<table>
<thead>
<tr>
<th>S. No.</th>
<th>CHAPTER</th>
<th>VSA (1 mark)</th>
<th>SA-I (2 marks)</th>
<th>SA-II (3 marks)</th>
<th>LA (5 marks)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Reproduction in Organisms</td>
<td>–</td>
<td>–</td>
<td>2(6)</td>
<td>–</td>
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<td>2.</td>
<td>Sexual Reproduction in Flowering Plants</td>
<td>1(1)+1*</td>
<td>1(2)</td>
<td>1*</td>
<td>–</td>
<td>2(3)</td>
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<td>3.</td>
<td>Human Reproduction</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>1(5)+1*</td>
<td>1(5)</td>
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<td>4.</td>
<td>Reproductive Health</td>
<td>–</td>
<td>–</td>
<td>–</td>
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<td>5.</td>
<td>Principles of Inheritance and Variation</td>
<td>–</td>
<td>1(2)</td>
<td>1*</td>
<td>–</td>
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<td>6.</td>
<td>Molecular Basis of Inheritance</td>
<td>–</td>
<td>1(2)</td>
<td>1(3) + 1*</td>
<td>1*</td>
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<td>7.</td>
<td>Evolution</td>
<td>–</td>
<td>–</td>
<td>2(6)</td>
<td>1(5)</td>
<td>3(11)</td>
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<td>8.</td>
<td>Human Health and Diseases</td>
<td>–</td>
<td>2(4)</td>
<td>2(6) + 1*</td>
<td>–</td>
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<td>9.</td>
<td>Strategies for Enhancement in Food Production</td>
<td>1(1)</td>
<td>2*</td>
<td>–</td>
<td>–</td>
<td>1(1)</td>
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<td>10.</td>
<td>Microbes in Human Welfare</td>
<td>–</td>
<td>–</td>
<td>1(3)</td>
<td>–</td>
<td>1(3)</td>
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<td>11.</td>
<td>Biotechnology : Principles and Processes</td>
<td>1(1)</td>
<td>1(2)</td>
<td>2(6)</td>
<td>–</td>
<td>4(9)</td>
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<td>12.</td>
<td>Biotechnology and Its Applications</td>
<td>1(1)</td>
<td>–</td>
<td>–</td>
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<td>1(1)</td>
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<tr>
<td>13.</td>
<td>Organisms and Populations</td>
<td>1(1)</td>
<td>–</td>
<td>1(3)</td>
<td>1(5)</td>
<td>3(9)</td>
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<tr>
<td>14.</td>
<td>Ecosystem</td>
<td>1*</td>
<td>–</td>
<td>1(3)</td>
<td>1*</td>
<td>1(3)</td>
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<td>15.</td>
<td>Biodiversity and Conservation</td>
<td>–</td>
<td>–</td>
<td>–</td>
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<td>16.</td>
<td>Environmental Issues</td>
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<td>7(14)</td>
<td>12(36)</td>
<td>3(15)</td>
<td>27(70)</td>
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</tbody>
</table>

*It is a choice based question.
BIOLOGY

Subject Code: 044

Time allowed: 3 hours
Maximum marks: 70

General Instructions:

(i) All questions are compulsory.
(ii) The question paper consists of four sections A, B, C and D.
(iii) Internal choice is given in all the sections. A student has to attempt only one of the alternatives in such questions.
(iv) Section–A contains 5 questions of 1 mark each.
(v) Section–B has 7 questions of 2 marks each.
(vi) Section–C is of 12 questions of 3 marks each
(vii) Section–D has 3 questions of 5 marks each.
(viii) Wherever necessary, the diagrams drawn should be neat and properly labelled.

SECTION - A

1. Mention the scientific term used for modified form of reproduction in which seeds are formed without fusion of gametes.

   OR

   What is double fertilisation?

2. Define inbreeding depression.

3. Name the technology used for separating DNA fragments in laboratory.

4. What is a transgene?

5. What are ectotherms?

   OR

   What is net primary productivity of an ecosystem?

SECTION - B

6. What category of pathogens causes polioymelitis? How is crippling caused in the victim of this disease? How this disease can be prevented?

   OR

   How is a disease resistant plant selected for successful breeding?

7. Draw the structure of nucleosome.
8. Briefly describe the process shown by given diagram.

9. Fever is usually an after-effect of an infection. Moderate fever helps the immune system to ward off the infection causing agents. Justify. Will higher temperature result in faster immunity?

   OR

   List any four objectives that you would recommend for biofortification.

10. Name any two sources of electronic wastes. Mention any one way for their disposal in developing and developed countries.

11. Explain how an XXY individual can be born in humans.


   **SECTION - C**

13. Why are herbivores considered similar to predators in the ecological context? Explain.

14. The cell divisions involved in gamete formation in haploid and diploid organisms are not of the same type. Explain.

   OR

   How does the coconut water differ from surrounding white kernel?

15. What do you mean by chemoautotrophs? How did they evolve?

16. Why is the excreta (dung) of cattle rich in bacteria?

   OR

   Expand LSD. Name its source organism. What category of drug is it?

17. Explain the importance of (i) ori, (ii) amp\(^R\) and (iii) rop in the *E.coli* vector shown below.
18. Why vegetative propagation may also be called as propagation of clones?

19. (a) Tendrils of cucumber and thorns of Bougainvillea are considered homologous structures. Why?
(b) Define gene migration.

OR

The base sequence on one of the strands of DNA is ATGTCTATA.
(a) Give the base sequence of its complementary strand.
(b) If an RNA strand is transcribed by this strand what would be the base sequence of RNA?
(c) In what other respects an RNA molecule differs from a DNA molecule?

20. Differentiate active immunity and passive immunity.

21. (a) Which instrument is shown in the given figure?

(b) Identify the parts labelled 1, 2, 3, 4 and 5.
(c) What is its use in gene transfer methods?

22. At what stage does Plasmodium gain entry into the human body? Write the different stages of its life cycle in the human body.

23. List the salient features of Human Genome Project.

OR

Classify the following into Mendelian and chromosomal disorders:
(a) Phenylketonuria (b) Myelogenous leukemia
(c) Tay-Sach’s disease (d) Cri-du-chat syndrome
(e) Alzheimer’s disease (f) Huntington’s disease

24. Construct a pyramid of energy when 10,000 joules of energy is available at the producer level.

SECTION - D

25. (a) Who discovered coacervates? List the biological properties of coacervates.
(b) Write short note on vestigial organs, giving example.

OR

Name the technique used for determining nucleotide sequence unique to an individual. Who gave this technique? Explain the procedure involved.
26. Different types of organisms show interactions of various kinds. Name and briefly explain the interaction existing between:
   (a) Algae and fungi in lichens
   (b) Herbivores and plants.

OR

List the different steps and state their role in the process of decomposition in an ecosystem.

27. Describe the post-zygotic events leading to implantation and placenta formation in humans. Mention any two functions of placenta.

OR

Diagrammatically explain the process of gametogenesis in both males and females.