3. Biology

New Syllabus

Course Content

Section A (Botany)

Teaching hours: 75 **Full Marks: 37.5**

Unit 1: Introduction to Biology **5 Teaching hour**

- Biochemically important organic and inorganic molecules (general concepts):
  Carbohydrate, protein, lipid, nucleic acid, minerals and water.

Unit 2: Cell Biology **15 Teaching hour**

- The cell: The cell as a unit of life, structure of prokaryotic and eukaryotic cells,
  Structure and functions of cell organelles and inclusions.
- Cell division: Amitosis, mitosis, meiosis.

Unit 3: Biodiversity **40 Teaching hour**

Definition and scope of biodiversity, flora diversity of Nepal, concept of taxonomy : classification, binomial nomenclature, shortcoming of two kingdom classification, hierarchic system in classification, phylogeny. Five kingdom classification: Monera, Protista, Mycota, Plantae and Animalia.

- **Monera:** General account, structure and function of bacterial cells, concept of autotrophic and heterotrophic life styles, economic importance of bacteria.
  Cyanobacteria: Nostoc - Structure, reproduction and economic importance.
- **Mycota:** Concept of Zygomycetes, Ascomycetes, Basidiomycetes and Deuteromycetes.
  Structure and reproduction of Zygomycetes (Mucor), Ascomycetes (Yeast).
  Economic importance of fungi.
- **Plantae:**
  Algae: Introduction to green, red and brown algae, structure and reproduction of Spirogyra.
  Bryophyta: Marchantia and Funaria (morphology and life cycle).
  Pteridophyta: Dryopteris (morphology and life cycle).
  Gymnosperm: Brief morphological structure of Cycas and Pinus structure and it's distribution.
  Angiosperm: Morphology: root, stem, leaf, flower, fruit and seed relevant to the following families.
  Taxonomy and economic importance of the following families; Cruciferae (Brassicaceae), Solanaceae,
  Leguminosae – Papilionoidae only, Compositae (Asteraceae) and Gramineae (Poaceae).
  Lichen: Introduction and economic importance.
  Virus: Structure and economic importance.

Unit 4: Biota and their Environment **15 Teaching hour**

- Ecology: Definition, abiotic, biotic factors and their interactions.
- Concept of ecosystem, Pond and grassland ecosystem: structural and functional aspects; food chain, trophic level, ecological pyramids, productivity, concept of community and succession.
- Bio-geochemical cycle: carbon cycle and nitrogen cycle.
- Ecological imbalance and its consequences: Green house effects, depletion of ozone layer and acid rain.
- Concept of mountain ecosystem (altitudinal and climatic changes).
- **Conservation:**

Forest conservation: Brief introduction of forest of Nepal, importance of afforestation and hazards of deforestation.

Management of land and water.

Evaluation Scheme

Unit wise weightage for Botany Part 1

Unit	Teaching hour	Marks	Types of questions asked in the examination		
			Very short question (1 mark)	Short questions (3 marks)	Long questions (7.5 or 8 marks)
1. Introduction to Biology	5	3	X	1	X
2. Cell Biology	15	8	2 or 1 opt	2	Or 1*
3. Biodiversity	39	18.5	3 or 1 opt	3 or 1 opt	1 or 1 opt (7.5 marks)
4. Biota and their environment	16	8	2 or 1 opt	2 or 1 opt	Or 1*
Total	75	37.5 marks	7 ques x 1 mark	5 ques x 3 marks	2 ques x 7.5 marks and 8 marks
			Total 7 marks	Total 15 marks	Total 15.5 marks

* One full question of 8 marks will be asked either from the unit cell biology or Biota and environment

Format for question model of Biology – Grade XI

Section A (Botany)

1. Answer in very short; any seven — 7 Q x 1 mark — = 7 marks
   Total questions to be asked - 10
2. Describe in brief; any five — 5 Q x 3 marks — = 15 marks
   Total questions to be asked – 7
3. Long answer questions (two questions) one question is given as option as "or" — 1 Q. of 8 marks + 1 Q. of 7.5 marks — = 15.5 marks

Total 37.5 marks

Time schedule for questions

Very short questions – 1 mark - maximum 1 min.
Short questions – 3 marks - maximum 7 – 8 min.
Long questions – 8 or 7.5 marks - maximum 23 - 24 min.

Note:

1. There will be separate answer sheets for section A (Botany) and section B (Zoology).
2. Total exam time period of theory will be of 3 hrs. for both the sections A and B.
3. Concerned examiners will evaluate both the papers separately.
4. The pass marks is 27. The students must pass in Botany and Zoology jointly.

Section B (Zoology)

Course Content

Teaching hour 75 — Full marks : 37.5

Unit 1: Introduction to Biology — **5 Teaching hour**

- Nature and scope of Biology.
- Branch and relation with other sciences.
- General approach to understand life processes.

Unit 2: Origin and evolution of life — **20 Teaching hour**

- Life and its origin.
- Theories of origin of life.
- Oparin and Haldane's Theory.
- Miller and Urey's experiment.
- Meaning of evolution, organic evolution.
- Evidences of evolution, structural, anatomical, Paleontological, Embryological & Biochemical.
- Lamarckism, Darwinism & concept of Neo Darwinism.
- Human evolution.

Unit 3: Biodiversity — **35 Teaching hour**

Meaning of biodiversity, faunal diversity of Nepal.

- **Protista:** Characteristics and classification of phylum Protozoa upto class with examples; Habit and habitat, structure, reproduction and lifecycle of Paramecium and Plasmodium vivax (a concept of P. falciparum).
- **Animalia:** General characters and classification of the following phyla (upto class) with examples – Porifera, Coelenterata (Cnidaria), Platyhelminthes, Aschelminthes (Nemathelminthes), Annelida, Arthropoda, Mollusca, Echinodermata and Chordata.
  Earthworm (Pheretima posthuma) : Habit and habitat, structure; digestive, excretory, reproductive and nervous systems. Economic importance.
  Frog (Rana tigrina) : Habit and habitat, structure; digestive, circulatory, respiratory, Reproductive.

Unit 4: Biota and their Environment **15 Teaching hour**

- **Environmental pollution:** Air, water and soil. Sources of pollution, their effects and control measures.
  Hazards of pesticides.
- **Animal behaviour:** Taxes, reflexes and reflex action, dominance and leadership, migratory behaviour of fish and bird.
- **Adaptation:** Animal: Aquatic, amphibious and terrestrial (arboreal and volant).
- **Conservation:**

1. **Wildlife conservation:** Meaning of wildlife, importance of wildlife, meaning of rare, threatened, vulnerable and endangered species; few endangered species in Nepal.
   Conservation practices (National parks, wildlife reserves and hunting reserves),
   Ways of conservation and causes of extinction.

- Human responsibility for the protection of earth.

Evaluation Scheme

Unit wise weightage for Zoology Grade XI

Unit	Teaching hour	Total marks asked in exam	Types of questions asked in the examination		
			Very short question (1 mark)	Short questions (3 marks)	Long questions (7.5 or 8 marks)
1. Introduction to Biology	5	2	2	X	X
2. Evolution of Life	20	10	2 or 1 opt	0 or 1 opt	1 (8 marks) *
3. Biodiversity	35	17.5	1 or 1 opt	3 or 1 opt	1 or 1 opt (7.5 marks)
4. Biota and their environment	15	8	2 or 1 opt	2	X *
			7 ques x 1 mark	5 ques x 3 marks	2 ques x 7.5 and and 8 marks
Total	75	37.5 marks	Total 7 marks	Total 15 marks	Total 15.5 marks

* One full question of 8 marks will be asked either from the unit Evolution of life or Biota and environment

Format for question model for Biology – Part 1
Section B (Zoology)

1. Answer in very short; any seven — 1 mark x 7 ques = 7 marks
   Total questions to be asked - 10
2. Describe in brief; any five — 3 marks x 5 ques = 15 marks
   Total questions to be asked – 7
3. Long answer questions (two questions) one question is given as option as "or' — 8 marks + 7.5 marks = 15.5 marks

Total 37.5 marks

Time schedule for questions

Very short question – 1 mark - maximum 1 min.
Short question – 3 marks - maximum 7 – 8 min.
Long question – 7 or 7.5 marks - maximum 23 - 24 min.

Note:

1. There will be separate answer sheets for section A (Botany) and section B (Zoology).
2. Total exam time period of theory will be of 3 hrs. for both the sections A and B.
3. Concerned examiners will evaluate both the papers separately.
4. The pass marks is 27. The students must pass in Botany and Zoology jointly.

Botany Practical (Grade XI)

1. Use and maintenance of compound microscope.
2. Study of museum specimen and slides:
   - i. Types of bacterial cells;
   - ii. Spirogyra filaments;
   - iii. Mucor: Culture to demonstrate mycelium and sporangium; culture of yeast cells.
   - iv. Study of vegetative and reproductive structure of Marchantia, Funaria, Dryopteris, *Pinus*.
3. Study of different stages of mitotic and meiotic cell division through permanent slides and chart.
4. Preparation of temporary slide to study cell structure:
   Onion scale leaf, Leaf of Geranium or Zebrina or Tradescantia or any other locally available leaf.
5. Description of following plants in semi-technical terms with their floral diagrams and formulae and identification and economic importance of at least one plant from each of the following families:
   a. Cruciferae (Brassicaceae)
   b. Solanaceae
   c. Leguminosae –Papilionoidae only
   d. Compositae (Asteraceae)
   e. Gramineae (Poaceae)
6. Study of freshwater ecosystem using an aquarium or pond showing a food chain.
7. Study of morphological adaptations of the hydrophytes, mesophytes and xerophytes.
8. Field study: Collection, identification of plants and animals from local area; Preservation of collected organisms in suitable preservatives and maintain a record. The students are also advised to observe different types of environmental pollution during their field study (Jointly with zoology Dept).

Zoology Practical (Grade XI)

1. Study of permanent slide and museum specimen:
   Paramecium, Plasmodium, Sycon, Hydra, Fasciola (Liver fluke), Taenia (Tape worm), Ascaris (Round worm), Pheretima (Earthworm), Hirudinaria (Leech), Palaemon (Prawn), Cancer (Crab), Periplaneta (Cockroach), Pieris (Butterfly), Bombyx (Moth), Aranea (Spider), Palamnaeus (Scorpion), Scolopendra (Centipede), Julus (Millipede), Helix (Garden Snail), Asterias (Starfish), Labeo (Rohu fish), Rana (Frog), Bufo (Toad), Hemidactylus (Wall-lizard), Chelone (Turtle), Columba (Pigeon), Rhinolophus (Bat) and Funambulus (Squirrel).
2. Preparation of temporary slide and their study:
   - i. Striated muscle fibre (thigh) of frog.
   - ii. Setae and ovary of earthworm.
   - iii. Squamous epithelial cell of human cheek.
3. Study of histological structure through permanent slides of skin, oesophagus, stomach, intestine, rectum, liver, pancreas, lung, kidney, testis and ovary of frog.
4. Study of adaptational features of a primary aquatic animal (Labeo), secondary aquatic animal (Turtle), arboreal (Calotes, Tree frog), primary volant (Pigeon or other birds) and secondary volant (Flying fish, Bat)
5. Dissection of animal provided so as to expose their:
   a. Earthworm : General anatomy, alimentary canal, nervous system and reproductive organs.

b. Frog: General anatomy, alimentary canal, arterial and venous system, reproductive organs and brain.

Model Question 2065

Subject: Biology (Theory)

Time: 3 hrs. **Full Marks: 75**
Pass Marks: 27

Section A (Botany)

Attempt ***ALL*** the questions.

1. Answer any seven questions in very short. [1 × 7 = 7]
   a) Differentiate prokaryotic and eukaryotic cells on the basis of nucleus. [Botany From Unit 2]
   b) Write the functions of chloroplast. [Botany From Unit 2]
   c) What are the components of a nucleotide? [Botany From Unit 1]
   d) Why are cynobacteria called a blue green algae? [Botany From Unit 2]
   e) Why are ferns called vascular cryptogams? [Botany From Unit 3]
   f) Write the difference between disc and ray floret. [Botany From Unit 3]
   g) Name the primary consumers of pond ecosystem. [Botany From Unit 4]
   h) Define green house effect. [Botany From Unit 4]
   i) Lichen is an example of symbiosis, how? [Botany From Unit 3]
   j) Define plant succession. [Botany From Unit 4]
2. Answer any five questions in brief. [3 × 5 = 15]
   a) In what ways DNA differ from RNA? [Botany From Unit 1]
   b) Give the shortcomings of two kingdoms system of classification. [Botany From Unit 3]
   c) Illustrate vegetative structure of Spirogyra with neat & labelled diagram (no dessription required) [Botany From Unit 3]
   d) Write economic importance of fungi. [Botany From Unit 3]
   e) By means of stamen character only, how will you differentiate the various families which are included in your syllabus. [Botany From Unit 3]
   f) Energy flow in an ecosystem is always unidirectional. Explain. [Botany From Unit 4]
   g) How does the carbon cycle exist in the nature? [Botany From Unit 4]
3. Describe the prophase I of meiosis cell division. Distinguish it from prophase of mitosis. [Botany From Unit 2]
4. Give the distinguishing characters of Solanaeceae with its floral formula and floral diagram. Mention botanical names of three economically important plants of this family. [7.5]

OR, Define alternation of generation discuss it with reference to life cycle of Marchantia. [Botany From Unit 3]

Section B (Zoology)

1. **Answer any seven questions in very short.** [1 × 7 = 7]]
   a. Define the terms: Parasitogy, Paleontology. [Zoology From Unit 1]
   b. How is zoology related with chemistry? [Zoology From Unit 1]
   c. What is organic evolution? [Zoology From Unit 2]
   d. Define analogous organs. [Zoology From Unit 2]
   e. Differentiate oxidizing atmosphere and reducing atmosphere. [Zoology From Unit 2]
   f. Write zoological names of (i) wall lizard (ii) liver fluke. [Zoology From Unit 3]
   g. Mention the functions of contractile vacuoles in Paramecium. [Zoology From Unit 3]
   h. Define conservation. [Zoology From Unit 4]
   i. Name two examples of migratory birds. [Zoology From Unit 4]
   j. Why is DDT banned? [Zoology From Unit 4]

2. **Answer any five questions in brief.** [3 × 5 = 15]

a. "Archeopteryx is connecting link between reptiles and birds", Justify. [Zoology From Unit 2]

b. Give an account of gamogony life cycle of Plasmodium vivax. [Zoology From Unit 3]

c. Classify Pila. [Zoology From Unit 3]

d. How is a cocoon formed in earthworm? [Zoology From Unit 3]

e. Draw labeled diagram of internal structure of frog's heart (No description). [Zoology From Unit 3]

f. Describe the volant adaptational features of birds. [Zoology From Unit 4]

g. Enlist the important measures to protect endangered species. [Zoology From Unit 4]

3. Draw the neat and labelled diagram of male reproductive system of Pheretima. [7.5] [Zoology From Unit 3]

OR Describe the alimentary canal of Rana tigrina. [Zoology From Unit 3]

4, Write an essay on the theory of natural selection. [8] [Zoology From Unit 2]

HSEB Questions

Section A (Botany)

Unit 1– Introduction to Biology

Answer in very short:

1. Why calcium is an important life component? [Q.N.1(a), 2058]
2. Give the names of important organic life-components. [Q.N.1(a), 2059]
3. Name the composition of DNA. [Q.N.1(e), 2057]
4. Mention the function of RNA molecules. [Q.N.1(g), 2059]
5. What is cholesterol ? [Q.N.1(a), 2060]
6. Mention the function of lipid. [Q.N.1(e), 2061]
7. Give two functions of RNA. [Q.N.1(b), 2062]
8. Why cellulose can not be digested by human being ? [Q.N.2(c), 2060]
9. Write the chief components of DNA. [Q.N.2(c), 2061]
10. Give two examples of polysaccharides. [Q.N.2(d), 2061]
11. What is cholesterol ? [Q.N.2(d), 2062]
12. Define conjugated protein. [Q.N.2(f), 2062]
13. Name the components of nucleotide. [Q.N.2(h), 2062]
14. Give the chief components of RNA. [Q.N. 2,(d) 2063]
15. Name two D.N.A. containing cell organelles. [Q.N.1(b), 2052]
16. What do you mean by micronutrients? [Group 'B' Q.N.1 (i), 2066]
17. What is molecular biology? [Q.N. 1(i), Supp. 2069]

Describe in brief :

1. Discuss protein as an important bio-molecule. [Q.N.3(d), 2056]
2. What are amino acids ? Describe their types and functions. [Q.N.3(a), 2060]
3. Differentiate between saturated and unsaturated fatty acids. [Group 'B' Q.N.2 (a), 2066]
4. Differentiate between a prokaryotic and eukaryotic cell. [Group 'B' Q.N.2 (g), 2066]
5. Define protein and highlight its role as an important biomolecule. 3 [Q.N. 2 (a), 2067]
6. Describe the fatty acids. [Q.N.2(a),2068]
7. The types and functions of amino acids. [Q.N. 2(f), Supp. 2068]
8. Differentiate between DNA and RNA. [Q.N. 2(a), 2069]
9. Discuss the function of carbohydrate. [Q.N. 2(g), Supp. 2069]
10. List out the functions of proteins. [Q.N. 2(a), 2070 'C']
11. Describe the types of lipids with examples. [Q.N. 2(a), 2070 'D']

Unit 2 – Cell Biology

Answer in very short:

1. Put a tick mark (✓) against the correct answer.
   i. Power-house of the cell is the Centriole Ribosome Mitochondria [Q.N.1(A) (i), 2051]
2. Whether the following statements are true or false?
   i. Chromosomes actually duplicate in the anaphase stage of mitotic division
   True False [Q.N.1(B) (i), 2051]
3. Answer the following in one or two words only:
   Give one diagnostic features of diplotene. [Q.N.1(C) (ii), 2051]
4. Why spirogyra is an eukaryote? [Q.N.1(d), 2052]
5. Name the site for: (i) Proteinsynthesis (ii) Photosynthesis
   List two characteristics which differ DNA and RNA. [Q.N.1(c), 2053]
6. List two characteristic features of a Prokaryotic cell with two examples. [Q.N.1(a), 2054]
7. Write the function of "akinete" in Spirogyra. [Q.N.1(f), 2060]
8. What is cyclosis ? [Q.N. 2(h), 2064]
9. What is the process dealing with the formation of sex cell? [Q.N.1(b), 2056]
10. Mention the change you find in chromosomes during anaphase stage of mitosis. [Q.N.1(c), 2056]
11. What is the basic difference between ribosome and mitochondria ? [Q.N.1(c), 2057]
12. Write a change in chromosomes during zygotene stage of meiotic Prophase-I cell division. [Q.N.1(c), 2059]
13. Give two characters of pro-caryotic cell. [Q.N.1(b), 2060]
14. Why mitochondria is called power house of a cell ? [Q.N.1(c), 2060]
15. What is cristae ? [Q.N.1(b), 2061]
16. Give two examples of micronutrients. [Q.N.1(a), 2061]
17. Differentiate between spermatogenesis and oogenesis. [Q.N.1(f), 2061]
18. Write the function of a cell wall. [Q.N.2(h), 2061]
19. Why Lysosome is called suicidal bag ? [Q.N. 1,(b) 2063]
20. What is prokaryotic cell ? [Q.N. 1,(c) 2063]
21. How Protein is formed ? [Q.N. 1(c), 2064]
22. What is the function of mitochondria ? [Group 'B' – Q.N. 1(c), 2065]
23. What are the major chemical constituents of protoplasm ? [Group 'B' – Q.N. 1(f), 2065]
24. Define Cell theory. [Q.N.2(b), 2060]
25. Mention the functions of cell wall. [Q.N. 2,(f) 2063]
26. Mention two differences between plant & animal cell. [Q.N. 2(e), 2064]
27. What do you mean by cytokinesis? [Group 'B' Q.N.1 (b), 2066]
28. What is incipient nucleus? [Group 'B' Q.N.1 (d), 2066]
29. Define cellular totiopotency. 1 [Q.N. 1 (a), 2067]
30. What is plasmodesmata ? 1 [Q.N. 1 (b), 2067]
31. Write the function of plasma membrane. 1 [Q.N. 1 (c), 2067]
32. What is chiasmata ? 1 [Q.N. 1 (h), 2067]
33. What is prokaryotic cell ? [Q.N.1(a),2068]
34. Define cell wall. [Q.N.1(b),2068]
35. What is cyclosis ? [Q.N.1(c),2068]
36. What is cellular totipotency? [Q.N. 1(a), Supp. 2068]
37. What is the message of Steward's experiment? [Q.N. 1(a), 2069]
38. What do you mean by RER and SER? [Q.N. 1(b), 2069]
39. Define suicidal bag. [Q.N. 1(c), 2069]
40. What is somatic cell? [Q.N. 1(a), Supp. 2069]
41. What do you mean by Cytokinesis? [Q.N. 1(a), 2070 'C']
42. What is eukaryotic cell? [Q.N. 1(b), 2070 'C']
43. Write any two functions of Golgi bodies. [Q.N. 1(c), 2070 'C']
44. What do you mean by cell inclusions? [Q.N. 1(a), 2070 'D']
45. What do you mean by karyokinesis? [Q.N. 1(b), 2070 'D']
46. Why meiosis is called as reductional cell division? [Q.N. 1(c), 2070 'D']

Describe in brief :

1. Differentiate between Prokaryotic and Eukaryotic cell. [Q.N.3(b), 2056]
2. Explain the structure of a mitochondrion. [Q.N.3(c), 2056]
3. How chromosome changes during 'Anaphase' of mitosis? [Q.N.3(b), 2058]
4. Discuss the changes that occur during Anaphase of mitosis. [Q.N.3(b), 2060]
5. Differentiate between meiotic and mitotic metaphase. [Q.N.3(g), 2061]
6. Describe the structure of Eukaryotic cell. [Q.N.3(a), 2062]
7. Give the significances of meiosis. [Q.N.3(g), 2062]
8. Explain the process of mitosis. (diagrammatically only) [Q.N. 3,(b) 2063]
9. Describe the structure and functions of mitochondria. [Q.N. 3,(c) 2063]
10. Describe the structure and functions of plastids. [Q.N. 3(a), 2064]
11. What is gametogenesis ? How oogenesis differs from spermatogenesis ? [Q.N. 3(j), 2064]
12. Golgi apparatus [Group 'B' – Q.N. 2(a), 2065]
13. Different types of ribosomes Group 'B' – Q.N. 2(b), 2065]
14. Significance of mitosis [Group 'B' – Q.N. 2(c), 2065]
15. Prokaryote and Eukaryote [Q.N.4(a), 2051]
16. Prophase and Metaphase [Q.N.7(b), 2052]
17. Prophase of Mitosis and Meiosis [Q.N.9(a), 2054]
18. Prokaryotic cell [Q.N.4(a), 2052]
19. Cell membrane [Q.N.4(b), 2052]
20. Prophase–I in meiosis [Q.N.10(a), 2051]
21. Prokaryotic cell [Q.N.9(a), 2053]
22. State the six main differences between Mitosis and Meiosis. [Q.N.3, 2053]
23. What is mitosis ? Describe the role of mitosis in cell division. [Q.N.3, 2057]
24. Describe the structure and functions of cell membrane and mitochondrion of a cell. [Q.N.4, 2058]
25. Describe the structures and functions of any two major cytoplasmic organelles of eukaryotic cell. [Q.N.4, 2059]
26. Describe the plastids. [Group 'B' Q.N.2 (b), 2066]
27. Describe the process of crossing over in meiosis. [Group 'B' Q.N.2 (c), 2066]
28. Describe the process of amitosis and mention its significance. 3 [Q.N. 2 (b), 2067]
29. Describe the structure and function of chloroplast. 3 [Q.N. 2 (c), 2067]
30. Discuss the structure of golgi complex. [Q.N.2(b),2068]
31. Describe the process of mitosis. [Q.N.2(c),2068]
32. Describe the importance and structure of endoplasmic reticulum. [Q.N.2(g),2068]
33. Structure of mitochondrion. [Q.N. 2(a), Supp. 2068]
34. Structure and functions of plastid. [Q.N. 2(b), 2069]
35. The process of meiosis I. [Q.N. 2(c), 2069]
36. Describe the structure of nucleus. [Q.N. 2(a), Supp. 2069]
37. Explain Metaphase and Anaphase stage of mitotic cell division. [Q.N. 2(b), Supp. 2069]
38. What is Mitochondria, explain. [Q.N. 2(c), Supp. 2069]
39. Describe the structure of mitochondria. [Q.N. 2(b), 2070 'C']
40. Write the significance of mitosis. [Q.N. 2(c), 2070 'C']
41. The structure of nucleus. [Q.N. 2(b), 2070 'D']
42. Differentiate between a prokaryotic and eukaryotic cell. [Q.N. 2(c), 2070 'D']

Long Questions:

1. Describe the process of mitosis with necessary diagram. How does it differ from meiosis? 8[Q.N. 4, Supp. 2068]

Unit 3– Biodiversity

Answer in very short:

1. Give the function of mesosomes of a bacterial cell. [Q.N.2(h), 2058]
2. What is two kingdom type of classification ? [Q.N.1(d), 2062]
3. What is Protonema ? [Q.N.1(g), 2062]
4. What is a taxonomic category ? [Q.N. 1,(e) 2063]
5. Why ferns are called vascular cryptogams ? [Q.N. 1,(g) 2063]

6. Why green algae is called producer ? [Q.N. 1(f), 2064]
7. Write hierachic system in classification. [Q.N.2(a), 2056]
8. Give the shortcoming of two kingdoms system of classification. [Q.N.2(b), 2056]
9. Write the function of "akinetes" in Spirogyra. [Q.N.2(c), 2056]
10. Give the type of vascular bundle found in Pinus stem. [Q.N.2(d), 2056]
11. Give the important chemical components of a virus. [Q.N.2(a), 2057]
12. Why the Spirogyra is included in algae ? [Q.N.2(b), 2057]
13. Write any two economic importance of fungi. [Q.N.2(d), 2057]
14. Give any two important characters of algae which is not found in fungi. [Q.N.2(e), 2057]
15. Give any two important characters of bacteria. [Q.N.2(g), 2057]
16. Classify the mustard plant in hierarchic system. [Q.N.2(b), 2058]
17. Name the types of fruit in Gramineae and Solanaceae. [Q.N.2(f), 2058]
18. Why "Bryophytes are known as amphibious plants"? [Q.N.2(g), 2058]
19. Draw the L.S. capsule of ***Funaria*** with labellings. [Q.N.3(f), 2058]
20. Give any two characters of red and brown algae. Also mention their differences. [Q.N.3(g), 2058]
21. Mention the advantage of five kingdoms system of classification. [Q.N.2(a), 2059]
22. Give the concept of binomial system of nomenclature. [Q.N.2(b), 2059]
23. State the function of "Gemma cups" in Marchantia. [Q.N.2(c), 2059]
24. Write the function of mycorrhal roots in Pinus. [Q.N.2(e), 2059]
25. Give the type of ovary you find in legumes. [Q.N.2(g), 2059]
25. Classify mustard plant in heirarchic system of classification. [Q.N.2(g), 2060]
26. Define heterocyst. [Q.N.2(b), 2061]
27. Name the types of anther found in family cruciferae and compositae. [Q.N.2(e), 2061]
28. Differentiate between ray and disc florets. [Q.N. 2,(c) 2063]
29. Write two points of the demerits of 2 kingdom system of classification. [Q.N. 2,(g) 2063]
30. Why Bryophytes are called amphibious plants ? [Q.N. 2(d), 2064]
31. What is the botanical name of pinus ? [Q.N. 2(f), 2064]
32. Whether the following statements are true or false?
iii. Siliqua is the fruit type of the Cruciferous plant.
True False [Q.N.1(B) (iii), 2051]
33. Answer the following in one or two words only:
i. What is the substance that makes the bacterial cell wall? [Q.N.1(C) (i), 2051]
34. What is binomial nomenclature? [Q.N.1(c), 2052]
35. Give the methods of reproduction in spirogyra. [Q.N.1(a), 2053]
36. Define adventitious root. [Group 'B' Q.N.1 (a), 2066]
37. What do you understand by binomial nomenclature? [Group 'B' Q.N.1 (c), 2066]
38. What is sporangium? [Group 'B' Q.N.1 (e), 2066]
39. What is lichen? [Group 'B' Q.N.1 (g), 2066]
40. Define aestivation. [Group 'B' Q.N.1 (j), 2066]
41. What do you mean by heterocyst ? 1 [Q.N. 1 (d), 2067]
42. Why lichen is called a dual organism ? 1 [Q.N. 1 (e), 2067]
43. What is a zygospore ? 1 [Q.N. 1 (f), 2067]
44. Give one example of each of the following:
(i) vascular seedless plant (ii) Vascular seeded plant 1 [Q.N. 1 (g), 2067]
45. Write the meaning of sporophyll with its types. 1 [Q.N. 1 (i), 2067]
46. Define a perianth. 1 [Q.N. 1 (j), 2067]
47. Define binomial nomenclature. [Q.N.1(d),2068]
48. What is coenocytic ? [Q.N.1(e),2068]
49. Define thallophytes. [Q.N.1(f),2068]
50. What is rhizoides ? [Q.N.1(g),2068]
51. Define pseudomycelium. [Q.N. 1(b), Supp. 2068]
52. Why are viruses called obligatory parasites? [Q.N. 1(c), Supp. 2068]
53. Write any two useful activities of bacteria. [Q.N. 1(d), Supp. 2068]

54. What is caralloid root? [Q.N. 1(e), Supp. 2068]
55. Explain the term cruciform corolla. [Q.N. 1(f), Supp. 2068]
56. Define simple leaf. [Q.N. 1(i), Supp 2068]
57. What does it mean by taxonomy? [Q.N. 1(d), 2069]
58. Write the name of bacteria on the basis of its shape. [Q.N. 1(e), 2069]
59. Define the function of leaf. [Q.N. 1(f), 2069]
60. Mention about sori. [Q.N. 1(g), 2069]
61. Define heterosporous? [Q.N. 1(b), Supp. 2069]
62. What is Oogamous? [Q.N. 1(c), Supp. 2069]
63. Give and name one example of hypogynous flower? [Q.N. 1(d), Supp. 2069]
64. What is the function of rhizome? [Q.N. 1(e), Supp. 2069]
65. Give two examples of gymnosperm. [Q.N. 1(f), Supp. 2069]
66. What is he function of east? [Q.N. 1(g), Supp. 2069]
67. Define species. [Q.N. 1(d), 2070 'C']
68. What is heterocyst? [Q.N. 1(e), 2070 'C']
69. What do you understand by heterosporous? [Q.N. 1(f), 2070 'C']
70. What is lichen? [Q.N. 1(g), 2070 'C']
71. Define taxonomy. [Q.N. 1(d), 2070 'D']
72. What is coenocytic hyphae? [Q.N. 1(e), 2070 'D']
73. Why ferns are called vascular cryptogams? [Q.N. 1(f), 2070 'D']
74. What is inflorescence? [Q.N. 1(g), 2070 'D']

Describe in brief :

1. Give an account of the Compositae flower. [Q.N.3(e), 2056]
2. Explain the economic importance of fungi. [Q.N.3(f), 2056]
3. Give the economic importance of bacteria. [Q.N.3(b), 2059]
4. Mention characters of the lichens. [Q.N.3(g), 2059]
5. Explain how zygotes are formed in angiosperm. [Q.N.3(c), 2060]
6. Describe the sporophyte of Merchantia. [Q.N.3(f), 2060]
7. Give the sketch of the life cycle of yeast. [Q.N.3(g), 2060]
8. Discuss the advantages of 5 - kingdom classification over 2 - kingdom classification. [Q.N.3(h), 2060]
9. Define the term genus and species with suitable examples. [Q.N.3(a), 2061]
10. Write the different structural types and economic importance of bacteria. [Q.N.3(b), 2061]
11. Describe in brief the female gametophyte in Marchantia. [Q.N.3(e), 2061]
12. Distribution of pinus in Nepal. [Q.N.3(d), 2062]
13. Mention the importance of Yeast. [Q.N. 3,(e) 2063]
14. Describe the asexual reproductive process of Mucor. [Q.N. 3,(g) 2063]
15. Discuss the merits of 5 kingdom system of classification over 2 kingdom system. [Q.N. 3(e), 2064]
16. Discuss the agriculture economic importance of Bacteria. [Q.N. 3(h), 2064]
17. Explain the following word in a few sentences with examples:
    (i) Binomial nomenclature [Q.N.2(a), 2051]
18. Explain the following with the help of diagram:
    (i) Capitulum of sunflower [Q.N.8(a), 2051]
19. "Bacteria are the nature's scavengers", justify. [Q.N.1(vi), 2055]
20. Give two differences in each of the following pairs: (any three)
    (i) Asexual reproduction and sexual reproduction [Q.N.9(c), 2054]
    (ii) Gametophytes of Marchantia and that of Fern. [Q.N.9(c), 2055]
21. Discuss the economic importance of virus or bacteria. [Q.N.2, 2055]
22. Describe the morphological structure of a fern. [Q.N.7 (a), 2057]
23. Give an account of bacterial cell. [Q.N.7 (b), 2057]
24. Describe the characters of red and brown algae. [Q.N.7 (e), 2057]
25. Describe the structure of Yeast. [Group 'B' Q.N.2 (d), 2066]
26. Describe the scalariform conjugation in Spirogyra. [Group 'B' Q.N.2 (e), 2066]
27. Describe tha male cone of Pinus. [Group 'B' Q.N.2 (f), 2066]
28. Describe the structure of fern prothallus. [Q.N. 2 (d), 2067]
29. Describe the structure of megasporophyll of cycas. [Q.N. 2 (e), 2067]
30. Justify with appropriate reasons that viruses are living beings. [Q.N. 2 (g), 2067]

31. Elaborate the economic importance of fungi. [Q.N.2(d),2068]
32. Describe the scalariform conjugation. [Q.N.2(e),2068]
33. Importance of biodiversity. [Q.N. 2(b), Supp. 2068]
34. The sexual reproduction of Mucor. [Q.N. 2(e), Supp. 2068]
35. The structure of sporophyte in Marchantia. [Q.N. 2(g), Supp. 2068]
36. Structure of Spirogyra. [Q.N. 2(d), 2069]
37. Distribution of Pinus and its importance. [Q.N. 2(g), 2069]
38. Describe the structure and function of protonema. [Q.N. 2(d), Supp. 2069]
39. Describe the scalariform conjugation. [Q.N. 2(e), Supp. 2069]
40. What is binomial nomencleature system with examples. [Q.N. 2(f), Supp. 2069]
41. Describe the prothallus of fern with the help of diagram. [Q.N. 2(d), 2070 'C']
42. Describe the structure of spirogyra. [Q.N. 2(e), 2070 'C']
43. Economic importance of virus. [Q.N. 2(g), 2070 'C']
44. The sporophyte of marchantia. [Q.N. 2(d), 2070 'D']
45. An account of scalariform conjugation of spirogyra. [Q.N. 2(e), 2070 'D']
46. Structure of virus. [Q.N. 2(g), 2070 'D']

Long Questions:

1. Describe in semi-technical language the taxonomy of the family solanacea with special reference to floral formula and floral diagram. [Q.N.8, 2052]
2. What is alternation of generation? Discuss it in the life-cycle of *Funaria*. [Q.N.5, 2056]
3. Give the distinguishing features of Solanaceae with its floral formula and floral diagram. Also mention botanical name of any four economically important plants of this family. [Q.N.5(Or), 2056]
4. Give the distinguishing characters of Cruciferae with the floral formula and floral diagram. Mention any four important plants of this family. [Q.N.6, 2057]
5. Describe the lifecycle of Marcantia. [Q.N.6 (Or), 2057]
6. Describe the diagrammatic life-cycle of ***Marchantia***. [Q.N.5, 2058]
7. Give the distinguishing characters of Cruciferae in semi-technical terms. Give the floral formula and floral diagram as well as scientific name of any two economically important plants of the same family. [Q.N.7, 2059]
8. Describe the structure and conjugation mode of reproduction in Spirogyra. [Q.N.7(Or), 2059]
9. Give the distinguishing features of Solanaceae with its floral diagram, F. formal and examples of two plants of economic importances. [Q.N.7, 2060]
10. What is alternation of generation ? Discuss this phenomenon in the life cycle of "Funaria". [Q.N.7(Or), 2060]
11. Describe the diagrammatic life cycle of Funaria. [Q.N.5, 2061]
12. Describe the family compositae with necessary diagram and give two examples of economic value of the same family. [Q.N.7(Or), 2061]
13. Describe the life cycle of Marchantia with the help of labelled diagram. [Q.N.5, 2062]
14. Give the salient features of Gramineae in semitechenical terms with its floral diagram, formula and two scientific names of economically important plants of this family. [Q.N.7, 2062]
15. What is alternation of generation ? Describe life cycle of Funaria. [Q.N. 5. 2063]
16. Give the distinct features of cruciferae in semi-technical terms giving its floral diagram, formula and two examples of plants (scientific name) of economic importance. [Q.N. 7.(or) 2063]
17. Write down the structure and reproduction of spirogyra. [Q.N. 5, 2064]
18. Give the distinguishing features of Solanaceae family with floral diagram and floral formula. Also write the scientific name of two plants of economic of this family. [Q.N. 7(or), 2064]
19. Describe the life cycle of Marchantia showing alternation of generation. [Group 'B' – Q.N. 3, 2065]
20. Describe the family papilionaceae with necessary diagrams and give two examples of economic value of this family. [Group 'B' – Q.N. 4(or), 2065]
21. Describe the life cycle of Dryopteris with alternation of generation. [Group 'B' Q.N.3, 2066]

22. Describe the family Cruciferae with necessary diagrams and give the two examples of economic value of this family. [Group 'B' Q.N.3 (or), 2066]
23. Describe the distinguishing characteristics of family Solanaceae with floral diagram and floral formula. Give scientific names of any two plants of this family. [Q.N. 3, 2067]
24. Explain the alternation of generations based on the life cycle of *Funaria*. [Q.N. 3 (Or), 2067]
25. Describe the life cycle of Fern with alternation of generation. [Q.N.3,2068]
26. Describe the Cruciferae with necessary diagrams and give two examples of economic value of this family. [Q.N.3(Or),2068]
27. Define alternation of generations and describe the life cycle of Funaria. 7.5 [Q.N. 3, Supp. 2068]
28. Describe the family compositae in semi–technical terms with diagrams. Mention botanical names of two economically important plants of this family. [Q.N. 3(Or), Supp. 2068]
29. Describe the structure and life cycle of Marchanita in detail. 7.5 [Q.N. 3, 2069]
30. Describe the family solaneceae with necessary diagrams and give two examples of economic value of this family. [Q.N. 3(Or), 2069]
31. Describe the family cruciferae in semi technical terms with distinguishing characters, floral diagram and floral formula with two examples of its. economic importance. 7.5[Q.N. 3, Supp. 2069]
32. Explain life cycle of pteridophyte with emphasis on the alternation of generation. [Q.N. 3(Or), Supp. 2069]
33. What is alternation of generation? Describe it with the reference of life cycle of Funaria. 7.5 [Q.N. 3, 2070 'C']
34. Describe the family compositae with necessary diagrams. And mention the botanical name of two plants belonging to this family. [Q.N. 3(Or), 2070 'C']
35. Describe the life cycle of Mucor with well labelled diagrams. 7.5 [Q.N. 3, 2070 'D']
36. Describe the family papilionaceae with necessary diagrams. Write any two plants belong to this sub family. [Q.N. 3(Or), 2070 'D']

Unit 4– Biota and their Environment

Answer in very short:

1. Provide two best examples of herbivorous consumer in a grassland ecosystem. [Q.N.1(C) (iii), 2051]
2. Give the name of three ecological factors. [Q.N.1(l), 2052]
3. Mention one important function of the primary producer. [Q.N.1(d), 2057]
4. Mention the significance of green house effect. [Q.N.1(g), 2057]
5. Name any two gases which cause green house effect. [Q.N.1(d), 2058]
6. Give any two examples of secondary consumers of a pond. [Q.N.1(e), 2059]
7. What are ecotypes ? [Q.N.1(d), 2060]
8. Define food web. [Q.N.1(e), 2060]
9. What is natural resource ? [Q.N. 1,(a) 2063]
10. What is food chain ? [Q.N. 1(b), 2064]
11. Define a grazing food chain. [Group 'B' – Q.N. 1(a), 2065]
12. Mention the abiotic components of ecosystem. [Group 'B' – Q.N. 1(d), 2065]
13. Which bacteria in legume roots is used for nitrogen fixation? [Q.N.2(f), 2056]
14. What are decomposers ? [Q.N.2(d), 2060]
15. What is food web ? [Q.N. 2,(a) 2063]
16. Define ecological Pyramid. [Q.N. 2(b), 2064]
17. Mention abiotic factors. [Group 'B' Q.N.1 (f), 2066]
18. What is food chain? [Group 'B' Q.N.1 (h), 2066]
19. Define abiotic factor. [Q.N.1(h),2068]
20. Discuss food chain. [Q.N.1(i),2068]
21. What is acid rain ? [Q.N.1(j),2068]
22. What steps would you suggest for conservation of forest? [Q.N. 1(g), Supp. 2068]

23. What do you mean by ecotypes? [Q.N. 1(h), Supp. 2068]
24. What is primary succession? [Q.N. 1(j), Supp. 2068]
25. How do you mean autecology? [Q.N. 1(h), 2069]
26. State about predation. [Q.N. 1(i), 2069]
27. Elaborate climax community. [Q.N. 1(j), 2069]
28. Define parasitism. [Q.N. 1(h), Supp. 2069]
29. Define acid rain. [Q.N. 1(j), Supp. 2069]
30. Define food chain. [Q.N. 1(h), 2070 'C']
31. What is acid rain? [Q.N. 1(i), 2070 'C']
32. Mention the role of decomposers in ecosystem. [Q.N. 1(j), 2070 'C']
33. What is xerosere? [Q.N. 1(h), 2070 'D']
34. What do you mean by parasitism? [Q.N. 1(i), 2070 'D']
35. What is the impact of altitude in vegetation? [Q.N. 1(j), 2070 'D']

Describe in brief :

1. Discuss the consequences of acid rain. [Q.N.3(i), 2056]
2. Explain the role of light in an aquatic ecosystem. [Q.N.3(j), 2056]
3. Define food chain ? Explain the simple food-chain in a pond ecosystem. [Q.N.7 (i), 2057]
4. Discuss the consequences of green-house effect. [Q.N.3(h), 2059]
5. Discuss the consequences of acid rain. [Q.N.3(e), 2060]
6. Explain Nitrogen cycle with the help of diagram. [Q.N.3(f), 2062]
7. Depletion of ozone layer, a threat to life. [Q.N.3(h), 2062]
8. Define ecosystem and mention the main components of ecosystem. [Q.N. 3,(i) 2063]
9. What is deforestation ? Discuss the causes of deforestation. [Q.N. 3,(j) 2063]
10. Explain the carbon cycle in nature. [Q.N. 3(f), 2064]
11. N_2 cycle in nature [Group 'B' – Q.N. 2(d), 2065]
12. Benefits of afforestation [Group 'B' – Q.N. 2(e), 2065]
13. Give a graphic diagram of the carbon cycle. [Q.N.1(vii), 2055]
14. Differentiate between the following pairs:
    (i) Ecological succession and community [Q.N.8(b), 2053]
15. What are the physical constraints of a mountain ecosystem ? 3 [Q.N. 2 (f), 2067]
16. Discuss the carbon cycle in nature. [Q.N.2(f),2068]
17. Define green house effect and explain its consequences. [Q.N. 2(c), Supp. 2068]
18. Differentiate between mutualism and commensalism. [Q.N. 2(d), Supp. 2068]
19. Importance of N_2 cycle in nature. [Q.N. 2(e), 2069]
20. Consequences of deforestation [Q.N. 2(f), 2069]
21. Mention the consequences of green house effects. [Q.N. 2(f), 2070 'C']
22. The importance of forest. [Q.N. 2(f), 2070 'D']

Long Questions:

1. Define ecosystem and discuss the biotic and abiotic components of pond ecosystem. [Q.N.3, 2052]
2. Draw a carbon-cycle and mention its significance in natural ecosystem. [Q.N.5, 2053]
3. Describe a Pond ecosystem with a diagrammatic sketch of food-chain. [Q.N.5, 2054]
4. How the temperature and the light influence the distribution of organism in an ecosystem ? [Q.N.5, 2055]
5 Define food chain and discuss it with reference to grassland ecosystem. [Q.N.3, 2057]
6. What is carbon cycle ? Describe the carbon cycle in nature ? [Q.N.3 (Or), 2057]
7 Define trophic level. How energy flows between the trophic levels in the pond cosystem? [Q.N.7, 2058]
8. Describe the measures used for forest conservation. [Q.N.7(Or), 2058]
9. Write down the structural and functional aspects of a pond ecosystem. [Q.N.5, 2059]
10. What is deforestation ? Discuss the causes and consequences of deforestation. [Q.N.5, 2060]

11. Define ecosystem. Describe abiotic factors in a terrestrial ecosystem. Mention the flow of energy in the trophic level. [Q.N.7, 2061]
12. What is an ecosystem ? Explain it with reference to a pond. [Q.N.7(Or), 2062]
13. Discuss the grass land ecosystem. [Q.N. 7. 2063]
14. Define ecosystem. Discuss in detail about the pond ecosystem. 8 [Group 'B' – Q.N. 4, 2065]
15. Define ecosystem and discuss the main components of ecosystem. 8 [Group 'B' Q.N.4, 2066]
16. Define ecosystem and describe food chain, Trophic level and ecological pyramids of a grassland ecosystem. 8 [Q.N. 4, 2067]
17. What is ecosystem ? Describe in detail about the pond ecosystem. [Q.N.4,2068]8
18. Define succession and describe the process of succession in detail. 8[Q.N. 4, 2069]
19. Define ecosystem, describe in detail about the aquatic system. 8[Q.N. 4, Supp. 2069]
20. Describe different types of ecological factors in detail with suitable examples. 8[Q.N. 4, 2070 'C']
21. Discuss the main components of ecosystems in detail with suitable examples. 8[Q.N. 4, 2070 'D']

Section B (Zoology)

Unit 1- Introduction to Biology

Answer in very short:

1. What was Louis Pasteur's view regarding origin of life? [Q.N.1(a), 2056]
2. Define earth crust. [Q.N.1(a), 2062]
3. Define Phycology. [Q.N. 1(a), 2064]
4. Define Cytology. [Q.N. 1(d), 2064]
5. What is morphology ? [Group 'A' – Q.N. 1(a), 2065]
6. Define the terms Mycology and Anthropology. [Q.N.2(a), 2060]
7. Define circulation. [Q.N.1(b), 2057]
8. How is biology inter related with other sciences? [Group 'A' Q.N.1 (b), 2066]
9. Define Physiology. 1 [Q.N. 1 (e), 2067]
10. Who coined the term Biology ? 1 [Q.N. 1 (h), 2067]
11. Define molecular biology. [Q.N.1(a),2068]
12. Name the branh of biology that deals with the study of fossils. [Q.N.1(b),2068]
13. Who coined the term of biology? [Q.N. 1(a), Supp. 2068]
14. What do you mean by Morphology? [Q.N. 1(b), Supp. 2068]
15. Define the term Herpetology. Q.N. 1(a), 2069]
16. Give a reason to show the relation of zoology with chemistry. [Q.N. 1(b), 2069]
17. Define histology. [Q.N. 1(a), Supp. 2069]
18. Name any two life processes. [Q.N. 1(b), Supp. 2069]
19. Which branch of biology deals with the physical and chemical functions of the tissues and organs? [Q.N. 1(a), 2070 'C']
20. How would you define excretion? [Q.N. 1(b), 2070 'C']
21. What does it mean by histology? [Q.N. 1(j), 2070 'C']
22. Define the term physiology. [Q.N. 1(a), 2070 'D']
23. What can you do after studying biology? [Q.N. 1(b), 2070 'D']

Describe in brief :

1. Explain the relations of biology with other sciences. [Q.N.3(a), 2058]

Unit 2- Origin and evolution of life

Answer in very short:

1. Mention the contribution made by Aristotle. [Q.N.1(e), 2056]
2. What is coacervate? [Q.N.1(b), 2058]
3. Mention the source of energy in the Miller-Urey's experiment. [Q.N.1(f), 2059]

4. What is Mutation ? [Q.N.1(c), 2062]
5. Give the name of vestigial organ of human intestine. [Q.N.1(d), 2056]
6. Define Neo-Darwinism. [Q.N.1(f), 2057]
7. Give any one example of the homologous organs in organisms. [Q.N.1(c), 2058]
8. Point out the difference between the new and old world monkeys. [Q.N.1(b), 2059]
9. Give two examples of vestigial organs. [Q.N.1(c), 2061]
10. What is organic evolution ? [Q.N.1(g), 2061]
11. Which one is closely related to man, apes or monkeys ? [Q.N. 1,(d) 2063]
12. Give two acquired characters with examples. [Q.N. 1(e), 2064]
13. Who proposed recapitulation theory? [Group 'A' Q.N.1 (d), 2066]
14. What are homologous organs ? 1 [Q.N. 1 (c), 2067]
15. Which human ancestor invented fire ? 1 [Q.N. 1 (g), 2067]
16. What is the gist of Lamarckism ? 1 [Q.N. 1 (j), 2067]
17. How was the earth formed ? [Q.N.1(c),2068]
18. Who wrote the book "Origin of species" ? [Q.N.1(d),2068]
19. What do you mean by speciation ? [Q.N.1(g),2068]
20. When were eukaryotes evolved? [Q.N. 1(c), Supp. 2068]
21. Define speciation. [Q.N. 1(e), Supp. 2068]
22. What is recaptulation theory? [Q.N. 1(c), 2069]
23. What do you know about primordial soup? [Q.N. 1(d), 2069]
24. Who gave the most widely accepted theory of "Origin of life"? [Q.N. 1(c), Supp. 2069]
25. Who proposed the first theory of evolution? [Q.N. 1(d), Supp. 2069]
26. What was the Hugo de Vries's view regrading origin of species? [Q.N. 1(g), Supp. 2069]
27. What is divergent evolution? [Q.N. 1(c), 2070 'C']
28. What do you understand by the term fossil? [Q.N. 1(g), 2070 'C']
29. In what condition of earth, life originated? [Q.N. 1(c), 2070 'D']
30. When and where Cro–Magnon man appeared? [Q.N. 1(d), 2070 'D']

Describe in brief :

1. Explain a short account of Oparin and Haldane theory of origin of life on earth. [Q.N.3(a), 2056]
2. Describe Miller-Urey's experiment. [Q.N.3(c), 2062]
3. Discuss the Oparin Haldane Theory of origin of life. [Q.N. 3,(a) 2063]
4. Miller-Urey's experiment. [Group 'A' – Q.N. 2(a), 2065]
5. Write the important features of Archaeopteryx [Q.N.2(a), 2061]
6. Explain how fossils give sufficient evidence in favour of organic evolution. [Q.N.3(c), 2058]
7. Describe Darwin's theory of overproduction with example. [Q.N.3(d), 2058]
8. "The Cro-magnons are the immediate ancestors of modern man". Justify. [Q.N.3(e), 2058]
9. Mention the criticisms to Darwinism. [Q.N.3(d), 2059]
10. Explain Lamarck's theory of "Inheritance of acquired characters." [Q.N.3(e), 2059]
11. Give the characteristics of Cro-Magnon. [Q.N.3(f), 2059]
12. Trace the evolution of modern man from Peking man. [Q.N.3(d), 2060]
13. Write short notes on Neanderthal man. [Q.N.3(f), 2061]
14. Explain Darwin's theory of natural selection. [Q.N.3(h), 2061]
15. Explain the palaeontological evidences of evolution with examples. [Q.N.3(b), 2062]
16. Explain the meaning of diversity in the context of the causes of evolution [Q.N. 3,(d) 2063]
17. Explain the chemical evolution of life. [Q.N. 3(b), 2064]
18. Discuss the role of variation in organic evolution. [Q.N. 3(c), 2064]
19. What is Neo-Darwinism ? Discuss. [Q.N. 3(i), 2064]
20. Lamarck's theory of use and disuse of organs. [Group 'A' – Q.N. 2(b), 2065]
21. Evolution of Cromagnon to modern man. [Group 'A' – Q.N. 2(c), 2065]
22. Biochemical evidences of evolution. [Group 'A' – Q.N. 2(d), 2065]

23. Discuss Lamarck's theory of "Inheritance of acquired characers". [Q.N.7 (c), 2057]
24. Mention the characteristics features of Neanderthal man. [Q.N.7 (j), 2057]
25. Point out the drawbacks of "Lamarckism". [Group 'A' Q.N.2 (a), 2066]
26. Write a short note on the "use and disuse of organ". [Q.N.2(e),2068]
27. Give the diagramatic representation of Miller and Urey experiment in support of biochemical theory of origin of life. [Q.N. 2(a), Supp. 2068]
28. Miller–Urey Experiment. [Q.N. 2(a), 2069]
29. Write a short note on vestigial organs. [Q.N. 2(e), Supp. 2069]
30. Explain the types of struggle for existence. [Q.N. 2(a), 2070 'C']
31. Biochemical theory. [Q.N. 2(b), 2070 'C']
32. Oparin–Haldane theory. [Q.N. 2(a), 2070 'D']
33. The development of Giraffe's neck. [Q.N. 2(b), 2070 'D']
34. How is a new species formed in nature? [Q.N. 2(c), 2070 'D']

Long Questions:

1. Write a short account of human evolution starting from an Anthropoid group. [Q.N.7, 2056]
2. Explain Darwin's theory of Evolution by natural selection with examples. [Q.N.4, 2060]
3. Explain the modern theory of evolution and show how a new species is formed according to this concept. [Q.N.4, 2062]
4. Discuss with examples how Lamarckism explains the theory of organic evolution. [Q.N. 4. 2063]
5. Write an essay on "evolution of man". 8[Group 'A' Q.N.3, 2066]
6. Discuss the Neo darwinism along with the draw backs of theory of Natural Selection. 8 [Q.N. 4, 2067]
7. Discuss briefly the evolution of human being from his early ancestor to modern man. 8 [Q.N.4,2068]
8. Discuss various morphological and anatomical evidences to support evolution. 7.5 [Q.N. 3, Supp. 2068]
9. Discuss the modern synthetic theory of evolution. 8[Q.N. 4, 2069]
10. Describe the various stages in the evolution of human being. 8[Q.N. ,4 Supp. 2069]
11. Discuss the analogous, homologous and vestigial organs in support of organic evolution. 8[Q.N. 4, 2070 'C']

Unit 3– Biodiversity

Answer in very short:

1. What is ovum ? [Q.N. 2,(b) 2063]
2. Gizzard in earthworm [Q.N.10(b), 2051]
3. Nemathehelminthes [Q.N.10(d), 2051]
4. Syngenacius anthers. [Q.N.10(f), 2051]
5. Characters of phylum protozoa. [Q.N.1(c), 2057]
6. Habitat of the lizard and rat. [Q.N.1(e), 2057]
7. What is typlosole ? [Q.N.1(g), 2060]
8. What do you mean by Protista ? [Q.N.1(e), 2062]
9. Differentiate between Centipede and Millipede. [Q.N.1(f), 2062]
10. Why paramecium never gets old ? [Q.N. 1,(f) 2063]
11. Give two characters of Sporozoa. [Q.N. 1(g), 2064]
12. What is the role of tympanic membrane ? [Group 'A' – Q.N. 1(b), 2065]
13. Give two characters of Insecta. [Group 'A' – Q.N. 1(c), 2065]
14. Why blood becomes red in higher organisms ? [Group 'A' – Q.N. 1(d), 2065]
15. What do you mean by hibernation ? [Group 'A' – Q.N. 1(f), 2065]
16. Give the scientific name of tiger and leopard. [Group 'A' – Q.N. 1(g), 2065]
17. In which group of animals you find flame cells? [Q.N.2(e), 2056]

18. Where do you find the signet-ring stage in the life-cycle of Plasmodium? [Q.N.2(g), 2056]
19. Mention the kinds of tooth found in frog. [Q.N.2(h), 2056]
20. Name any two examples of class Arachnida. [Q.N.2(c), 2057]
21. Give the biological name of (a) Pigeon and (b) Tape worm. [Q.N.2(f), 2057]
22. What is the function of tooth in frog ? [Q.N.2(h), 2057]
23. Name the father of taxonomy. [Q.N.2(a), 2058]
24. Write the Phylum and Class names of a millipede. [Q.N.2(c), 2058]
25. How is sound produced in frog? [Q.N.2(d), 2058]
26. Give the two characters of Sporozoa. [Q.N.2(e), 2058]
27. Mention the action of proteolytic enzyme in frog's stomach. [Q.N.2(d), 2059]
28. State the condition of coelom in the Nemathehelminthes. [Q.N.2(f), 2059]
29. Mention segment/s where the nerve-ring lies in earthworm. [Q.N.2(h), 2059]
30. Give the scientific names of wall lizard & tape worm. [Q.N.2(h), 2060]
31. What do you mean by nictitating membrane ? [Q.N.2(f), 2061]
32. Which organ takes part in circulation of blood in living beings ? [Q.N.2(e), 2062]
33. Give the scientific name of spider and frog. [Q.N.2(g), 2062]
34. What is cutaneous respiration ? [Q.N. 2,(e) 2063]
35. In what medium proteolytic enzymes work ? [Q.N. 2,(h) 2063]
36. Why cellulose can not be digested by carnivores ? [Q.N. 2(a), 2064]
37. Write the function of trichocyst. [Q.N. 2(c), 2064]
38. Fill in the gap:
ii. Ovary in earthworm lies in the segment..... [Q.N.1(D) (ii), 2051]
39. What are the locomotory organs of earthworm? [Q.N.1(f), 2052]
40. Where, when and why peristalsis occur? [Q.N.1(h), 2052]
41. What is the difference between aestivation and hibernation? [Q.N.1(j), 2052]
42. What do you understand by taxonomy? [Group 'A' Q.N.1 (a), 2066]
43. Give the zoological name of (i) Jelly fish and (ii) Pigeon. [Group 'A' Q.N.1 (c), 2066]
44. Mention the number of valves in auriculo-ventricular aperture. [Group 'A' Q.N.1 (e), 2066]
45. What is pellicle? [Group 'A' Q.N.1 (f), 2066]
46. Name the boring organ of earthworm. [Group 'A' Q.N.1 (g), 2066]
47. Write two peculiar characters of class Aves. 1 [Q.N. 1 (a), 2067]
48. Give classification of Earthworm. 1 [Q.N. 1 (b), 2067]
49. The opening of pulmonary veins are devoid of valves. Why ? 1 [Q.N. 1 (d), 2067]
50. Mention the functions of Trichocyst in Paramecium. 1 [Q.N. 1 (f), 2067]
51. What do you understand by taxonomic hierarchy ? [Q.N.1(e),2068]
52. What is Ostium ? [Q.N.1(f),2068]
53. Give scientific name of tapeworm and squirrel. [Q.N. 1(d), Supp. 2068]
54. Name the mucus secreting cell. [Q.N. 1(f), Supp. 2068]
55. Write the significance of typhlosole. [Q.N. 1(g), Supp. 2068]
56. Define hermaphroditism. [Q.N. 1(h), Supp. 2068]
57. Write the scientific name of a vertebrate having long, flexible neck and webbed foes. [Q.N. 1(e), 2069]
58. Name the excretory organs of flatworms. [Q.N. 1(f), 2069]
59. When do female anopheles mosquitoes become infectious? [Q.N. 1(g), 2069]
60. Who is the father of taxonomy? [Q.N. 1(e), Supp. 2069]
61. What do you understand by the term spawn? [Q.N. 1(f), Supp. 2069]
62. Write the significance of contractile vacuoles in paramecium. [Q.N. 1(d), 2070 'C']
63. Define symmetry. [Q.N. 1(e), 2070 'C']
64. Give the scientific name of garden lizard and leech. [Q.N. 1(h), 2070 'C']
65. What do you understand by monogenetic life cycle? [Q.N. 1(e), 2070 'D']

66. Define the term pseudocoelom. [Q.N. 1(f), 2070 'D']
67. Why do the frogs need hibernation and aestivation? [Q.N. 1(g), 2070 'D']
68. Write about sexual dimorphism. [Q.N. 1(h), 2070 'D']
69. Name the respiratory pigment found in earthworm. [Q.N. 1(i), 2070 'D']

Describe in brief :

1. List the characteristic features of Arachnida. [Q.N.3(g), 2056]
2. Describe the process of binary fission in Paramecium. [Q.N.3(h), 2056]
3. Describe the erythrocytic phase of life cycle of ***Plasmodium***. [Q.N.3(h), 2058]
4. Describe the structure of liver of frog. [Q.N.3(i), 2058]
5. Write sporogony in the life cycle of Plasmodium. [Q.N.3(i), 2060]
6. How Cocoon is formed in earthworm ? Discuss. [Q.N.3(j), 2060]
7. Draw a well labelled diagram of Paramecium. [Q.N.3(c), 2061]
8. Give a brief account of exo-erythrocytic cycle in Plasmodium. [Q.N.3(d), 2061]
9. Give the important characters of class mammalia. [Q.N.3(i), 2061]
10. Characters of reptiles and fish. [Q.N.3(e), 2062]
11. Give the characters and classification of protozoa. [Q.N. 3,(f) 2063]
12. Explain the digestion in earthworm. [Q.N. 3,(h) 2063]
13. State the feeding mechanism in paramecium. [Q.N. 3(d), 2064]
14. Characteristic features of class aves. [Group 'A' – Q.N. 2(e), 2065]
15. How does Cocoon formation take place in earthworm? [Q.N.1(v), 2055]
16. Give the characteristic features of:
    (a) Striated muscle fibres. [Q.N.4(c), 2052]
17. Mention the classes of protozoa will one example of each. [Q.N.7 (d), 2057]
18. Give the important characters of mollusca. [Q.N.7 (g), 2057]
19. State two major steps of digestion of food by human beings. [Q.N.1(i), 2053]
20. Name the site for: i) Aerobic respiration, ii) reflex-action
    iii) ultra-filtration, iv) fertilization in mammal [Q.N.1(e), 2054]
21. List the significances of conjugation in Paramecium. [Group 'A' Q.N.2 (b), 2066]
22. Describe pre-erythrocytic schizogony of malarial parasites. [Group 'A' Q.N.2 (c), 2066]
23. How do flatworms and roundworms differ in body cavity digestive tract and excretory organs? [Group 'A' Q.N.2 (d), 2066]
24. Draw a well labelled diagram of T.S. of earthworm passing through typhlosole. [Group 'A' Q.N.2 (e), 2066]
25. The general characters of class Mammalia. [Q.N. 2 (a), 2067]
26. Earthworms are friends of farmers. Justify. 3 [Q.N. 2 (b), 2067]
27. Draw well labelled diagram of Arterial system of frog (no description required)3 [Q.N. 2 (c), 2067]
28. The control measures of Malaria. 3 [Q.N. 2 (e), 2067]
29. The process of binary fission in Paramecium. [Q.N.2(a),2068]
30. Draw a well labelled diagram of T.S. of earthworm through pharynx. [Q.N.2(b),2068]
31. About the hibernation and aestivation. [Q.N.2(c),2068]
32. The teeth of frog. [Q.N.2(d),2068]
33. The process of conjugation in paramecium after formation of ex-conjugants. [Q.N. 2(b), Supp. 2068]
34. The various measures to control malaria. [Q.N. 2(c), Supp. 2068]
35. Differentiate between Agnatha and Gnathostomata. [Q.N. 2(d), Supp. 2068]
36. Draw a well labelled diagram of T.S. through gizzard of earth worm. (no description) [Q.N. 2(e), Supp. 2068]
37. Give any six important characters of Phylum Mollusca. [Q.N. 2(b), 2069]

38. Draw a neatly labelled diagram of T.S. of ileum of frog. (No description required) [Q.N. 2(c), 2069]
39. The process of cocoon formation in Pheretima. [Q.N. 2(d), 2069]
40. Erythrocytic schizogony of Plasmodium. [Q.N. 2(e), 2069]
41. The significance of conjugation in Paramecium. [Q.N. 2(a), Supp. 2069]
42. Draw a well labelled diagram of T.S. of earthworm through gizzard. [Q.N. 2(b), Supp. 2069]
43. Write down the main distinguishing feature of class mammalia. [Q.N. 2(c), Supp. 2069]
44. The cutaneous respiration of frog. [Q.N. 2(d), Supp. 2069]
45. The diagnostic features of phylum mollusca. [Q.N. 2(c), 2070 'C']
46. The significances of clitellum in earthworm. [Q.N. 2(d), 2070 'C']
47. Draw a neatly labelled diagram of T.S. of pharynx of Earthworm. (no description is required) [Q.N. 2(e), 2070 'C']
48. Mention the characteristic features of mammalia. [Q.N. 2(d), 2070 'D']
49. The process of copulation in earthworm. [Q.N. 2(e), 2070 'D']
50. Sketch well–labelled figure of Paramecium (No description). [Q.N. 2(f), 2070 'D']
51. Functions of liver of frog. [Q.N. 2(g), 2070 'D']

Long Questions:

1. With the help of labelled diagram, describe the reproductive system of earth worm. [Q.N.6, 2052]
2. Describe in brief the digestive organs of earthworm. [Q.N.2, 2053]
3. What is a portal system? Describe it with reference to frog. [Q.N.4, 2056]
4. Give an account of the structure of digestive tract of Pheretima. [Q.N.4(Or), 2056]
5. Describe the structure frog's heart. [Q.N.5, 2057]
6. Give an account of the digestive tract of ***Pheretima***. [Q.N.6, 2058]
7. Describe the conjugation process in *Paramecium*. What is the significance of the process? [Q.N.6(Or), 2058]
8. Describe the process of reproduction of Plasmodium in its primary host. [Q.N.6, 2059]
9. Discuss the structure of lung in frog and its working mechanism. [Q.N.6 (Or), 2059]
10. Describe the sexual reproduction in Paramecium with its significance. [Q.N.6, 2060]
11. Describe the internal structure of heart and its working mechanism in Frog. [Q.N.6(Or), 2060]
12. Describe the reproductive organ of earthworm. [Q.N.6, 2061]
13. Describe the mechanism of pulmonary respiration in frog. [Q.N.6(Or), 2061]
14. What is reproduction ? Describe the female reproductive organs of frog. [Q.N.6, 2062]
15. Discuss on the conjugation process of reproduction in paramecium. [Q.N.6(Or), 2062]
16. Elaborate the life cycle of plasmodium in man. [Q.N. 6. 2063]
17. Describe the internal structure and working mechanism in the heart of frog. [Q.N. 6.(or) 2063]
18. Describe the life cycle of plasmodium in mosquito. [Q.N. 4, 2064]
19. Discuss the processes of respiration in Frog. [Q.N. 6, 2064]
20. Give an account of reproductive organs of earthworm. [Q.N. 6(or), 2064]
21. Describe in detail the process of feeding and digestion in earthworm. [Group 'A' – Q.N. 4, 2065]
22. Describe the internal structure of heart of frog and explain its working mechanism. [Group 'A' – Q.N. 4(or), 2065]
23. Give an illustrated account of the excretory system of earthworm. 7.5[Group 'A' Q.N.4, 2066]
24. Describe the structure of lung of frog. Discuss its working mechanism. [Group 'A' Q.N.4 (or), 2066]
25. Describe the reproductive system of Frog with suitable diagram. 7.5 [Q.N. 3, 2067]

26. Describe the structure and function of septal nephridia of Earthworm. 7.5 [Q.N. 3 (Or), 2067]
27. Describe the structure of lung and explain its working mechanism in frog. [Q.N.3,2068]7.5
28. What is schizogony ? Illustrate it with reference to the life cycle of Plasmodium vivax. [Q.N.3(Or),2068]
29 What is portal system? Describe the hepatic portal system of frog. 8[Q.N. 4, Supp. 2068]
30. Describe the life cycle of Plasmodium inside the human body.. [Q.N. 4(Or), Supp. 2068]
31. Give an account of the structure of heart of Frog. 7.5 [Q.N. 3, 2069]
32. Describe the nephridial system of Pheretima. [Q.N. 3(Or), 2069]
33. Discuss the process of food digestion in frog. 7.5 [Q.N. 3, Supp. 2069]
34. Explain life cycle of Plasmodium vivax in human host. [Q.N. 3(Or), Supp. 2069]
35. Give an account of the male and female reproductive organs of frog. 7.5 [Q.N. 3, 2070 'C']
36. Describe the sexual reproduction in paramecium. [Q.N. 3(Or), 2070 'C']
37. Give an account of Reproductive system of frog. 7.5 [Q.N. 3, 2070 'D']
38. Explain life cycle of Plasmodium in mosquito. [Q.N. 3(Or), 2070 'D']

Unit 4– Biota and their Environment

Answer in very short:

1. Give the type of limb found in aquatic animals. [Q.N.1(f), 2056]
2. Mention the example of chemotoxis in animals. [Q.N.1(g), 2056]
3. Name any two sources of air pollution. [Q.N.1(a), 2057]
4. Give the names of any two migratory birds. [Q.N.1(e), 2058]
5. Name any two importances of wildlife. [Q.N.1(f), 2058]
6. Write any two volant features of bat. [Q.N.1(g), 2058]
7. Mention the body shape of the volant animals. [Q.N.1(d), 2059]
8. Give two examples of endangered species. [Q.N.2(e), 2060]
9. Role of hormones in birds migration. [Q.N.2(f), 2060]
10. Give two main reasons causing air pollution. [Q.N.2(g), 2061]
11. What is endangered species ? [Q.N.2(a), 2062]
12. Mention two major external characteristics of a lizard. [Q.N.1(b), 2053]
13. Give two major morphological modifications that help a bird to lead aerial mode of life. [Q.N.1(b), 2054]
14. Write two causes of air-pollutions and two measures to control population explosion. [Q.N.1(i), 2054]
15. How can you prevent the air pollution? [Q.N.1(i), 2055]
16. Define adaptation. [Group 'A' Q.N.1 (h), 2066]
17. Write the full from of IUCN. [Group 'A' Q.N.1 (i), 2066]
18. What is taxis? [Group 'A' Q.N.1 (j), 2066]
19. What do you understand by wild life ? 1 [Q.N. 1 (i), 2067]
20. Name two wildlife reserves of Nepal. [Q.N.1(h),2068]
21. Give the difference between reflex action and taxis. [Q.N.1(i),2068]
22. Define the term nature conservation. [Q.N.1(j),2068]
23. Give the reason of fish migration. [Q.N. 1(i), Supp. 2068]
24. Name the oldest national park of Nepal. [Q.N. 1(j), Supp. 2068]
25. What is smog? [Q.N. 1(h), 2069]
26. What do you mean by arboreal adaption? [Q.N. 1(i), 2069]
27. Define Buffer zone. [Q.N. 1(j), 2069]
28. Name the hunting reserve of Nepal. [Q.N. 1(h), Supp. 2069]
29. What do you mean by leadership? [Q.N. 1(i), Supp. 2069]
30. Define pesticides. [Q.N. 1(j), Supp. 2069]
31. What is phototaxis? [Q.N. 1(f), 2070 'C']

32. Define conservation. [Q.N. 1(i), 2070 'C']
33. What is wildlife conservation? [Q.N. 1(j), 2070 'D']

Describe in brief :

1. Air pollution [Q.N.10(e), 2051]
2. Adoptation [Q.N.9(b), 2053]
3. Describe the adaptational features of a fish. [Q.N.7 (h), 2057]
4. Discuss the responsibilities of man for the protection of earth. [Q.N.3(a), 2059]
5. Give regions of fish migration. [Q.N.3(j), 2058]
6. Define 'endangered' animals and give any four examples from Nepal. [Q.N.3(i), 2059]
7. Describe adoptive features of bird and wall lizard. [Q.N.3(j), 2061]
8. Water pollutants. [Q.N.3(i), 2062]
9. Migratory behavior of birds. [Q.N.3(j), 2062]
10. Write the control measures of air pollution. [Q.N. 3(g), 2064]
11. Discuss the control measures of water pollution. [Group 'A' Q.N.2 (f), 2066]
12. Write short notes on fish migration. [Group 'A' Q.N.2 (g), 2066]
13. Write short note on Taxis. 3 [Q.N. 2 (d), 2067]
14. The causes of depletion of wild life in Nepal. 3 [Q.N. 2 (f), 2067]
15. The benefits of animal migration. 3 [Q.N. 2 (g), 2067]
16. The effects of water pollution. [Q.N.2(f),2068]
17. Migratory behaviour of fishes. [Q.N.2(g),2068]
18. The control measures of air pollution. [Q.N. 2(f), Supp. 2068]
19. The aquatic adaptations of whale. [Q.N. 2(g), Supp. 2068]
20. The effects of air pollution. [Q.N. 2(f), 2069]
21. The causes of extinction of wildlife. [Q.N. 2(g), 2069]
22. The control measures of air pollution. [Q.N. 2(f), Supp. 2069]
23. Flight adaplation in birds. [Q.N. 2(g), Supp. 2069]
24. An account of the migratory behaviour of birds. [Q.N. 2(f), 2070 'C']
25. "The threats to wildlife is due to hunting and habitat loss." Discuss. [Q.N. 2(g), 2070 'C']

Long Questions:

1. What is pollution? Discuss on air pollution and its impact on human health. [Q.N.3(Or), 2052]
2. Discuss the sources and effects of air pollution in an environment. [Q.N.6, 2056]
3. What are the major causes of forest and wildlife depletion ? Describe its methods of conservation. [Q.N.4, 2061]
4. Define conservation. What are the conservation strategies for the wild life resources ? [Q.N. 7, 2064]
5. What are the major causes of air pollution ? Discuss its impact on life and suggest appropriate control measures. 7.5 [Group 'A' – Q.N. 3, 2065]
6. Discuss about the sources, effects and control measures of air pollution. 8[Q.N. 4, 2070 'D']