PART - I (BIO-BOTANY)

SECTION – 1

1. Restriction enzymes are: -
(a) Not always required in genetic engineering
(b) Essential tools in genetic engineering
(c) Nucleases that cleave DNA at specific sites
(d) Both (b) and (c)

2. Nilavembu belongs to the family ___ .
(a) Acanthaceae (b) Euphorbiaceae
(c) Vitaceae (d) Lamiaceae

3. In Mendel's experiments with garden pea, round seed shape (RR) was dominant over wrinkled seeds (rr), Yellow cotyledon (YY) was dominant over green cotyledon (yy). What are the expected phenotypes in the F_2 generation of the cross RRYY × rryy?
(a) Only wrinkled seeds with green cotyledons
(b) Only round seeds with green cotyledons
(c) Round seeds with yellow cotyledons and wrinkled seeds with yellow cotyledons
(d) Only wrinkled seeds with yellow cotyledons

4. A specific place in an ecosystem, where an organism lives and performs its functions is:
(a) landscape (b) habitat
(c) biome (d) niche

5. Match the following :
(1) Totipotency (i) Reversion of mature cells into meristem
(2) Dedifferentiation (ii) Bio-chemical and structural changes of cells
(3) Explant (iii) Properties of living cells develops into entire plant
(4) Differentiation (iv) Selected plant tissue transferred to culture medium
(a) (1)-(ii), (2)-(i), (3)-(iv), (4)-(iii)
(b) (1)-(iii), (2)-(i), (3)-(iv), (4)-(ii)
(c) (1)-(iv), (2)-(ii), (3)-(iii), (4)-(i)
(d) (1)-(i), (2)-(iii), (3)-(ii), (4)-(iv)

6. Parthenocarpic fruits lack:
(a) Mesocarp (b) Endocarp
(c) Seed (d) Epicarp

7. The unit for measuring ozone thickness:
(a) Dobson (b) Joule
(c) Watt (d) Kilo

8. ___ was the first scientist to use the term heterosis.
(a) Muller and Stadler
(b) Cotton Mather
(c) G.H. Shull
(d) William S. Gaud

SECTION - 2

9. Define multiple alleles.
10. Name the chemicals used in gene transfer.
11. What is Co-evolution?
12. Pyramid of energy is always upright. Give reasons.
13. Differentiate primary introduction from secondary introduction.
14. Name the humors that are responsible for the health of human beings.

SECTION - 3

15. Mention the name of man-made cereal. How is it formed?

16. What are the materials used to grow microorganism like Spirulina?
17. Differentiate cladode from phyllode with example.
18. Give four examples of plants cultivated in commercial agroforestry.
19. Draw the diagrammatic structure of ovule and label its parts.

SECTION – 4

20. (a) Discuss the steps involved in Microsporogenesis.

OR

(b) Describe dominant epistasis with an example.

21. (a) Explain the basic concepts involved in plant tissue culture.

OR

(b) Explain the types of succession.

PART - II (BIO-ZOOLOGY)

SECTION - 1

22. ELISA is mainly used for:

(a) Selecting animals having desired traits
(b) Detection of mutations
(c) Selecting plants having desired traits
(d) Detection of pathogens

23. mRNA molecule is produced by:

(a) Duplication (b) Replication
(c) Translation (d) Transcription

24. Which of the following was the contribution of Hugo de Vries?

(a) Theory of inheritance of acquired characters
(b) Theory of mutation
(c) Germplasm theory
(d) Theory of natural selection

25. Organisms which can survive a wide range of temperature are called:

(a) Endotherms (b) Ectotherms
(c) Stenotherms (d) Eurytherms

26. The primary treatment of wastewater treatment is:

(a) Removal of microbes by the application of chlorine
(b) Physical removal of solid particles
(c) Anaerobic digestion of sludge
(d) Large aeration of the water

27. In a lake, the water is cold and clear, supporting little life. This stage is called as:

(a) Mesotrophic
(b) Eutrophic
(c) Accelerated eutrophic
(d) Oligotrophic

28. The mature sperms are stored in the:

(a) epididymis (b) seminiferous tubules
(c) prostate gland (d) vas deferens

29. The permanent birth control method in males is:

(a) Appendictomy (b) Vasectomy
(c) Oral contraceptives (d) Tubectomy

SECTION – 2

30. What is parthenogenesis?
31. What is amniocentesis?
32. Write the central dogma of protein synthesis.

33. What is vaccine?

34. What is Co-extinction?

35. What is referred to as biomagnification?

SECTION – 3

36. Write the salient features of mutation theory.

37. Write short notes on microbial fuel cell.

38. Differentiate somatic cell gene therapy from germ line gene therapy.

39. List out any five causes of biodiversity loss.

40. If a marriage occurs between normal man ($X^{H}Y^{-}$) and heterozygous haemophiliac woman ($X^{H}X^{h}$), what would be the result of F_1 and F_2 ? Draw flow chart.

SECTION – 4

41. (a) Explain the process of fertilization and prevention of polyspermy in human.

OR

(b) Explain the classical model of Lac Operon, proposed by Jacob and Monod.

42. (a) Explain the structure of immunoglobulin with suitable diagram.

OR

(b) Give an account of the properties of soil.