



WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 1st Semester Examination, 2022-23

BOTACOR01T-BOTANY (CC1)

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.*

GROUP-A

1. Answer **all** questions from the following: 1×3 = 3
 - (a) What is lag phase? Mention its significance.
 - (b) What do you mean by 'viroids'?
 - (c) What is pilus?

2. Answer any **four** questions from the following: 3×4 = 12
 - (a) Draw and label the ultrastructure of bacterial flagella.
 - (b) Write a short note on *Mycoplasma*.
 - (c) Mention the difference between lytic cycle and lysogenic cycle.
 - (d) Write a short note on 'Prion'.
 - (e) Describe the structure of T-phage with labelled diagram.
 - (f) Calculate the total number of bacteria after 4 hours of incubation of 100 cells, where the generation time is 30 min.

3. Answer any **one** question from the following: 5×1 = 5
 - (a) Write down the industrial importance of bacteria citing suitable examples.
 - (b) Discuss bacterial conjugation mechanism with suitable illustrations.

GROUP-B

4. Answer **all** questions from the following: 1×3 = 3
 - (a) What is coenobium? Give an example.
 - (b) Name the pigments of Xanthophyceae.
 - (c) What is coenozoospore?

5. Answer any *four* questions from the following: 3×4 = 12
- (a) Diagrammatically represent the life cycle of *Fucus*.
 - (b) Mention the general characters of Xanthophyta.
 - (c) Draw the life cycle of *Oedogonium* (macrandrous type).
 - (d) How *Prochloron* differs from Cyanophyta and Chlorophyta? Why it is called obligate symbiont?
 - (e) Write down the various reserve food materials of algae.
 - (f) Discuss the role of algae in agriculture.
6. Answer any *one* question from the following: 5×1 = 5
- (a) Illustrate the post-fertilization changes found in *Polysiphonia*.
 - (b) Draw and label the T.S. of sexual reproductive structures of *Chara*.



WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 1st Semester Examination, 2022-23

BOTACOR02T-BOTANY (CC2)

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.*

GROUP-A

1. Answer **all** questions briefly from the following: 1×3 = 3
 - (a) Name an aromatic amino acid found in proteins.
 - (b) What is co-enzyme?
 - (c) What is Gibb's free energy?

2. Answer any **four** questions from the following: 3×4 = 12
 - (a) Write down the important properties of water.
 - (b) Differentiate between α -helix and β -pleated sheet.
 - (c) Write a short note on t-RNA structure.
 - (d) Explain briefly redox reactions.
 - (e) Draw a neatly labelled Lineweaver-Burk plot.
 - (f) Differentiate between triacylglycerols and phosphoglycerides.

3. Answer any **one** question from the following: 5×1 = 5
 - (a) Compare epimer with anomer with proper example. Write down the name and function of a storage polysaccharide. 3+2
 - (b) ATP is called the 'Energy Currency of the Cell'— Justify the statement. 3+2
 $\Delta G = \Delta H - T\Delta S$, what does ΔG , ΔH and $T\Delta S$ denote?

GROUP-B

4. Answer **all** questions briefly from the following: 1×3 = 3
 - (a) What is the full form of NOR?
 - (b) What are lysosomes?
 - (c) What are tubulins?

5. Answer any **four** questions from the following: 3×4 = 12
- (a) Write down the characteristic features of cpDNA. 3
 - (b) What is active transport? Distinguish between antiport and symport. 1+2
 - (c) Explain endosymbiotic origin of mitochondria. 3
 - (d) Mention the importance of cell cytoskeleton. 3
 - (e) Differentiate between meiotic division I and II. What is cell cycle? 2+1
 - (f) What are lamins? State the functions of NPC. 1+2
6. Answer any **one** question from the following: 5×1 = 5
- (a) What is glycosylation protein? Elucidate the role of golgi complex in sorting and distribution of proteins. 1+4
 - (b) Describe the role of MPF in regulation of cell cycle. 5



WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 1st Semester Examination, 2021-22

BOTACOR01T-BOTANY (CC1)

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.*

GROUP-A

1. Answer **all** questions from the following: 1×3 = 3
 - (a) What do you mean by virion?
 - (b) Why bacterial endospores are too much resistant to environment?
 - (c) What is 'S layer'? Where it is found?

2. Answer any **four** questions from the following: 3×4 = 12
 - (a) Describe the DNA uptake procedure in bacterial cell during transformation.
 - (b) Write a note on bacterial nutrition.
 - (c) Describe the "three domain concept" of microorganisms.
 - (d) Draw and describe the growth phase of bacteria.
 - (e) What is vaccine? Describe two different types of vaccine with example.
 - (f) Write a short note on Archaeobacteria.

3. Answer any **one** question from the following: 5×1 = 5
 - (a) Describe the cell structure of Eubacteria with suitable illustrations.
 - (b) Citing suitable example write down the major role of bacteria in agriculture.

GROUP-B

4. Answer **all** questions from the following: 1×3 = 3
 - (a) Name the main pigment and reserve food material in Phaeophyceae.
 - (b) Name a coenocytic algae.
 - (c) Mention the significance of root cap cells in the genus *Oedogonium*.

5. Answer any *four* questions from the following:

- (a) Draw and label the ultrastructure of cell wall of Cyanophyta.
- (b) Mention the evolutionary significance of *Prochloron*.
- (c) What is dwarf male? Mention its function.
- (d) Write down the role of algae in industry.
- (e) Diagrammatically represent the life-cycle of *Ectocarpus*.
- (f) Draw and describe the asexual reproduction of a coenocytic algae you have studied.

6. Answer any *one* question from the following:

5×1 = 5

- (a) Draw and describe the ultrastructure of algal flagella.
- (b) Write a note on range of thallus structure in chlorophyceae.

N.B. : *Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.*

—×—



WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 1st Semester Examination, 2021-22

BOTACOR02T-BOTANY (CC2)

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.*

GROUP-A

1. Answer **all** questions briefly from the following: 1×3 = 3
- (a) Define ionic bond with example.
- (b) How does protein denaturation can be induced?
- (c) Write the definition of prosthetic group.
2. Answer any **four** questions from the following: 3×4 = 12
- (a) Write down the name of homopolysaccharide and heteropolysaccharide with their monomer. Draw the chemical structure of pentose sugar. (1+1)+1
- (b) What are Peptides? With proper diagram describe the formation of Peptide bond. 2+1
- (c) State the differences between oils and fats. What do you mean by rancidity of fats? 2+1
- (d) Draw the basic structure of any nucleotide and label its components. 2+1
- (e) What do you mean by exothermic and endothermic reactions? 1½ +1½
- (f) Prove that the pH of pure water is 7. What is Henderson-Hasselbalch equation? 2+1
3. Answer any **one** question from the following: 5×1 = 5
- (a) State the theories of mechanism of enzyme action.
- (b) Discuss different levels of protein structure mentioning the bonds involved.

GROUP-B

4. Answer **all** questions briefly from the following: 1×3 = 3
- (a) What happens at the S phase?
- (b) What is flip-flop movement?
- (c) Mention the importance of signal sequence in protein targeting.

5. Answer any **four** questions from the following:
- (a) Discuss the structure of plant cell wall with emphasis on chemical composition.
 - (b) Nucleosome concept — Explain with a diagram in brief.
 - (c) Discuss the role of channels and carrier proteins in membrane transport.
 - (d) Briefly describe the cell cycle checkpoints in yeast.
 - (e) Why is fluid mosaic model considered as the best model? What are the factors that affect membrane fluidity? 1+2
 - (f) Mention the expected chromosome number in root tip cells, pollen mother cells, pollen cells and anther wall cells of a diploid plant with chromosome number $2n = 16$. What is bivalent? 2+1
6. Answer any **one** question from the following: 5×1 = 5
- (a) Write the structure of nuclear pore complex with proper diagram.
 - (b) With suitable diagram describe the formation of 1400 nm metaphase chromosome.

N.B. : *Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.*

—×—



WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 1st Semester Examination, 2020, held in 2021

BOTACOR01T-BOTANY (CC1)

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.*

GROUP-A

1. Answer **all** questions from the following: 1×3 = 3
 - (a) Name one acid fast bacteria.
 - (b) Name one disease caused by Prion.
 - (c) Write the membrane characters of Archaea.

2. Answer any **four** questions from the following: 3×4 = 12
 - (a) Write the differences between membrane structures of bacteria and archaea.
 - (b) Draw the labeled structure of TMV and mention their physico-chemical characters.
 - (c) Write the differences of various types of recombination in bacteria.
 - (d) Differentiate between the cell wall of Gram (+) and Gram (–) bacteria. Write down the special component present in *Mycobacterium* cell wall.
 - (e) Mention the role of small subunit of ribosome in bacterial classification.
 - (f) Draw and describe the physico-chemical characteristics of a plant virus.

3. Answer any **one** question from the following: 5×1 = 5
 - (a) Draw and describe the different steps of lytic cycle in a bacteriophage.
 - (b) With suitable examples, write a note on different types of vaccines.

GROUP-B

4. Answer **all** questions from the following: 1×3 = 3
 - (a) Name the main pigment and reserve food material in Rhodophyceae.
 - (b) What is Gaidukov phenomenon?
 - (c) Name one algae where isomorphic alternation of generation is found.

5. Answer any *four* questions from the following:

- (a) Draw and label the sexual reproductive structures in *Chara*.
- (b) In which algae 'daughter colony' is found? Describe the structure of this algae.
- (c) Write a short note on the range of thallus structure of Phaeophyceae.
- (d) State the diagnostic characters of Cyanophyta.
- (e) What is triphasic life cycle? Where it is found? Why it is so named?
- (f) What is diatomite? Mention the economic importance of diatomite.

6. Answer any *one* question from the following:

5×1 = 5

- (a) Draw and describe the life cycle of a monoecious macrandrous *Oedogonium*.
- (b) Illustrate with diagram the sexual reproduction in *Vaucheria*.

N.B. : *Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.*

—×—



WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 1st Semester Examination, 2020, held in 2021

BOTACOR02T-BOTANY (CC2)

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.*

GROUP-A

1. Answer **all** questions briefly from the following: 1×3 = 3
 - (a) How many stereoisomers are possible for a carbohydrate with six chiral centers?
 - (b) Name a non-protein enzyme and the reaction it catalyses.
 - (c) What do you mean by Gibbs free energy?

2. Answer any **four** questions from the following: 3×4 = 12
 - (a) Write a note on the mechanism of buffer action. 3
 - (b) What is epimer? Name and draw the structure of two epimers of D-Glucose. 1+2
 - (c) Name one aromatic amino acid. “The peptide bond is rigid and planar” — Explain the statement. 1+2
 - (d) Compare among A-, B- and Z-DNA on the basis of base pairs per helical turn, nature of helix and topology of groove. 3
 - (e) ATP is called the “Energy Currency of the cell” — Justify the statement. 3
 - (f) What are Omega fatty acids? Why are they important? 3

3. Answer any **one** question from the following: 5×1 = 5
 - (a) Write the classification of carbohydrate with example in brief. 5
 - (b) Draw and mention the unique features of Lineweaver-Burk plot for competitive inhibition and noncompetitive inhibition. 5

GROUP-B

4. Answer **all** questions briefly from the following: 1×3 = 3
 - (a) What is nucleoid?
 - (b) Mention the chemical nature of middle lamella.
 - (c) State an evidence in favour of semiautonomous nature of chloroplast.

5. Answer any **four** questions from the following:
- (a) Distinguish between microfilaments and microtubules.
 - (b) Write down the role of cholesterol on membrane fluidity and importance of membrane fluidity.
 - (c) Mention types of protein glycosylation with their site of occurrence. What is the significance of KDEL sequence in protein trafficking? 2+1
 - (d) Write down the major differences between peroxisome and lysosome. 3
 - (e) What are lamins? State the functions of NPC. 3
 - (f) Illustrate the different steps of co-translational translocation with suitable diagram and proper labelling. 3
6. Answer any **one** question from the following: 5×1 = 5
- (a) Discuss in brief molecular organization of chromatin with proper diagram. 2+3
 - (b) What is MPF? What role does it play in regulation of the cell cycle? 5

N.B. : *Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.*

—×—



WEST BENGAL STATE UNIVERSITY

B.Sc. Honours 1st Semester Examination, 2019

BOTACOR01T-BOTANY (CC1)

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.*

1. Answer **all** questions briefly from the following: 1×5 = 5
- Who proposed three domain system concept of classification?
 - What is the causal organism of AIDS?
 - What is Prophage?
 - What is Corona?
 - Why Phaeophyceae are brown in colour?

2. Answer any **five** questions from the following: (At least **two** questions from each Group) 3×5 = 15

GROUP-A

- Draw and describe the structure of T4 phage. 1 $\frac{1}{2}$ + 1 $\frac{1}{2}$
- Write short notes on Mycoplasma.
- Write a note on different type of plasmids with their function.
- Differentiate between Virulent and Temperate phage.

GROUP-B

- What is 'dwarf male'? State its function.
- Write a note on *Prochloron*.
- Mention the characteristic features of Xanthophyceae.
- Describe the cellwall structure of Cyanophyceae.

3. Answer any **four** questions from the following: (At least **two** questions from each Group) 5×4 = 20

GROUP-A

- Write down the characteristic features of Archaea.
- Draw and describe the bacterial Growth Curve. 1 $\frac{1}{2}$ + 3 $\frac{1}{2}$
- Draw and describe the process of transformation in any bacteria. 2+3

GROUP-B

- Elucidate the ultrastructure of algal flagella.
- With labelled diagram describe the external and internal structure of *Fucus*. 2 $\frac{1}{2}$ + 2 $\frac{1}{2}$
- What is Cystocarp? Describe its structure. Name two economically important Rhodophyceae and mention its importance. 1+2+2

—x—



WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 1st Semester Examination, 2019

BOTACOR02T-BOTANY (CC2)

BIOMOLECULES AND CELL BIOLOGY

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.
All symbols are of usual significance.*

1. Answer **all** questions briefly from the following: 1×5 = 5
- (a) Name one amino acid which does not possess any asymmetric carbon atom.
 - (b) Name the C_4 epimer of glucose.
 - (c) What is phosphodiester bond?
 - (d) Define kinetochore.
 - (e) Name different phases of eukaryotic cell cycle.

2. Answer any **five** questions from the following: (At least **two** questions from each Group) 3×5 = 15

GROUP-A

- (a) Give the pyran and furan structures of hexose. 3
- (b) Differentiate between nucleoside and nucleotide. 3
- (c) Mention the basic differences between mRNA and rRNA. 3
- (d) Write a note on competitive inhibition. 3

GROUP-B

- (e) Outline the fluid-mosaic model of plasma membrane. 3
- (f) With suitable diagram describe the structural details of nucleolus. State its function. 2+1
- (g) Justify the semi autonomous nature of mitochondria. 3
- (h) Differentiate between mitotic and meiotic cell division. 3

3. Answer any **four** questions from the following: (At least **two** questions from each Group) 5×4 = 20

GROUP-A

- (a) Differentiate between purine and pyrimidine. Describe the structure of tRNA with suitable diagram. 2+3

- (b) Calculate V_{\max} of an enzymatic reaction from the following data using Michaeli Menten equation

$$K_m = 1 \text{ mol L}^{-1}$$
$$[S_0] = 0.5 \text{ mol L}^{-1}$$
$$V_0 = 50 \mu \text{ mol L}^{-1} \text{ min}^{-1}$$

- (c) Discuss about the bonds involved in different structural levels of proteins. 5

GROUP-B

- (d) Briefly describe the biogenesis of ribosome in nucleus with suitable diagram. 5
- (e) What is smooth ER? How does it differ from rough ER? What role does RER play in cell organization? 1+2+2
- (f) Give the chemical constituents of plant cell wall. What is glycocalyx? Define exocytosis. 3+1+1

-----x-----



WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 1st Semester Examination, 2018

BOTACOR01T-BOTANY (CC1)

PHYCOLOGY AND MICROBIOLOGY

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.*

1. Answer **all** questions briefly from the following: 1×5 = 5
- Name one Gram positive bacterium.
 - Mention the principal source of bacterial amylase.
 - What is plurilocular sporangium?
 - What is phototroph?
 - Name the principal reserve food materials found in Cyanophyceae.

2. Answer any **five** questions from the following: 3×5 = 15
(At least **two** questions from each group)

GROUP-A

- Describe the three domain system of classification. 3
- Briefly describe the cell wall structure of a Gram negative bacterium. 3
- Discuss the characteristic features of prion and viroid. 1.5+1.5
- Draw, label and describe the different phases of bacterial growth curve. 1+2

GROUP-B

- Discuss the salient features of the class Rhodophyceae. 3
- Write a short note on algal biofertilizer. 3
- Discuss the asexual reproductive structures in *Ectocarpus* sp. 3
- Draw and label the male reproductive structure in *Chara* sp. 3

3. Answer any *four* questions from the following:
(At least *two* questions from each group)

GROUP-A

- (a) Draw and describe the process of generalized transduction in bacteria. 2+3
- (b) Mention the economic importance of bacteria with reference to their role in agriculture and industry. 2.5+2.5
- (c) Draw and describe the different steps of lytic cycle in a bacteriophage. 2+3

GROUP-B

- (d) With suitable diagram discuss the cell structure of Cyanophyceae. 1+4
- (e) What is coenobium? With proper diagram give the asexual mode of reproduction in *Volvox* sp. 1+4
- (f) With neat labelled sketches, discuss the process of sexual reproduction in *Vaucheria* sp. 2+3

—x—



WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 1st Semester Examination, 2018

BOTACOR02T-BOTANY (CC2)

BIOMOLECULES AND CELL BIOLOGY

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.*

1. Answer **all** questions briefly from the following: 1×5 = 5
- (a) Give example of one reducing and one non-reducing sugar.
 - (b) What is B-form of DNA?
 - (c) What is ribozyme?
 - (d) What is nuclear lamina?
 - (e) What is G₀ phase?

2. Answer any **five** questions from the following: 3×5 = 15
(At least **two** questions from each group)

GROUP-A

- (a) What do you mean by cis-trans fatty acids? 3
- (b) Define epimer and anomer with example. 1.5+1.5
- (c) Explain the molecular structure of α -helix structure of protein. 3
- (d) How does the structure of ATP contribute to its function? 3

GROUP-B

- (e) Mention the three main types of passive transport. What is the source of energy used in the active transport through biological membrane? 2+1
- (f) Define cytoskeleton. Differentiate between microtubules and microfilaments. 1+2
- (g) State the significance of meiotic cell division. 3
- (h) What is endosymbiotic hypothesis? To which cellular organelles the hypothesis can be applied? 2+1

3. Answer any *four* questions from the following:
(At least *two* questions from each group)

GROUP-A

- | | |
|---|-----|
| (a) Define carbohydrate. Classify them with suitable example. | 1+4 |
| (b) Outline the structure of DNA as proposed by Watson and Crick. | 5 |
| (c) Describe in short the Michaelis-Menten equation of enzyme action. | 5 |

GROUP-B

- | | |
|---|-----|
| (d) Describe briefly the structure of nuclear pore complex with suitable diagram. | 3+2 |
| (e) What is MPF? Discuss the role of MPF in regulating the cell cycle of Yeast. | 1+4 |
| (f) What is peroxisome? State the role of peroxisome in photorespiration. | 5 |

—x—