



WEST BENGAL STATE UNIVERSITY

B.Sc. Honours 5th Semester Examination, 2021-22

BOTADSE03T-BOTANY (DSE1/2)

INDUSTRIAL AND ENVIRONMENTAL MICROBIOLOGY

Time Allotted: 2 Hours

Full Marks: 40

*The figures in the margin indicate marks of question.
Candidates should answer in their own words and adhere to the word limit as practicable.*

1. Answer **all** questions briefly from the following: 1×16 = 16
- Name one antifoam agent.
 - Name the enzyme associated with development of semi synthetic penicillin.
 - Define eutrophication.
 - Name one ammonifying bacterium.
 - Write a difference between α -amylase & β -amylase.
 - What is secondary metabolite?
 - Write the name of an enzyme which is use to break the fungal cell wall in laboratory.
 - What is microbial plastic? Give an example.
 - Name one flavouring agent.
 - Write an advantage of air lift fermenter.
 - Define upstream process in industrial fermentation.
 - Write the name of a bacteria which grow only on hydrocarbons.
 - Write the name of an instrument which is use to break the cells in industry.
 - Define bioaerosol.
 - What is salting out of protein?
 - What is PHA?
2. Answer any **eight** questions from the following: 3×8 = 24
- Write the steps involved in the formation of root nodule in leguminous root. 3
 - Write in brief the methods of enzyme immobilization. 3
 - Write the main principles of fixed bed and fluidized bed bioreactor. 3
 - Describe the recovery process of ethanol and penicillin. 3
 - Compare batch and continuous fermentation. What is diauxic growth? 2+1



- (f) Write the benefit of mycorrhiza in agriculture. 3
- (g) Describe the process of sewage waste water treatment. 3
- (h) How water quality can be checked by faecal coliform? 3
- (i) Draw the growth curves of bacteria in batch and continuous fermentations. 3
- (j) Describe the roles of microbes in medical microbiology. 3
- (k) Describe different parts of constantly stirred tank bioreactor. 3
- (l) Draw a flowchart for purification of an extracellular enzyme. 3

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WEST BENGAL STATE UNIVERSITY

B.Sc. Honours 6th Semester Examination, 2022

BOTADSE04T-BOTANY (DSE3/4)

ANALYTICAL TECHNIQUES IN PLANT SCIENCES

Time Allotted: 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.*

*প্রান্তিক সীমার মধ্যস্থ সংখ্যাটি পূর্ণ মান নির্দেশ করে।
পরীক্ষার্থীরা নিজের ভাষায় যথা সম্ভব শব্দসীমার মধ্যে
উত্তর করিবে।*

1. Answer the following questions:

1×16 = 16

নিম্নলিখিত প্রশ্নগুলির উত্তর দাওঃ

(a) What is negative staining?

নেগেটিভ স্টেনিং কি ?

(b) Give full form of FISH.

FISH-এর পুরো নাম কি ?

(c) Write the full form of TEM.

TEM-এর পুরো কথাটি লেখো।

(d) What is the working principle of Confocal Microscopy?

কনফোকাল মাইক্রোস্কোপির কার্য পদ্ধতিটি কি ?

(e) Name one synthetic gel which is used for protein separation.

প্রোটিন বিশ্লেষণে ব্যবহৃত একটি “সিঙ্থেটিক জেল”-এর নাম লেখো।

(f) What do you mean by Mean deviation in biostatistics?

জীবপরিসংখ্যানবিদ্যায় গড় বিচ্যুতি বলতে কি বোঝো ?

(g) Mention two important applications of autoradiography in biological science.

জীববিদ্যায় অটোরেডিওগ্রাফির দুটি গুরুত্বপূর্ণ প্রয়োগ সম্পর্কে আলোচনা করো।

(h) What is radioisotope? Give an example.

তেজস্ক্রিয় আইসোটোপ কি ? একটি উদাহরণ দাও।

(i) State two application of spectroscopy in biological research.

জীববিদ্যা গবেষণায় স্পেকট্রোস্কোপির দুটি প্রয়োগ উল্লেখ করো।

(j) What is the full form of HPLC?

HPLC-এর পুরো নাম লেখো।



(k) What is the working principle of molecular sieve chromatography?

মলিকিউলার সীভ ক্রোমাটোগ্রাফির কার্য পদ্ধতিটি কি ?

(l) What are the mobile phase and stationary phase in TLC?

TLC-তে মোবাইল ফেজ ও স্টেশনারী ফেজ কোনটি ?

(m) For which purpose agarose gel electrophoresis is used?

কি উদ্দেশ্যে অ্যাগারোজ জেল ইলেকট্রোফোরেসিস ব্যবহৃত হয় ?

(n) Define sample and population.

স্যাম্পেল ও পপুলেশন-এর সংজ্ঞা দাও।

(o) What is mode?

মোড কি ?

(p) Define variance.

ভেরিয়েন্স-এর সংজ্ঞা দাও।

2. Answer any **eight** questions from the following:

3×8 = 24

নিম্নলিখিত যে-কোনো আটটি প্রশ্নের উত্তর দাও:

(a) Write a short note on sample preparation for electron microscopy.

ইলেকট্রন মাইক্রোস্কোপির নমুনা প্রস্তুতির উপর একটি সংক্ষিপ্ত টীকা লেখো।

(b) Discuss about the working principle of flow cytometry.

ফ্লো সাইটোমেট্রির কার্যপ্রণালীটি আলোচনা করো।

(c) Write the differences between normal tabletop centrifuge and ultracentrifuge.

সাধারণ টেবিলটপ সেন্ট্রিফিউজ ও আল্ট্রাসেন্ট্রিফিউজ-এর মধ্যে পার্থক্যগুলি লেখো।

(d) Write a short note on TLC.

TLC-এর উপর টীকা লেখো।

(e) Write down the uses of radioisotope in biological research. Name one fluorescent stain which is used in Fluorescent Microscopy.

রেডিও আইসোটোপের জীববিদ্যায় ব্যবহারগুলি লেখো। ফ্লুরোসেন্ট মাইক্রোস্কোপিতে ব্যবহৃত একটি ফ্লুরোসেন্ট স্টেন-এর নাম লেখো।

(f) Write a short note on 'Agarose Gel Electrophoresis'.

অ্যাগারোজ জেল ইলেক্ট্রোফোরেসিস-এর উপর সংক্ষিপ্ত টীকা লেখো।

(g) State the differences between Ion exchange and Affinity chromatography.

আয়ন এক্সচেঞ্জ ও এফিনিটি ক্রোমাটোগ্রাফির মধ্যে পার্থক্যগুলি লেখো।

(h) Discuss about different methods of Gel Electrophoresis.

জেল ইলেক্ট্রোফোরেসিসের বিভিন্ন পদ্ধতি সম্বন্ধে আলোচনা করো।

(i) What is standard deviation? Discuss with formula.

স্ট্যান্ডার্ড বিচ্যুতি কি ? সূত্রের সাহায্যে বর্ণনা করো।



- (j) In laboratory, researchers had repeated some of Mendel's experiment and reported the following results were shown in F_2 generation with seed colour in peas. Yellow coloured seed 115 and green coloured seed 65. Calculate the Goodness of Fit for these data. [1 df = 3.841 at 5% level of table value]

পরীক্ষাগারে গবেষকের, মটর গাছ নিয়ে মেন্ডেলের পরীক্ষার পুনরাবৃত্তি করাকালীন F_2 জনুতে হলুদ বর্ণের বীজ 115টি এবং সবুজ বর্ণের 65টি বীজ পেলেন। এই ফলাফলের উপর ভিত্তিতে “গুডনেস অফ ফিট” নির্ণয় করো।

- (k) Define and explain the relationship between mean, median and mode.

Mean, median এবং mode-এর মধ্যে সম্পর্ক সংজ্ঞায়িত করো এবং ব্যাখ্যা করো।

- (l) Why standard deviation considered to be the most useful method for measurement of dispersion of a series of data?

কেন স্ট্যান্ডার্ড ডেভিয়েশন ডেটা সিরিজ-এর বিচ্ছুরণ পরিমাপের জন্য সবচেয়ে দরকারী পদ্ধতি হিসেবে বিবেচিত হয় ?

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WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 2nd Semester Examination, 2021

BOTACOR03T-BOTANY (CC3)

Time Allotted: 2 Hours

Full Marks: 40

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Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.*

1. Answer **all** the following questions in brief: 1×6 = 6
 - (a) Name one aquatic fungus.
 - (b) What is an aethalium?
 - (c) Why is the classification proposed by Hawksworth et al (1995) considered as a phylogenetic system of classification?
 - (d) What do you mean by coprophilous fungi?
 - (e) Define Etiology.
 - (f) What is pandemic disease?

2. Answer any **eight** questions from the following: 3×8 = 24
 - (a) What is Parasexual Cycle? Mention its significance in the life cycle of fungi. 2+1
 - (b) What is planogametic copulation? How does it differ from gametangial contact? 2+1
 - (c) Describe the different types of sexual fruit-bodies found in Ascomycota. 3
 - (d) Enumerate the salient features of Oomycota. 3
 - (e) What is acervulus? Define dikaryophase. 2+1
 - (f) Discuss the role of plant quarantine in disease management. 3
 - (g) Write the ecological significance of lichen. 3
 - (h) Briefly explain the phenomenon of biological specialization. 3
 - (i) Name the causal organism of white rust of crucifers. Why is the disease so named? What is coenocentrum? 1+1+1
 - (j) Write short note on fairy ring. 3
 - (k) What is disease triangle? How can a favourable microclimate for infection influence disease triangle area? 2+1



(1) Define mycosis. Mention the name of the causal organism and treatment of candidiasis. 1+1+1

3. Answer any *two* questions from the following: 5×2 = 10
- (a) Mention the affinity of fungi with plants and animals. 5
- (b) Name two antifungal antibiotic and their causal organism. Write down the role of fungi in food industry. 2+3
- (c) What do you mean by holocarpic fungus? With suitable illustrations, discuss the life cycle of a holocarpic fungus. 1+4
- (d) Name the causal organism of Black stem rust of wheat disease. Mention its symptoms and control measures. 1+2+2

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WEST BENGAL STATE UNIVERSITY

B.Sc. Honours 2nd Semester Examination, 2021

BOTACOR04T-BOTANY (CC4)

ARCHEGONIATE

Time Allotted: 2 Hours

Full Marks: 40

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All symbols are of usual significance.*

1. Answer the following questions briefly: 1×6 = 6
 - (a) Name a pollution sensitive Bryophyte.
 - (b) Name one aquatic Bryophyte.
 - (c) Which plant group is also called vascular cryptogams?
 - (d) What is apospory? Give example.
 - (e) Name one living fossil of Gymnosperm.
 - (f) Name two drug yielding Gymnosperm.

2. Answer any **eight** questions from the following: 3×8 = 24
 - (a) Mention the distinctive features of leaf of *Sphagnum*. 3
 - (b) Mention the salient features of Bryopsida. Mention two advanced features found in the sporophyte of *Anthoceros*. 2+1
 - (c) State the Angiospermic features of *Gnetum*. 3
 - (d) Write a short note on Gemma cup. 3
 - (e) Comment on the morphological nature of rhizophore of *Selaginella*. 3
 - (f) Mention the distinguishing characteristics of the early land plants with an example. 3
 - (g) What is plicate mesophyll? State the xerophytic characters of the genus where it is found. 2+1
 - (h) Distinguish between Gradate sorus and Coenosorus with examples. 3
 - (i) Mention one similarity and one dissimilarity of Bryophytes with Pteridophytes. Comment on the elaters found in the spores of *Equisetum*. 2+1
 - (j) Distinguish between the Coralloid root and the Mycorrhizal root with example. 3
 - (k) Write down the differences between Manoxylic and Pycnoxylic wood with one example of each type. 3



(l) Draw and level the longitudinal section of *Equisetum* cone.

3. Answer any *two* questions from the following:

- | | |
|---|-------|
| (a) Compare the photosynthetic region as seen in the internal organization of the thallus of <i>Riccia</i> and <i>Marchantia</i> with diagrams. | 5 |
| (b) Give a brief outline of the Telome theory for explaining the evolution of macrophyllous leaves in Pteridophytes. | 5 |
| (c) Mention two fern characters of <i>Cycas</i> . Describe the Microsporophyll and Megasporophyll structure of <i>Cycas</i> with suitable diagrams. | 1+2+2 |
| (d) Explain heterospory in Pteridophytes with a diagram. Mention its importance in the evolution of seed habit. | 3+2 |

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WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 2nd Semester Examination, 2020

BOTACOR03T-BOTANY (CC3)

Time Allotted: 2 Hours

Full Marks: 40

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All symbols are of usual significance.*

1. Answer the following questions in brief: 1×6=6
 - (a) Define Straminopila.
 - (b) Name one bioluminescence fungi.
 - (c) Name one edible mycorrhiza.
 - (d) What is a crozier?
 - (e) What is myxamoeba?
 - (f) What is hyperplastic symptom?

2. Answer any **eight** questions from the following: 3×8=24
 - (a) Briefly explain the phenomenon of gametangial copulation present in *Rhizopus*.
 - (b) Draw and describe conidial structures of *Penicillium*.
 - (c) Distinguish between pycnidia and perithecia.
 - (d) What do you mean by somatogamy? Give example. 2+1
 - (e) Differentiate between uredospore and teleutospores.
 - (f) Write the causal organism and symptoms of Blast of Rice.
 - (g) Write the role of mycorrhiza in mineral nutrition.
 - (h) Write down the salient features of Chytridiomycota.
 - (i) Describe the different sexual spore forms in fungi.
 - (j) Schematically represent the life cycle of *Phytophthora sp.*
 - (k) Differentiate between pandemic and sporadic diseases.
 - (l) Describe Koch's postulates. Mention its limitations. 2+1

3. Answer any **two** questions from the following: 5×2=10
 - (a) Define clamp connection. Mention its role in the formation of dikaryotic mycelium. 2+3
 - (b) Write the role of fungi as biofertilizer. Name two fungi used as myconematocides. 3+2
 - (c) Describe, with labelled diagram, the process of sexual reproduction in *Agaricus sp.* 3+2
 - (d) Name the causal organism of Citrus canker. Mention its symptoms and control measures. 1+2+2

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WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 2nd Semester Examination, 2020

BOTACOR04T-BOTANY (CC4)

ARCHEGONIATE

Time Allotted: 2 Hours

Full Marks: 40

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Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.*

1. Answer the following questions briefly: 1×6 = 6
 - (a) What are epicranoid peristome teeth?
 - (b) What is a gemmae cup?
 - (c) What is incipient heterospory?
 - (d) What are mesomes?
 - (e) What do you mean by haplocheilic stomata?
 - (f) Name a gymnosperm with pycnoxylic wood.

2. Answer any **eight** questions from the following: 3×8 = 24
 - (a) Write an account on the dehiscence of *Sphagnum* capsule.
 - (b) Mention some of the unique features of the internal organization of *Anthoceros* thallus.
 - (c) What is the fate of Endothecium and Amphithecium in *Marchantia*, *Anthoceros* and *Sphagnum*?
 - (d) Distinguish between chloronema and caulonema of *Funaria*.
 - (e) Highlight the peculiar features of the internal organisation of *Equisetum* stem.
 - (f) Write two characters of *Cooksonia*. Name two species of this primitive land plant. 2+1
 - (g) Mention the land adaptive features of *Rhynia*.
 - (h) Differentiate between Homoeophyllum and Heterophyllum of *Selaginella* sp.
 - (i) Write in brief the internal structure of *Pinus* stem.
 - (j) Draw and label the T. S. of *Cycas* leaflet. 2+1
 - (k) Write a short note on the economic importance of gymnosperms mentioning the name of the plant species. 2+1
 - (l) Draw and label the male strobilus of *Gnetum* sp. 2+1

3. Answer any **two** questions from the following: 5×2 = 10
 - (a) Describe the leafy gametophyte of *Porella* with illustration. Distinguish between metzgerinae and jungermanninae. 2+2+1



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BOTACOR03T-BOTANY (CC3)

Time Allotted: 2 Hours

Full Marks: 40

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1. Answer **all** the questions briefly from the following: 1×6 = 6
- Name one ascomycetous edible fungi. 3
 - Name one holocarpic fungi. 3
 - What is Buller phenomenon? 3
 - Define polyetic plant disease. 3
 - Name one litmus producing lichen. 3
 - Write down the name of a fungi used in biological control of pests. 3
2. Answer any **eight** questions from the following: 3×8 = 24
- Describe the sexual reproduction in *Phytophthora* sp. 3
 - Discuss the role of fungal secondary metabolites in pharmaceutical industry. 3
 - Mention the ecological significance of lichen. 3
 - Distinguish between obligate parasite and facultative parasite. 3
 - Write down the characteristic features of Chytridiomycota. 3
 - Describe the asexual reproduction in *Rhizopus* sp. 3
 - Briefly describe the sequence of events of parasexual cycle in fungi. 3
 - Write in brief the anatomical features of the gill of *Agaricus* sp. 3
 - Write a short note on the types of plasmodia found in slime moulds. 3
 - Mention the fungal sources and uses of mycoprotein and citric acid. 1½ + 1½
 - Name the causal organism of citrus canker disease and describe the symptoms of the disease. 1+2 = 3
 - Discuss the role of quarantine in plant disease management. 3
3. Answer any **two** questions from the following: 5×2 = 10
- Describe the life cycle of *Albugo* sp. 5
 - Describe the development of fruit body of a coprophilous fungi. 5
 - What is mushroom? Briefly discuss the process of mushroom cultivation. 1+4 = 5
 - Name the causal organism of late blight of potato. Mention its symptoms and control measures. 1+2+2 = 5

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WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 2nd Semester Examination, 2019

BOTACOR04T-BOTANY (CC4)

Time Allotted: 2 Hours

Full Marks: 40

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1. Answer briefly: 1×6 = 6
- What is amphigastria?
 - What do you mean by eusporangiate type of sporangial development?
 - What is mixed type of sorus?
 - If the chromosome number in the leaf of *Funaria* is 10, what will be the chromosome number in the spores?
 - Name a gymnosperm with manoxylic wood.
 - How the phloem of gymnosperm differ from angiosperm?
2. Answer any **eight** questions from the following: 3×8 = 24
- Write a brief note on the adaptations needed for transition to land habit.
 - State with reasons, which class is more advanced among Hepaticopsida and Bryopsida.
 - State the distinctive feature of *Sphagnum* leaf.
 - Draw a labelled diagram of L.S. of the archegoniophore highlighting the parts of archegonium.
 - Name one fossil pteridophyte and its identifying characters. 1+2
 - Draw and describe the spore producing structure of *Psilotum*. 1+2
 - What is the contribution of seed habit of pteridophytes in the evolution of seed plant?
 - Distinguish between perigynium and calyptra.
 - Why are the female cones of *Cycas* not considered as true cones?
 - Comment on the ovule of *Gnetum*.
 - Name the plant yielding Canada balsam. Mention two economic importance of *Pinus*. 1+2
 - Draw and label the longitudinal section of *Equisetum* cone.
 - What is the fate of amphithecium and endothecium in classes Hepaticopsida and Anthocerotopsida?
3. Answer any **two** questions from the following: 5×2 = 10
- Give the ecological and economical significance of *Sphagnum*. 3+2
 - Draw a labelled diagram of the longitudinal section of the capsule of *Funaria*. 3+2
Explain the role of peristome in the dispersal of the spores.
 - Write a note on the stelar evolution of pteridophytes with examples. 5
 - What is sulphur dust of *Pinus*? Describe with labelled diagram the longitudinal section of female cone of *Pinus*. 1+2+2

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