

Reg. No. :

Name :

Fifth Semester B.Sc. Degree Examination, December 2022

First Degree Programme Under CBCSS

Botany

Core Course

BO 1543 – CELL BIOLOGY, GENETICS AND EVOLUTIONARY BIOLOGY

(2018 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – A

- I. Answer all questions in one word or two sentences. Each question carries 1 mark.
1. Give one example for an inter-chromosomal structural aberration of chromosomes.
 2. What is speciation?
 3. Name the part of chromosome where the chromatids are joined together.
 4. What are autosomes?
 5. What are B- chromosomes?
 6. What is linkage?
 7. What is recombination frequency?

P.T.O.

8. In which phase of the cell cycle does DNA replicates?
9. Who proposed the theory of inheritance of acquired characters?
10. What is epistasis?

(10 × 1 = 10 Marks)

SECTION – B

II. Answer any **eight** questions; not to exceed a paragraph. Each question carries **2** marks.

11. Give the names of histones that constitute the histone octamer of nucleosomes.
12. What is telomere?
13. What is linkage map?
14. Differentiate between heterogametic and homogametic sex.
15. Which are the different types of intra chromosomal structural aberrations of chromosomes?
16. Differentiate between heterochromatin and euchromatin.
17. What are polytene chromosomes?
18. What is convergent evolution?
19. Explain the cause and symptoms of Klinefelter's syndrome
20. Differentiate between back cross and test cross.
21. What is interference and coincidence in genetics?
22. What is complementary gene action? Give one example.
23. What are the major functions of mitochondria?

24. What causes aneuploidy?
25. Comment on the features of lampbrush chromosomes.
26. What are the functions of cell membrane?

(8 × 2 = 16 Marks)

SECTION – C

- III. Answer any **six** questions; not to exceed 120 words. Each question carries **4** marks.
27. Explain the functional role of peroxisomes in plant cells.
 28. Explain the meiotic events responsible for creating genetic recombination.
 29. Describe the chemical structure of plasma membrane.
 30. What is extrachromosomal inheritance? Give an example for Chloroplast gene inheritance.
 31. Explain the type of gene interaction involved in the inheritance of the fruit shape in summer squash with 9:6:1 ratio.
 32. Describe the structural organization of eukaryotic chromosomes starting from the nucleosome structure.
 33. Genetic Drift is an important force of evolution. Explain.
 34. What is the difference between macroevolution and microevolution?
 35. Citing an example, explain incomplete dominance.

36. Describe the genetics that determine the inheritance of the different blood types in human beings.
37. Describe the inheritance of eye color in *Drosophila* as an example for sex-linked inheritance.
38. What is independent assortment of chromosomes? How does linkage upset independent assortment?

(6 × 4 = 24 Marks)

SECTION – D

- IV. Write essay on any **two** of the following, not more than **three** pages. Each question carries **15** marks.
39. Write an essay to describe the ultra-structure and functions of organelles found in a typical eukaryotic cell.
40. Compare and contrast multiple allelism and polygenic inheritance, citing suitable examples.
41. What is sex determination? Describe the different types of chromosomal sex determination and add a note on the sex determination mechanism in *Melendrium album*.
42. Write a brief account on the various theories of evolution.
43. What are numerical chromosomal aberrations? Which are the types of numerical aberrations?
44. Explain the reasons for the success of Mendel in genetic studies.

(2 × 15 = 30 Marks)

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Core Course

BO 1542 : ENVIRONMENTAL STUDIES AND PHYTOGEOGRAPHY

(2019 Admission Onwards)

Time : 3 Hours

Max. Marks : 80

(Draw diagrams wherever necessary)

SECTION – A

I. Answer **all** questions in a word or sentence. Each question carries **1** mark.

Write short notes on

1. Natural resource.
2. Leaching.
3. 10% law.
4. KSBB.
5. Stockholm Conference.
6. Expand IPCC.

P.T.O.

7. Central Pollution Control Board.
8. DFC.
9. ODS (in ecology).
10. Continental drift.

(10 × 1 = 10 Marks)

SECTION – B

II. Answer any **eight** of the following in a paragraph. Each question carries **2** marks.

11. Distinguish between renewable and non renewable resources.
12. Write a note on desertification.
13. Distinguish between food chains and food web.
14. What do you mean by pyramid of numbers?
15. Write a note on lentic ecosystems.
16. Distinguish between perfect and imperfect cycles.
17. What do you mean by Shannon index?
18. Write a note on Ramsar sites.
19. Write the causes of noise pollution.
20. What are biodiversity hot-spots?
21. Briefly describe E-waste management.
22. What do you mean by UNEP?
23. Write a note on Environment protection Act.
24. What do you mean by biological disaster?

25. Write the causes of Acid rain.
26. Distinguish between continuous and discontinuous distribution.

(8 × 2 = 16 Marks)

SECTION – C

III. Answer any **six** of the following. Each question carries **4** marks.

27. Give an account of Soil and land resources and their importance.
28. Give a description of renewable and non renewable energy resources.
29. Describe the carbon cycle.
30. Explain how Halophytes adapt to their environments morphologically, physiologically, and anatomically.
31. Briefly describe characteristic features, structure and functions of marine ecosystem.
32. Describe how biodiversity is threatened in various ways.
33. Describe the important global initiatives to conserve biodiversity.
34. Discuss the various threats to biodiversity.
35. Define thermal pollution and describe its causes, impacts, and mitigation strategies.
36. Provide a description of the sources and management methods of solid waste.
37. Discuss the causes and effects of ozone layer depletion.
38. Briefly describe the different types of forests found in India.

(6 × 4 = 24 Marks)

SECTION – D

- IV. Answer any **two** questions. **Each** question carries **15** marks.
39. Write an essay on the degradation of natural resources and measures taken to conserve them.
 40. Explain the process of ecological succession with special reference to hydrosere.
 41. Write an essay on various in situ and ex situ methods of biodiversity conservation.
 42. Explain causes, effects and control measures of air pollution.
 43. Describe the different stages of disaster management.
 44. Write an essay on phytogeographical regions of India.

(2 × 15 = 30 Marks)

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BO 1543 : CELL BIOLOGY, GENETICS AND EVOLUTIONARY BIOLOGY

(2019 Admission Onwards)

Time : 3 Hours

Max. Marks : 80

(Draw diagrams wherever necessary)

SECTION – A

- I. Answer **all** questions in **one** or **two** sentences. Each question carries **1** mark.
1. What are B chromosomes?
 2. What are peroxisomes?
 3. What are cisternae?
 4. What are thylakoids?
 5. What is a test cross?
 6. What are complementary genes?
 7. What is the significance of 12:3:1?

P.T.O.

8. What is a tonoplast?
9. What is speciation?
10. What is convergent evolution?

(10 × 1 = 10 Marks)

SECTION – B

- II. Answer any **eight** of the following. Each question carries **2** marks.
11. Differentiate between heterochromatin and euchromatin.
 12. What are chromosome puffs?
 13. What is aneuploidy? Mention its significance.
 14. What is deletion?
 15. List the significance of mitosis.
 16. Mention any two functions of ribosomes.
 17. Why lysosomes are known as suicidal bags?
 18. What is incomplete dominance? Give an example.
 19. Mention the significance of the ratio 15:1.
 20. Compare linkage and independent assortment.
 21. What is coefficient of coincidence?
 22. What is XX-XO mechanism?
 23. What is haemophilia? Why does it happen?

24. What are kappa particles? Mention its importance in *Paramecium*.
25. Comment on Neo-Darwinism.
26. Differentiate between progressive and retrogressive evolution.

(8 × 2 = 16 Marks)

SECTION – C

III. Answer any **six** of the following. Each question carries 4 marks.

27. Describe the features of lamp brush chromosomes.
28. Write a brief account on functions of endoplasmic reticulum.
29. Give a brief account on nucleosome model of DNA.
30. With a labelled diagram explain structure of mitochondria.
31. What is duplication? Mention different types of it.
32. Compare anaphase I and anaphase II of meiosis.
33. Explain the genetic mechanism underlying ABO blood group in man.
34. Briefly describe the sex determination in higher plants.
35. Explain the genetic reason and symptoms of Klinefelter's syndrome.
36. Critically evaluate the mechanism of plastid inheritance in *Mirabilis*.
37. Mention the role of genetic drift in evolution.
38. Explain the postulates of Darwinism.

(6 × 4 = 24 Marks)

SECTION – D

- IV. Write essay on any **two** of the following. Each question carries **15** marks.
39. With labelled diagrams explain various types of translocations in chromosomes. Add a note on its significance.
 40. With labeled diagrams explain structure and function of nucleus.
 41. Write a checker board explain the recessive epistasis in mice.
 42. Explain the features of a polygenic inheritance. Give an example.
 43. Describe the role of genetic variation in evolution.
 44. Illustrate the major events occur during Prophase I of Meiosis I.

(2 × 15 = 30 Marks)

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Botany

Core Course

**BO 1541 : ANGIOSPERM MORPHOLOGY, SYSTEMATIC BOTANY,
ECONOMIC BOTANY, ETHNOBOTANY AND PHARMACOGNOSY**

(2019 Admission Onwards)

Time : 3 Hours

Max. Marks : 80

PART – A

Answer **all** questions in **one** word to maximum of **2** sentences.

1. Family where monothealous anthers are seen
2. How many families are there in Bentham and Hooker system of classification?
3. Expand APG.
4. What are false fruits?
5. What is a follicle?
6. Parietal placentation is seen in
 - (a) Fabaceae
 - (b) Rubiaceae
 - (c) Cucurbitaceae
 - (d) Solanaceae

P.T.O.

7. What is ray floret?
8. The acronym K stands for which herbarium?
9. What is the standard size of a herbarium sheet?
10. What is gynostegium?

PART – B

(10 × 1 = 10 Marks)

Answer any **eight** questions in not more than **one** paragraph.

11. What is Caryopsis?
12. Comment on the perianth of Poaceae.
13. Where was the last International Botanical congress held? Specify the year.
14. Draw the floral diagram of any of the members of Solanaceae.
15. Write the systematic position of Euphorbiaceae as per Bentham and Hooker system.
16. Compare the style in Acanthaceae with that of Lamiaceae.
17. Comment on the anthers in Apocynaceae.
18. What is a bad character?
19. Distinguish between hypanthium and Hypanthodium?
20. How will you distinguish an Umbel from a Corymb?
21. Comment on the ethnobotanical uses of *Aegle marmelos*.
22. Flower is a modified shoot. Justify the statement with reasons.
23. Write the binomial of Green gram and mention the aestivation found in its corolla.

24. Differentiate between Epigyny and Hypogyny ovary.
25. Name two well known herbaria from India and give their acronym.
26. Compare the ovary in Apocynaceae and Rubiaceae.

(8 × 2 = 16 Marks)

PART – C

Answer any **six** questions in not more than **120** words.

27. What is pharmacognosy? How it helps to prevent adulteration in various medicinal formulations in plant based healing systems
28. Write the economic importance of Solanceae.
29. Explain the advantages of molecular taxonomy.
30. Outline the merits and demerits of Engler and Prantle system of classification.
31. Compare the androecium in Asteraceae with that of Cucurbitaceae.
32. Diagrammatically explain verticillaster inflorescence.
33. Distinguish between homogamous and heterogamous heads.
34. Comment on the various types of multiple fruits.
35. Write an account on the floral characters of Aracaceae.
36. Write an account on the medicinal uses of *Vinca rosea* and *Aloe vera*.
37. Diagrammatically represent the various placentations.
38. Compare the ovaries in Cucurbitaceae, Apocynaceae and Malvaceae.

(6 × 4 = 24 Marks)

PART – D

Answer any **two** questions.

39. Write an essay on the classification of inflorescences.
40. Discuss the use of Chemotaxonomy in classification of plants.
41. Explain the principles of ICBN and point out the various nomenclatural types.
42. Explain Bentham and Hooker system of classification. Discuss on its merits and demerits.
43. Compare the subfamilies in Fabaceae.
44. Explain the steps involved in the preparation of herbarium and discuss on the role of herbaria in taxonomic research.

(2 × 15 = 30 Marks)