily hydrolysed by alkali whereas DNA is not why?

f) What is phylogenetic shrub?

g) Name two differences between membrane structure of bacteria and Archaea.

hj) What is T_m?

2. Answer any five 3x5=15

i) How can the small size and haploid genetics of prokaryotes accelerate their evolution . 3

ii) Why gram negative bacteria resist them from penicillin? How some gram positive bacteria also resist them from penicillin? 3

iii) What will happen if *Escherichia coli* is treated with lysozyme and kept in fresh water? In same condition what will happen in *Halococcus*? 3

iv) Hfr x F^- mating produces recombinant F^- cells but not F^+ cell- justify the comment. 3

v) What is prophage? Why a prophage is immune to superinfection by similar type of phage? 3

vi) An F^+ strain marked at 10 loci, gives rise spontaneously to Hfr progeny. For any Hfr

strain, the order of markers can be determined by interrupted mating experiments. From the following data for several Hfr strains derived from the same F^+, determine the order of markers in the F^+ strain.

Hfr Strains	Markers donated in order
1	MQZC
2	RPCZ
3	YDBM
4	DYLR
5	LRPC

3

vii). Phages are collected from an infected *E. coli* cell of genotype $amp^R bio^+ gly^+$ and used to transduce a recipient of genotype $amp^S bio^- gly^-$. The treated recipient population was plated on a minimal medium supplemented with ampicillin and biotin. Many colonies grew. Which one of the following combination of genotypes are appropriate for the colonies that grew and why?

a) $amp^R bio^- gly^+$ $amp^R bio^- gly^+$ $amp^R bio^+ gly^+$

b) $amp^S bio^+ gly^-$ $amp^R bio^+ gly^+$ $amp^R bio^+ gly^-$

c) $amp^R bio^+ gly^+$ $amp^R bio^- gly^+$ $amp^S bio^+ gly^+$

d) $amp^R bio^- gly^+$ $amp^S bio^+ gly^+$ $amp^R bio^+ gly^-$

3

viii) You have inoculated 1000 bacterial cells in a medium at 8 am. Calculate the no of cell at 8 pm (still in log phase), if the generation time of bacteria is 30 min and there was 2 hrs lag phase.

BARASAT GOVERNMENT COLLEGE

BOTANY

M.Sc. Semester-II Examination 2022

COURSE CODE: BOTPCOR06T

(Angiosperms Systematics)

Time: 2 hrs

Full Marks: 40

Figures in the margin indicate full marks
Candidates should answer in their own words and adhere to the word limit as practicable.

1. Answer any five from the following: 2x5=10

a) What do you understand by alpha and omega taxonomy?

b) Distinguish isotype from paratype.

c) What is the recent classification of flowering plants? Mention the basis of this classification.

d) Name two phenolics used as Taxonomic evidences.

e) Name two advanced features of Asteraceae and Orchidaceae.

f) Define outgroup and sister group?

g) How anagenesis differs from cladogenesis?

2. Answer any six of the following questions: 5X6=30

a) With one example for each explain the use of "et", "ex", "in" and parenthesis in author's citation. 5

b) Give examples for two different types of illegitimate names for plants. With examples explain the meanings of "nom. nov." and "comb. nov." 2+3

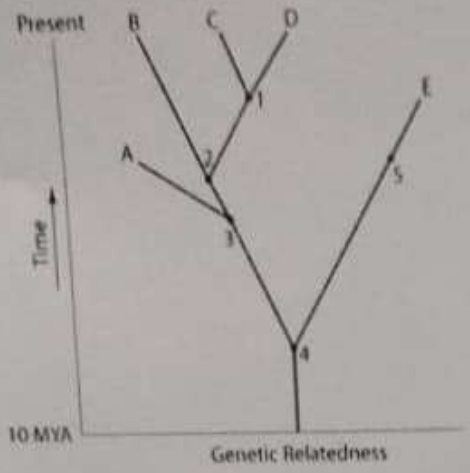
c) Give an idea of primitive and advanced angiosperm characters as given by Takhtajan. 5

d) Give an outline of Cronquist's system of classification (1988) with bubble diagrams. Mention its one merit and one demerit. 3+2

e) Write two salient features of Magnoliales. Give a brief idea of its interrelationship and evolution. 1+(2+2)

[TURN OVER]

f) On the basis of the phylogenetic tree given below answer the following questions:



(i) The common ancestor for both C and D is located at what position number?

(ii) Which two extant species are most closely related to one another and why?

(iii) Can the extinct species be identified from the information provided in the tree? If yes, then identify them. 1+2+2

g) What are the three major types of DNA used in molecular systematic studies? In chloroplast DNA what are the large single copy region, small single copy region and inverted repeats? Why the Chloroplast genome is considered more reliable and useful in comparison to mitochondrial genome in plant phylogeny studies at different taxonomic levels? 1+3+1

h) Briefly discuss the basic principles of numerical taxonomy. How overall similarity is calculated between operational taxonomic units? 3+2

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BARASAT GOVERNMENT COLLEGE
(WEST BENGAL STATE UNIVERSITY)
BOTANY
M.Sc. Semester-II Examination, 2022
(Diversity of Plant life: PTERIDOPHYTES, GYMNOSPERMS, PALAEOBOTANY & PALYNOLOGY)
Course Code: BOTPCOR09T

Time: 2 Hours **Full Marks: 40**

The figures in the margin indicate full marks allotted for each question. Candidates should answer all the question in their own words.

1. Answer any five questions from the following: 2x5

(a) What is " Filmy fern" ? Give one example. 2

(b) What do you mean by genetic load? 2

(c) Differentiate between explant culture and embryo culture? 2

(d) What do you mean by pollination syndrome? 2

(e) Enumerate the characteristics of a good index fossil. 2

(f) Distinguish between holotype and isotype. Which suffixes are used for naming a fossil wood and a fossil seed? 1+1

(g) Diagrammatically represent the exine structure of an angiosperm pollen grain. What is sporopollenin. 1+1

2. Answer any six of the following: 5 x 6 = 30

(a) Name a fern which possess unusual leaf morphology. Write a brief account on sex determination of femaleness in free sporing heterosporous pteridophytes. 1+4

(b) Distinguish between obligate and facultative apogamy. Mention the factors influencing in-vitro apogamy in ferns. State the major in-vitro culture methods employed in ferns. 1+2+2

(c) How drought resistance differs from drought resilience? Briefly discuss the mechanisms of drought tolerance in conifers. 2+3

(d) Distinguish between fertilization fluids and pollination drops. Briefly discuss the modification of ovular secretion chemistry in ambophilous gymnosperms. 2+3

(e) What is reconstruction of fossils? What types of problems are encountered during reconstruction of fossils? How such problems are solved? 1+1+3

(f) With labeled diagram and examples discuss hydrasperman reproduction in early gymnosperms. 5

[TURN OVER]

(g) **Write short notes on (any two):** **2.5 x 2**

(i) Aperture types in angiosperm pollen grains.

(ii) Endomycorrhiza in *Agalophyton* and *Rhynia.*

(iii) Life in the Warrawoona group.

(h) Briefly discuss the evolution of closed carpels in gymnosperms taking evidence from Corystospermales. 5

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BARASAT GOVERNMENT COLLEGE
(WEST BENGAL STATE UNIVERSITY)
BOTANY

M.Sc. Semester-II Examination, 2022
(Plant Pathology and Crop Protection)
Course Code: BOTPCOR08T

Time: 2 Hours **Full Marks: 40**

The figures in the margin indicate full marks allotted for each question. Candidates should answer all the question in their own words.

1. Answer any five questions from the following: 2x5

(a) What is exclusion? Cite an example.
(b) Differentiate between phytoalexin and phytoanticipin. Name one suppressor of phytoalexin biosynthesis.
(c) Why is the activity of phenol oxidizing enzyme (Polyphenol oxidase) generally higher in infected tissue of resistant varieties.
(d) What is oxidative burst?
(e) Name the pathogen causing blast of wheat? Give one control measure.
(f) Name a Oomycetous plant pathogen and a chemical used against it.
(g) Who is the 'Father of plant pathology' in India and name a book authored by him.

2. Answer any six of the following: 5 x 6 = 30

(a) Enumerate pre-existing and induced morpho-anatomical defense mechanism in plant. 5
(b) Mention the role of salicylic acid in SAR signal transduction. 5
(c) Distinguish between host specific and non host specific toxins. Briefly describe the mode of action of Victorin and T-toxin. 1+2+2
(d) How cellulose and pectic substances in plant cell wall are macerated enzymatically *in vivo* by invading pathogens? 5
(e) What are the symptoms of black stem rust of wheat? Draw and describe the disease cycle. 2+3
(f) What is hybrid necrosis? Explain the physiological mechanism of hybrid necrosis? 2+3
(g) Define antibiosis and hypovirulence. Describe their role in biological control of plant diseases. 2+1.5+1.5
(h) Discuss the process of defensive mechanism in plant against viruses through RNA silencing by pathogen derived genes. 5

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BARASAT GOVERNMENT COLLEGE
(WEST BENGAL STATE UNIVERSITY)
BOTANY
M.Sc. Semester-II Examination, 2022
(Plant Biodiversity and Conservation)
Course Code: BOTPSEC01T

Full Marks: 20

Time: 1 Hour

The figures in the margin indicate full marks allotted for each question. Candidates should answer all the question in their own words.

Q.1. Answer any TEN questions from the following: 1×10

(a) What do you mean by biodiversity crisis?

(b) What is the full form of TRAFFIC? Mention its activity.

(c) Mention the significance of Red data book.

(d) Give an example of wild life sanctuary and mention its particular purpose.

(e) Write the full form of 'CITES' and state its activity.

(f) Mention the role of natural history museums in conservation.

(g) Distinguish between α and β diversity.

(h) Write the full form of CMFRI and mention its function.

(i) How a wildlife sanctuary differs from a National Park?

(j) Define cryopreservation and state its importance.

(k) Name the biodiversity hot spot regions shared by our country.

(l) What do you mean by artificial seed?

(m) Name one Biosphere Reserve located in West Bengal.

(n) Distinguish between ex-situ and in-situ conservation.

Q. 2. Answer any TWO questions from the following: 2x5

(a) What do you mean by biodiversity in cities and towns? 2.5+2.5

(b) Mention the salient features of Wildlife protection act (1972) of India. Briefly describe the measures taken to control poaching and wild life trade. 3+2

(c) What are the reasons behind conserving PGR? Name one regional station of NBPGR. Write a brief note on United Nation convention on Biological diversity. 2+1+2

Plant Genetic Resources Dehradun Lucknow

(d) Briefly discuss the main objectives of BSI and ZSI. 2.5+2.5

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BARASAT GOVERNMENT COLLEGE
(WEST BENGAL STATE UNIVERSITY)
BOTANY
M.Sc. Semester-II Examination, 2022
(Plant Ecology)
Course Code: BOTPCOR07T

Time: 2 Hours **Full Marks: 40**

The figures in the margin indicate full marks allotted for each question. Candidates should answer all the question in their own words.

1. Answer any five questions from the following: 2x5

(a) Draw the structure of 'silica tetrahedron' and 'aluminum octahedron' of soil micelles.

(b) Define inflection point and mention its relation with carrying capacity.

(c) Distinguish between nitrogen fixation and nitrification.

(d) Differentiate between chamaephytes and therophytes.

(e) What are autogenic and autotrophic succession?

(f) What are the criteria for biodiversity hot spots ? Name the hot spots shared by our country.

(g) What do you understand by Savannahs?

2. Answer any six of the following: 5 x 6 = 30

(a) With schematic diagrams describe briefly isomorphous substitution and cation exchange capacity of clay particles. 2+3

(b) Write the properties and equations for "J" and "S" shaped growth. Write the significance of r and k for a population. 3+2

(c) Give a brief idea of niche shift and character displacement. 2+3

(d) Differentiate detritus and grazing food chain. Explain the components of energy transfer efficiency from one trophic level to the next. 2+3

(e) Explain with chemical equations the ozone cycle and ozone depletion process in stratospheric layer. Write two harmful effects of ozone depletion on plants. 4+1

[TURN OVER]

(f) With schematic diagrams explain the models of successionn as given by Clements, Egler, Connel & Slatyre and Lawton. 5

(g) Discuss in brief the structure and role of biosphere reserve in conservation of biodiversity. 5

(h) What do you understand by species diversity and species richness? With schematic diagrams explain the relationship among alpha, beta and gamma diversity. 2+3

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BARASAT GOVERNMENT COLLEGE

BOTANY

M.Sc. SEMESTER-II CLASS TEST, 2022

DEPARTMENTAL: 8T

PLANT PATHOLOGY & CROP PROTECTION

Time: 1 Hour | Full Marks: 20

Q1. Answer *all* questions.

a) Define inoculum potential. What are the factors affecting inoculum potential? 1+2=3

b) Define pathotoxin, vivotoxin and phytotoxin 3

c) Describe the structure of R gene. 2

d) What is gene for gene hypothesis? 2

e) Write down the name of possible enzymes involved in causing soft rot of apple caused by *Penicillium*sp in storage. 2

f) What is kresek phase of bacterial blight of rice? 2

g) How can you express the quantitative output of plant immunity in response to pathogenic invasion? 3

h) Write down the causal organism and symptoms of disease 'Wilt of pigeon pea'. 1+2=3

OR

Draw the disease cycle of 'Early blight of potato'. 3

DEPARTMENT OF BOTANY

BARASAT GOVT.COLLEGE

PG SEMESTER-II; Internal Examination, 2022

PAPER: BOTPCOR09T (Diversity of Plant Life- Pteridophytes, Gymnosperms, Paleobotany &Palynology**)**

Time: 1 hr | Date: 21.6.2022 | Full Marks: 20

Answer the following questions,* figures *in the margin indicate full marks

1. What do you mean by induced apospory? 1

2. What is syndiploidy? Give an example of an obligate apogamous fern which does not exhibit syndiploidy. 1+1

3. Why apogamous ferns are found in dry habitats? 1

4. Why fern spores exhibit autofluroscence? 1

5. What is ambophily? 1

6. Distinguish between isohydric and anisohydric conifers. Mention two anatomical adaptations by which conifers tolerate drought. 1+1

7. What is litter? What do you mean by litter mass loss? 1+1

8. What is a pre-ovule? How is it different from modern day ovules of extant angiosperms? 2

9. What are Cycadofilicales? Why are they called so? 2

10. How algal stromatolites are significant to study Pre-Cambrian life on earth? 2

11. Write briefly the significance of fossil epiphyllous fungi. 2

12. Write the salient characteristics of aquatic plants which helped them in successful colonization of terrestrial environment. 2

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(23)

No.

BARASAT GOVERNMENT COLLEGE
PG Department of Botany
M.Sc. Semester- II (Mid Sem.) Examination 2022
Subject- Botany, Paper- Taxonomy of Anglosperms

Time: 1 Hour. Zoology FM- 20

Answer any ten of the following questions: 10x2=20

1. What do you understand by ramet and genet?
2. Distinguish unitary and modular individuals.
3. Name the ecological hierarchy.
4. What are the different types of distribution patterns of populations?
5. What are ecological neighbourhood and ecologically effective density?
6. Define realized natality and theoretical mortality.
7. What is logarithmic growth rate? Why it is named so?
8. What are "r", "K" in Logistic growth equation?
9. Characterise K- selected species. Why it is named so?
10. What is opportunity factor and what is its significance?
11. What is Inflexion point and what factors determine its value?
12. Give the equations for Predator- prey model.
13. Write the meanings for alpha and beta in Lotka-Volterra equations.
14. Give the graphical representation for predator – prey interaction when they coexist together.
15. Give the components of transfer efficiency.
16. Define niche according to Grinnell and explain niche width.

No.

BARASAT GOVERNMENT COLLEGE
PG Department of Botany
M.Sc. Semester- II (Mid Sem.) Examination 2022
Subject- Botany, Paper- Taxonomy of Angiosperms

Time: 1 Hour. FM- 20

Answer any ten questions 10x2=20

1. Write the importance binomial Nomenclature.
2. Write the full form, Author's name and importance of FBI.
3. Write short note on priority of publication.
4. Sequentially write the principles of ICBN.
5. Mention the conditions of effective publication.
6. Mention the conditions for valid publication.
7. Explain with examples synonym and basionym.
8. What is type concept? Name different kinds of type specimens.
9. .Explain with example holotype.
10. Explain with example neotype.
11. Explain with example lectotype.
12. Differentiate with one example artificial and phylogenetic systems of classification.
13. Why phylogenetic system is much proffered than artificial and natural systems?
14. Write some primitive and advanced vegetative characters of Angiosperms.
15. Write some primitive and advanced floral characters of Angiosperms.
16. Draw the bubble diagrams given by Arthur Cronquist for monocots and dicots.

DEPARTMENT OF BOTANY
BARASAT GOVT.COLLEGE
PG SEMESTER-II; Internal Examination, 2022
PAPER: SEC (Biodiversity & Conservation)

Time: 30 mins

Full Marks: 10

Answer the following (Figures in the margin indicate full marks)

1. What is meant by National Park? Give an example. (2)

2. Briefly discuss about the principle of conservation agriculture. (3)

3. State the role of National Bureau of Plant Genetic Resources in conservation. (3)

4. Distinguish between ex-situ and in-situ conservation. State the role of Botanical Survey of India in conservation of biological diversity. (1+1)

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BARASAT GOVERNMENT COLLEGE

BOTANY

M.Sc. SEMESTER-II EXAMINATION-2022

SEC-1

PLANT BIODIVERSITY AND CONSERVATION

Time: 1 Hours **Full Marks: 20**

Answers to all the questions must be written as for as practicable in your own words. The figures in the margins represent the marks allotted for each question.

Q.1. Answer any FIVE questions from the following: **1x5**

(a) What do you mean by biodiversity crisis? 1

(b) What is TRAFFIC? 1

(c) Mention significance of Red data book. 1

(d) Define opportunistic species. 1

(e) Give an example of Sanctuary. 1

(f) What is the full form of 'CITES'? 1

(g) State the role of natural history museums in conservation? 1

(h) The Earth summit was held in which year and where? 1

(i) Write the full form of CMFRI. 1

(j) What is ex-situ conservation? 1

(k) Mention the primary objective of Nagoya protocol. 1

Q. 2. Answer any THREE questions from the following: **3x5**

(a) What do you mean by biodiversity in cities and towns? Describe faunal region. Define threatened species. 2+2+1

(b) Mention the types of biodiversity. State the relationship between climatic zones and biodiversity. Mention significance of biodiversity hotspots and name two hotspots of India. 1+2+ (1+1)

(c) What is CITES? Briefly discuss the salient features of Wildlife protection act (1972) of India. 1+4

(d) Describe the measures taken to control poaching and wild life trade. 5

(e) How a wildlife sanctuary differs from a National Park? Briefly discuss the role of Protected Areas (PA's) in conservation of biological diversity. 2+3

(f) Write down the features of conservation agriculture systems and its role in conservation. 3+2

(g) What is PGR? What are the reasons behind conserving PGR? Name the regional stations of NBPGR. 1+3+1

(h) Write a short note on United Nation convention on Biological diversity. 5

(i) What is artifical seed? How do artificial seeds differ from biological Seeds?

State the role of somatic embryos and artificial seeds in biodiversity conservation. 1+1+3

(j) What are the main objectives of ZSI and BSI? 2.5+2.5

Barasat Govt. College
Department of Botany
PG Semester-III
Internal Examination, 2022
PAPER- BOTPCOR11T
(Molecular & Cellular Genetics & Plant Breeding)

Time: 1 hour **Full marks: 25**

Figures in the margin indicate full marks

1. Answer the following (Any two): 2x2=4

a) Distinguish between overlapping and included inversion.
b) What is segmental allopolyploid?
c) What is meant by partial sex linkage?

2. Write short notes on the following (Any three): 3x3=9

a) Multigenic sex determination in plants
b) Origin of *Brassica* species
c) Cytological consequences of Trisomy.
d) Meiotic consequences of three strand double cross over in paracentric inversion loop
e) Origin of duplication in Bar eye locus of *Drosophila*

3. Define overlapping gene and pseudo gene. 1+1=2

Or

Give the full form of VNTR, SSR, STS, RFLP 0.5 x 4 = 2

4. Describe eukaryotic splicing mechanism in relation to spliceosome. Give proper diagram. 2+2=4

Or

Describe the splicing mechanism of *Tetrahymena*. Give proper diagram. 2+2=4

5. Draw and describe three types of microtubules. Define (+) end and (–) end. Mention the function of these ends. 1.5+1.5+1+1+1=6

Or

Define APC. Describe the composition of cohesion complex. Draw and describe sister chromatid separation. 1+1+2+2=6

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Barasat Govt College
Post Graduate Department of Botany
MSc III Semester Internal Examination
Subject Botany
Paper XIIIB (Phytochemistry and Pharmacognosy)

Time 1h **Full Marks 20**

1Q. Answer any 3of the following 3X2=6

a. What are steroids? Mention different types of steroids. 1+1

b. What are Polyols? Site examples of polyols (one natural and one artificial) 1+1

c. Write composition of *Catharanthus* and Aloe 1+1

d. Write the main groups of Carotenoids? Mention their importance. 1+1

2Q. Mention the classification of alkaloid on the basis of their pharmaceutical action. Site examples. 3+1

OR

Classify phenolics based on their parent structure mention their the source of each them. 4+2

3Q. What is Chromatography? Write the principles of chromatographic process. What is meant by the term R_f value? On what factors does the R_f value of a compound depend? 1+1+1+1

OR

Enumerate the glycosides according to their glycon and aglycon moiety. 2+2

4Q. What do you mean by Ethnopharmacognosy and ethnomedicine? Write the importance of ethnopharmacology in drug developments.

1+1+2

OR

With suitable example write the advantages and disadvantages of subunit vaccines. What is Fc? What is hapten? 2+1+1

Barasat Govt. College
Department of Botany
PG Semester-III
Internal Examination, 2022
PAPER- BOTPCOR11T
(Molecular & Cellular Genetics & Plant Breeding)

Time: 1 hour 30 mins **Full marks: 30**

Figures in the margin indicate full marks

1. Answer the following (Any five): 5x2=10

(a) Name one Hydroxylating agent which is responsible for DNA damage. Describe in brief with an example.

(b) What is CAF-1 and CPD?

(c) In which DNA repair mechanism Lex A plays an important role? What is AP site?

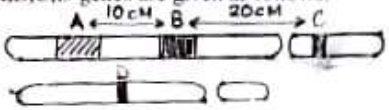
(d) What is protein engineering?

(e) State in brief the basic process of SDM.

(f) What are the advantages and disadvantages of transposon mutagenesis?

2. **Answer the following (Any five):** 5x2=10

(a) Location of A,B,C,D genes are given as follows:



Arrange these genes in ascending order based on linkage between A and others.

(b) Why F_2 phenotype ratio is modified to 9:7 instead of 9:3:3:1 in flower colour of sweet pea.

(c) Distinguish between maternal inheritance and maternal effect with proper examples.

(d) Calculate fixation index from the given data of a population of 500 individuals for a single locus with two alleles.

Genotype	*Observed Number*
TT	300
Tt	180
tt	020

(e) Determine the proportion of genotype Aa BB cc Dd in F_2 generation will be producing by selfing of Aa Bb Cc Dd.

(f) Two homozygous varieties of *Nicottana longiflora* have mean corolla lengths of 40.5 cm and 93.3 cm. The average of the F_1 hybrids from these two varieties was of intermediate length. In F_2 generation, only 1 offspring out of 256 exhibited corolla length similar to one parent. Calculate the minimum number of genes involved in corolla length determination.

P.T.O

3. **Answer the following (Any five):** 5x2=10

(a) The following list are the genotypes of 3 strains of *E.coli*. For each strain indicate whether the *Z* gene product will be expressed in presence of lactose and whether it will be expressed in the absence of lactose. Explain your answer.

(i) $I^{S}P^{+}O^{+}Z^{+}$

(ii) $I^{+}P^{+}O^{+}Z^{+}$

(iii) $I^{+}P^{+}O^{+}Z^{+}$

(b) Compare the effect of a deletion in the operator of the lactose with one in the operator of tryptophan operon.

(c) What would be the effect on transcription if a bacterial cell does not possess sigma factor and rho (ρ) protein?

(d) How does UV damage induce the lytic cycle in phage λ ?

(e) What are enhancers and silencers? What is unusual about the promoters of genes transcribed by RNA Pol III?

(f) Why B chromosomes are regarded as nuclear parasites? Are B chromosomes devoid of functional genes?

BARASAT GOVT. COLLEGE

P.G DEPARTMENT OF BOTANY

M.Sc. SEMESTER-III INTERNAL EXAMINATION- 2022

PAPER: GEC-1- Instrumentation (BOTPGEC01T)

TIME: 1 hr ***Figures in the margin indicate full marks*** **F.M: 20**

Answer the following: **(2X10=20)**

1. What is colony PCR? What features are essential for a bacterial cloning vector? **(1+1)**
2. A Kan^r, Tet^r plasmid is treated with the restriction enzyme BglI, which cleaves the Kan (Kanamycin) gene. The DNA is annealed with a BglI digest of *Neurospora* DNA and then used to transform *E. coli*.
   (a) What antibiotic would you put in the growth medium to ensure that each colony has the plasmid?
   (b) What antibiotic resistance phenotype would be found among the resulting colonies? **(1+1)**
3. Write down the significance of SDS and chilled 70% ethanol in DNA isolation. **(2)**
4. Draw a schematic diagram of 2D gel of a protein mixture have protein A (m.w 20D, pI 6.5), B (m.w 40D, pI 7.5), C (m.w 20D, pI 7.5), D (m.w 10D, pI 4.5), E (m.w 50D, pI 8.7), F (m.w 25D, pI 3.5), and G (m.w 40D, pI 6.5).m.w= molecular weight, D= Dalton. **(2)**
5. If protein "A" with isoelectric point (pI)= 5.7 is kept in a solution of pH 6.8, pH 5.7 and pH 3.4, what will be the net charge of the protein in each solution? **(2)**
6. Compare Scanning and Transmission electron microscopy**.** **(2)**
7. What is meant by freeze fracture method? **(2)**
8. Briefly state the mechanism for biotinylation of antibodies. **(2)**
9. Explain the significance of dichroic mirror in fluorescent microscopy. **(2)**
10. How can you differentiate between a VT and a normal nucleotide? State the use of TCEP in this sequencing process. **(2)**

M.Sc. Sem-IV Internal Examination 2022

Virology Mycology Special

Departmental 16

FM-20 Time:1hr

1. Answer in brief [7x2]

i. Name two satellite viruses.
ii. Write four properties of viriods.
iii. Name two viruses which are transported by nematodes.
iv. Name two enzymes which can be used in ELISA.
v. What is plaque?
vi. Give two examples of Tobarmavirus.
vii. Name two negative stranded RNA viruses.
viii. How many ORFs are found in Closterovirus? Give an example.
ix. Give two examples of Geminivirus.
x. Give the scientific name of the vector of Rice tungrovirus. Name one symptom of this disease.

2. Answer any two [2x3]

i. Draw the genome organization of Potyvirus/Closterovirus.
ii. Write four characters of satellite.
iii. Virus codes protein but viriod does not—Comment on it.
iv. Draw the replication process of Geminivirus.

BARASAT GOVERNMENT COLLEGE

POST GRADUATE DEPARTMENT OF BOTANY

M Sc 3rd SEMESTER CLASS TEST

Departmental 12

PLANT PHYSIOLOGY AND BIOCHEMISTRY

Date: 20/12/2022 F.M. 20

Time : 1 hour

Answer any four from the following questions 4X5 = 20

1. Explain how light regulates the dark reactions of photosynthesis. How ATP : ADP ratio can affect the activity of Rubisco? (3+2)
2. What is chloroplast dimorphism? How anatomical and biochemical adaptations make C 4 plants more efficient than C3 plants? (1+4)
3. What is gluconeogenesis? Enumerate its similarities and dissimilarities with glycolysis. How gluconeogenesis can affect the metabolic flux of Krebs cycle? (1+3+1)
4. Write note on **any two** (2.5+2.5)
   a. Effect of NADH:NAD$^+$ ratio on Pyruvate dehydrogenase complex
   b. Oxaloacetate slump in Krebs cycle
   c. Krebs cycle as an amphibolic phenomenon
5. Define Anapleurotic reactions in Krebs cycle. Enumerate the cataplerotic reactions involved which affect the metabolic flux of Krebs cycle. (1+4)
6. State the committed enzyme of glyoxylate cycle. How β oxidation is related with glyoxylate cycle? Explain how glyoxylate and TCA cycles are related with one another. (1+1+3)
7. Distinguish between (2.5+2.5)
   a. Hexokinase and Glucokinase
   b. Pyruvate carboxylase and PEP carboxykinase

M.Sc. SEMESTER-III INTERNAL EXAMINATION, 2023
BOTANY
Course Code: BOTPGEC01T
GEC- 1 (INSTRUMENTATION)

Time: 1 hr **F.M: 20**

1. Answer <u>any ten</u> from the following in brief: **10 X 2=20**

(a) What is automated DNA sequencing? Mention its advantages. 1+1

(b) Distinguish between a genomic and a c-DNA library. 2

(c) What do you mean by expression vector and reporter gene? 2

(d) Distinguish between a primer and a probe. 2

(e) What are the characteristics of an electron gun? 2

(f) What do you mean by dead time? 2

(g) Why isolation of plasmid DNA is carried out in an alkaline environment? 2

(h) What is the difference between scanning and transmission electron microscopy? 2

(i) How native PAGE differs from SDS PAGE? 2

(j) Mention the advantages of scintillation counter over Geiger Muller counter. 2

(k) Mention the role played by lysozyme and EDTA in plasmid DNA isolation. 2

(l) Mention the role played by peroxidase and luminol during Western blotting. 2

(m) What do you mean by Radiation dosimetry and Townsend avalanche effect? 2

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M.Sc. Sem-IV Internal Examination 2023

Virology Mycology Special

Departmental 16

FM-20 Time:1hr

1. Answer in brief (any two) [2x2]=4

i. Name two viruses which are transmitted through pollen.
ii. Name two viruses which are transported by nematodes.
iii. What is pfu?
iv. Give two examples of Tobamovirus.
v. How animal virus can be cultured?
vi. How many ORFs are found in Closterovirus? Give an example.

2. Answer any two [2x3]=6

i. Draw the genome organization of Potyvirus.
ii. Write a note on symptoms of virus-mediated plant diseases.
iii. Diagrammatically show any type of ELISA
iv. Draw the replication process of Closteroviruses/Topsoviruses.

BARASAT GOVERNMENT COLLEGE
(WEST BENGAL STATE UNIVERSITY)
BOTANY M.Sc. SEMESTER-III EXAMINATION, 2023
Course Code: BOTPCOR11T

(Molecular & Cellular Genetics & Plant Breeding)

Time: 2 Hours **Full marks: 40**

The figures in the margin indicate full marks. Candidates should answer in their own words and adhere to the word limit as practicable. All symbols are of usual significance.

1. Answer Any Five from the following: **5 x 2 =10**

(a) What is meant by quadruplex autotetrapliod? 2

(b) Comment on expected frequency of parental and recombinant progenies in a testcross of two genes which showed complete linkage and incomplete linkage. 2

(c) A plant may have green, white, or variegated (green-and-white) leaves on its branches, owing to a mutation in the chloroplast that prevents colour from developing. Predict the phenotype of progenies with reasons when egg and pollen developed from Variegated and green branch plants are crossed respectively. 2

(d) What are ITRs? 2

(e) There are five structural genes in the trp operon, yet the operon codes for only 3 enzymes- Explain. 2

(f) Why are most plaques caused by λ phage turbid in appearance? 2

(g) What important characteristics do eukaryotic transcription factors have in common with prokaryotic σ factors? 2

2. Answer Any Six from the following: **6 x 5 =30**

(a) Some sweet-pea plants have purple flowers and other plants have white flowers. A homozygous variety of pea that has purple flowers is crossed with a homozygous variety that has white flowers. All the F1 have purple flowers. When these F1 are self-fertilized, the F2 appear in a ratio of 9/16 purple to 7/16 white. **(i)** Give genotypes for the purple and white flowers in these crosses, **(ii)** Write down the gene interaction that cause such result, **(iii)** Draw a hypothetical biochemical pathway to explain the production of purple and white flowers in sweet peas. 1+1+3

(b) Cite an example of multiple alleles. Give the Hardy–Weinberg expected genotypic frequencies for an autosomal locus with three alleles. Orange coat color of cats is due to an X-linked allele (X^O) that

is codominant with the allele for black (X^*). Genotypes of the orange locus of cats in Kolkata, were determined, and the following data were obtained: X^OX^O females 11; X^OX^* females 70; X^*X^* females 94; X^OY males 36; X^*Y males 112. Calculate the frequencies of the X^O and X^* alleles for this population. 1+1+3

(c) What is transposon mutagenesis? What are the advantages and disadvantages of in vitro mutagenesis? Which method is used to alter the nucleotide sequence of cloned DNA at a unique position? 1+2+2

(d) What is tautomerization? What is FEN-1? Differentiate between lesion bypass and SOS response in DNA repair mechanism. 1+1+3

(e) Distinguish between a repressor and a co repressor. How do repressors that bind to silencers in eukaryotes differ from repressors that bind to operators in bacteria? Suppose you have cloned a gene from *Petunia* and want to know which tissue (roots, stems, leaves, flowers or seeds) transcribes this gene to the greatest extent. How do you use a Northern blot to answer this question? 1+1+3

(f) A mutation prevents the CAP from binding to the promoter in the lac operon. What will be the effect of this mutation on the transcription of the operon? Explain why mutations in the lac I gene are trans in their effects, but mutations in the lac O gene are cis in their efects? Which phage gene would not be expressed after the λ lytic cyle is underway? 2+2+1

(g) Phenotypic variation is analyzed for milk production in a herd of dairy cattle and the following variance components are obtained: Additive genetic variance (V_A) = 0.4; Dominance genetic variance (V_D) = 0.1; Genic interaction variance (V_I) = 0.2; Environmental variance (V_E) = 0.5; and Genetic-environmental interaction variance (V_{GE}) = 0.0. Calculate the narrow-sense and broad-sense heritability of milk production? How does a quantitative characteristic differ from a discontinuous characteristic? 3+2

(h) Give the full forms of VNTR, SNP, STR and SCAR. Compare RAPD, RFLP and AFLP in detecting genetic polymorphism. 2+3

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BARASAT GOVERNMENT COLLEGE
(West Bengal State University)
BOTANY M.Sc. Semester- III Examination, 2023
Course Code: BOTPCOR012T
[PLANT PHYSIOLOGY & BIOCHEMISTRY]

Time: 2 Hours **Full marks: 40**

The figures in the margin indicate full marks. Candidates should answer in their own words and adhere to the word limit as practicable. All symbols are of usual significance.

1. Answer <u>Any Five</u> from the following: **5 x 2 =10**

(a) "Transition state analogues are potent inhibitors of enzymes" - Explain.

(b) How ligand gated channels are different from voltage gated channels?

(c) What is NPA motif in aquaporins? Mention its significance.

(d) Can we consider RUBISCO as an ancient enzyme? Give supportive evidence for your answer.

(e) How drought avoiding plants are different from drought tolerant plants. Give examples.

(f) How glyoxylate cycle is linked to Krebs cycle?

(g) What are 'molecular chaperones' ?

2. Answer <u>Any Six</u> from the following: **6 x 5 =30**

(a) Explain the role of Ferredoxin-thioredoxin system in carbon reduction cycle of photosynthesis. What is RubisCO activase? How does it affect CO_2 assimilation in plants? 2+1+2

(b) Is glucokinase an isoenzyme of hexokinase? Explain in brief. Under what circumstances formation of Acetyl-CoA can be limited in plants? 3+2

(c) Explain the role of Ca^{+2} in managing abiotic stress tolerance in plants? What is the role of inducible genes during abiotic stress of plants? 2+3

(d) Why Krebs cycle is an amphibolic phenomenon? Discuss in salient points the factors affecting Krebs cycle. 1+4 ~~1.5+4.5~~

(e) Schematically represent the stages of gibberellin biosynthesis. Name two inhibitors of gibberellin biosynthesis having growth retardation properties. AMO-1618 3+2

(f) Briefly enumerate a comparative account on 'ribozyme' and 'abzyme'. 5

(g) Schematically describe signal transduction process in relation to perception of blue light and subsequent regulation of stomatal conductance. 5

(h) How does phytochrome regulate the synthesis of 'LHCB' gene expression in association with circadian rhythm? 5

BARASAT GOVERNMENT COLLEGE
(West Bengal State University)
BOTANY M.Sc. Semester- III Examination, 2023
Course Code: BOTPDSE01T
(PHYTOCHEMISTRY AND PHARMACOGNOSY)

Full Marks: 40

Time: 2 Hours

Answer all questions. Marks for each question is indicated at the right hand margin.

1. Answer Any Five from the following: **5 x 2 =10**

(a) What are phytoestrogens? Give examples 1+1

(b) What is pectin? Mention the biological activity of pectin. 1+1

(c) Name the lignin producing pathway mentioning the end-products. Coumarin alcohol 2

(d) What is NMR? Mention its importance in natural product chemistry. 2

(e) Name one hallucinogenic and one allergenic plant. 2

(f) What is apocarotenoid? Give two examples. 2

(g) Name the precursor and the end products of acetate pathway. 2

2. answer Any six of the following: **6x5=30**

(a) Describe and classify tannins mentioning their importance. 3+2

(b) Describe the chemistry of resins. What are the differences between volatile oils and fixed oils. 3+2

(c) Describe the pharmacological activities of plant drugs having hypoglycemic, anti-hepatotoxic and tumor inhibitory properties. 1.5+1.5+2

(d) Classify phenolics based on their parent structure and mention the sources of each of these. 3+2

(e) Why carotenoids are considered as antioxidants? How are carotenoids related to good vision? Discuss briefly on the bioavailability of carotenoids with reference to their bioactivity. 1+2+2

(f) With suitable examples write a note on advantages and disadvantages on different types of vaccines. 5

(g) What are steroids? Give some examples of steroids with biological functions. What are the main types of lipids? How are lipids classified according to their solubility. 1+2+1+1

(h) How would you distinguish ethnopharmacognosy from ethnomedicine? Mention the ethnomedicinal and ethnopharmacological aspects of 2 medicinal plants used in Indian traditional Medicine. State the importance of ethnopharmacognosy. 2+2+1

BARASAT GOVERNMENT COLLEGE
(WEST BENGAL STATE UNIVERSITY)
BOTANY M.Sc. SEMESTER-III EXAMINATION, 2023
Course Code: BOTPGEC01T
(INSTRUMENTATION)

Time: 2 Hours Full marks: 40

Answer all questions. Marks for each question is indicated at right hand margin.

1. Answer <u>any five</u> from the following in brief: **5 x 2=10**

(a) Write the advantages of Automated DNA sequencing. 2

(b) What is episome? 2

(c) State the role of lysozyme, triton X 100 and EDTA in plasmid isolation. 2

(d) What is SDS-PAGE? 2

(e) What is the function of immersion oil in microscopy? 2

(f) How is contrast achieved in the electron microscope? 2

(g) What is scintillation ? 2

2. Answer <u>any six</u> from the following: **5x6=30**

(a) What is limit of resolution? Describe the principle of production of Contrast in Phase-Contrast Microscopy. 1+4

(b) State the working principle of Geiger Muller counter. State the advantages of scintillation counters over Geiger Muller counters. 3+2

(c) Describe briefly the assay of Cytochrome c during apoptosis by western blotting. Briefly describe the assay of Procaspase-3 degradation during apoptosis by western blotting. 2+3

(d) Describe the synthesis of cDNA with proper diagram. State the differences between integrative and non- integrative plasmid replication. 3+2

(e) Describe λ vector and Cosmid vector in genetic engineering with proper illustrations. 2.5+2.5

(f) Describe detection of apoptotic changes of cells by nuclear protein Lamin B using western blotting. State the role of peroxidase and Luminol in western blotting. 3+2

(g) Write down the steps of separation of genomic DNA by agarose gel electrophoresis. Give a brief outline of the steps involved in Southern blotting? 3+2

(h) Describe briefly the isolation procedure of plasmid DNA on the basis of ETBr, Caesium chloride density gradient centrifugation method. State two applications of genetic engineering. 3+2

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