Total number of printed pages–7

63(FY) SEM–4/MIN/BOTMIN2024

2025

BOTANY

(Minor)

Paper : BOTMIN2024

(Analytical Techniques in Plant Sciences)

Full Marks : 50

Pass Marks : 20

Time : Two hours

The figures in the margin indicate full marks for the questions.

1. Choose the correct answer : 1×5=5

শুদ্ধ উত্তৰটো নিৰ্বাচন কৰা ঃ

(a) R_f value is used in

R_f মান ব্যৱহৃত হয়

(i) Electrophoresis

ইলেক্ট্ৰ'ফ'ৰেছিছ

(ii) Centrifuge

চেন্ট্ৰিফিউজ

(iii) Chromatography
ক্রমেটগ্রাফী

(iv) Spectrophotometer
স্পেক্ট্রফটমিটাৰ

(b) The microscope was invented by
অণুবীক্ষণ যন্ত্ৰৰ আবিষ্কাৰক হ'ল

(i) Leeuwenhoek
লিউৱেনহুক

(ii) Robert Hook
ৰবাৰ্ট হুক

(iii) Louis Pasteur
লুই পেষ্টুৰ

(iv) Aristotle
এৰিষ্টটল

(c) Marker enzymes Lamin A and C are associated with
মাৰ্কাৰ এনযাইম বা চিহ্নিতকৰণ উৎসেচক লেমিন 'এ' আৰু 'চি' সংযুক্ত হৈ আছে

(i) Golgibodies
গলগি সংঘ

(ii) Nucleus
কোষকেন্দ্ৰ

(iii) Cell membrane
কোষাবৰণ

(iv) Endoplasmic reticulum
অন্তঃপ্ৰবসীয় জালিকা

(d) The main basis of Spectrophotometry
স্পেক্ট্রফটমিট্রিৰ মূল আধাৰ হ'ল

(i) Darwin Law
ডাৰউইন তত্ত্ব

(ii) Lamarck Law
লেমার্ক তত্ত্ব

(iii) Gravitional Law
মাধ্যাকর্ষণ তত্ত্ব

(iv) Beer-Lambart Law
বিয়েৰ-লেম্বার্ট সূত্ৰ

(e) The term 'Chromatography' was fir used by

ক্রমেট'গ্রাফী শব্দটো পোন প্রথমে ব্যৱহাৰ কৰিছিল

(i) Mikhail Tswett

মিখাইল চৰেট

(ii) Martin

মার্টিন

(iii) Consden

কনছডেন

(iv) Gordon

গর্ডন

2. Answer the following questions : ***(any five)*** 2×5=10

তলত দিয়া প্রশ্নবোৰৰ উত্তৰ লিখা ঃ *(যিকোনো পাঁচটা)*

(a) Define mean and median.

গড় আৰু মধ্যমা কি সংজ্ঞা দিয়া।

(b) What is the use of Autoradiography ?

অট'ৰেডিঅ'গ্রাফীৰ ব্যৱহাৰ কি ?

(c) What do you mean by measure of dispersion ?

বিচ্যুতিৰ মাপ বুলিলে কি বুজা ?

(d) Write the uses of radioisotopes in Biological sciences research.

জৈৱ গৱেষণাত তেজস্ক্রিয় সমস্থানিকৰ ব্যৱহাৰৰ বিষয়ে লিখা।

(e) What is Cryofixation ?

অতিশীতল স্থিৰকৰণ বা ক্রায়'ফিক্সেচন কি ?

(f) What do you mean by negative staining ?

ঋণাত্মক ৰংকৰণ বা নিগেটিভ ষ্টেইনিং বুলিলে কি বুজা ?

(g) What is chi-square test ?

কাই-বর্গ পৰীক্ষা কি ?

3. Write short notes of the following : ***(any five)*** 5×5=2

তলত দিয়াবোৰৰ চমু টোকা লিখা ঃ *(যিকোনো পাঁচটা)*

(a) Chromosome Painting

ক্রম'জ'ম পেইন্টিং

(Fluorescence In Situ Hybridization)

ফিছ (ফ্লৰ'চেন্স ইনচিটু হাইব্রিডাইজেছন)

(c) Advantages and Limitations of fluorescence microscope

ফ্লু'ৰ'চেন্স মাইক্ৰ'স্ক'প বা প্ৰতিপ্ৰভা অণুবীক্ষণ যন্ত্ৰৰ উপযোগিতা আৰু সীমাৱদ্ধতা

(d) Paper chromatography

পেপাৰ ক্ৰমেট'গ্ৰাফী

(e) Marker Enzyme

চিহ্নিতকৰণ উৎসেচক বা মাৰ্কাৰ এনজাইম

(f) Applications of HPLC

HPLC-ৰ ব্যৱহাৰ

(g) Primary and Secondary Data

মুখ্য আৰু গৌণ তথ্য

(h) Application of mass spectrometry

ভৰ বৰ্ণালী বীক্ষণ বা মাচ্ স্পেক্ট্ৰ'মিট্ৰি'ৰ ব্যৱহাৰ

4. What is Gel electrophoresis ? Describe the method of separation of nucleic acid by gel electrophoresis. 3+7=10

জেল ইলেক্ট্ৰ'ফ'ৰেচিছ কি? ইয়াৰ সহায়ত নিউক্লিক এচিদ পৃথকীকৰণ কৰা পদ্ধতিটো বৰ্ণনা কৰা।

Or / অথবা

What is electron microscope ? Discuss the working principle of transmission electron microscope and compound light microscope with neat diagram. 2+4+4=10

ইলেকট্ৰন অণুবীক্ষণ যন্ত্ৰ কি? ট্ৰেন্সমিছন ইলেকট্ৰন অণুবীক্ষণ যন্ত্ৰ আৰু যৌগিক আলোক অণুবীক্ষণ যন্ত্ৰৰ কাৰ্য্যপদ্ধতি চিত্ৰসহ বৰ্ণনা কৰা।

Total number of printed pages–5

63(FY) SEM–4/MAJ/BOTMAJ2044

2025

BOTANY

(Major)

Paper : BOTMAJ2044

(Anatomy of Angiosperms)

Full Marks : 50

Pass Marks : 20

Time : Two hours

The figures in the margin indicate full marks for the questions.

1. Choose the correct answer : 1×5=5

(i) Which of the following dermal tissue structures is involved in transpiration ? 1

(A) Trichomes

(B) Root hairs

(C) Hypodermis

(D) Lenticels

(v) Which anatomical feature is specifically associated with C4 plants like maize and sugarcane?

(A) Sunken stomata

(B) Kranz anatomy

(C) Lenticels

(D) Hydathode

2. Answer the following questions : ***(any five)*** 2×5=10

(a) What is the basic difference between promeristems, meristems, and cambium?

(b) What is Korper-Kappe theory? What is the function of the 'Korper' region in the Korper-Kappe theory of root development? 1+1=2

(c) What are lithocysts? What is their function in plants? 1+1+2

(d) How does the cuticle help plants adapt to dry environments?

(e) What is interfascicular cambium? How does it differ from fascicular cambium? 1+1=2

(f) What are pits? Mention its types.

(g) What is exodermis in plants? How does exodermis help plants in water retention? 1+1=2

3. Answer the following questions : ***(any five)*** 5×5=25

(a) Discuss how plant anatomy is applied in systematics, highlighting specific examples of anatomical features used for plant classification and identification.

(b) Discuss the steps involved in the formation of lateral roots in plants.

(c) What is adcrustation? Briefly discuss the types of materials commonly involved in adcrustation. 3+2=5

(d) Give the anatomical differences between roots of xerophytes and hydrophytes.

(e) Classify vascular bundles based on the arrangement of xylem and phloem.

(f) Write a comparative acount of moncot and dicot stomata. Include shape, arrangement, and distribution.

(g) Define reaction wood. Describe its formation, types, and its function in plants. 1+4=5

(h) What is Cambium? Explain the seasonal activity of vascular cambium in temperate regions. How does this activity result in the formation of annual growth rings in woody plants? 1+4=5

4. Answer the following questions : ***(any one)*** 10×1=10

(a) Explain the process of secondary growth in dicot plants, emphasizing the role of cambium in the formation of secondary vascular tissues and bark.

(b) Explain the structure, types, and functions of trichomes in plants, How do these structures contribute to the plant's defence mechanisms?

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Total number of printed pages–4

63(FY) SEM–4/MAJ/BOTMAJ2054

2025

BOTANY

(Major)

Paper : BOTMAJ2054

(Genetics and Evolution)

Full Marks : 50

Pass Marks : 20

Time : Two hours

The figures in the margin indicate full marks for the questions.

1. Choose the correct answer : 1×5=5

   (a) Who first introduced the term 'Genetics'?

   (i) William Bateson

   (ii) Gregor Johann Mendel

   (iii) Hugo de Vries

   (iv) Carl Correns

(b) Kappa Particles are

(i) Plasmodium

(ii) Cacobacter

(iii) Virus

(iv) Yeart

(c) Hypertrichosis is

(i) Y Chromosome linked trait

(ii) X Chromosome linked trait

(iii) X-Y Chromosome linked trait

(iv) Autosomal linked trait

(d) Down's Syndrome is caused due to trisomy of

(i) 18th Chromosome

(ii) 19th Chromosome

(iii) 20th Chromosome

(iv) 21st Chromosome

(e) Transposons are also known as

(i) Marker gene

(ii) Musk gene

(iii) Jumping gene

(iv) Facultative gene

2. Answer the following questions : **(any five)** 2×5=10

(a) Define alleles.

(b) What is Pleiotropy? Give *one* example.

(c) What do you mean by sex linked inheritance? Give example.

(d) Mention *two* genetic disorders.

(e) What is position effect? Mention its type.

(f) What do you mean by frameshift mutation?

(g) Write *two* features of natural selection.

3. Answer the following questions : **(any five)** 5×5=25

(a) Explain the first law of Mendel with suitable example.

(b) What is incomplete dominance Explain the law with example. 1+4

(c) What is maternal effect? Explain effect seen in the shell coiling of sn 1+

(d) Write a short note on the disorder Klinefelter's syndrome.

(e) What is linkage ? Explain different types of linkage with example. 1+4=5

(f) Define mutation. Discuss briefly the mutation at molecular level. 1+4=5

(g) Differentiate between paracentric inversion and pericentric inversion.

(h) What is speciation ? Explain different types of speciation. 1+4=5

4. Answer the following question : ***(any one)*** 10×1=10

(a) What are mutagens ? Explain the physical and chemical mutagens with example. 2+8=10

(b) What is polyploidy ? Discuss different types of polyploidy with suitable example. 2+8=10

Total number of printed pages–4

63(FY) SEM–4/MAJ/BOTMAJ2034

2025

BOTANY

(Major)

Paper : BOTMAJ2034

(Plant Ecology and Phytogeography)

Full Marks : 50

Pass Marks : 20

Time : Two hours

The figures in the margin indicate full marks for the questions.

1. Choose the correct answer : 1×5=5

   (a) Which of the following is related to soil characteristics ecological groups of plants ?

   (i) Oxylophytes

   (ii) Epiphytes

   (iii) Hydrophytes

   (iv) Endophytes

(b) Pedogenesis stages of soil formation is largely involved by

(i) Chemical phenomenon

(ii) Physical phenomenon

(iii) Biological phenomenon

(iv) Oxidation–reduction phenomenon

(c) Members of autotrophic components are known as

(i) Producer

(ii) Macroconsumers

(iii) Decomposer

(iv) Carnivores

(d) Which form of soil water is absorb by plants ?

(i) Hygroscopic water

(ii) Capillary water

(iii) Gravitational water

(iv) Water vapour

(e) Foliage leaves wherever present may become thick, fleshy and succulent *or* tough and leathery texture in

(i) Hydrophytes

(ii) Thallophytes

(iii) Bryophytes

(iv) Xerophytes

2. Answer the following questions : ***(any five)*** 2×5=10

(a) What is the major functions of an ecosystem ?

(b) What is climax community ?

(c) What is the effects of light on biological pigmentation ?

(d) What is rain ? Write the ranges in inches per hour for light rain and heavy rain.

(e) What is ecosystem ? Who coined the term 'ecosystem' ?

(f) Name the *three* biotic components of an ecosystem.

(g) What is continental drift ?

3. Answer the following questions : ***(any five)*** 5×5=25

(a) Give a brief description on tundra biom.

(b) What is endemism? Write a note on endemic species of North-East India. 1+4=5

(c) What is ecosystem productivity? Explain the primary productivity. 1+4=5

(d) What is energy flow in ecosystem? Explain Universal Energy flow model of ecosystem. 1+4=5

(e) Explain the food chain in an ecosystem.

(f) What is ecotone? Write the features and importance of ecotone. 1+4=5

(g) Explain the hydrological *or* water cycle.

(h) Write notes on types of plants on temperatue variation.

4. Answer the following question : ***(any one)*** 10×1=10

(a) What are the phytogeographical divisions of India? Describe the phytogeographical divisions of India. 2+8=10

(b) What is biogeochemical cycle? Write an essay on Nitrogen cycle. 2+8=10
