2024 III 06 **0930** **Seat No.** | | | | | |

Time : 3 Hours **BIOLOGY**

Subject Code

H	4	7	0	4

Total No. of Questions : 34 (Printed Pages : 8) **Maximum Marks : 70**

***INSTRUCTIONS* :** (*i*) *All* questions are compulsory.

(*ii*) Draw diagrams in lead pencil only.

(*iii*) The question paper consists of *four* Sections A, B, C and D.

- Section A has **13** questions of **01** mark each.
- Section B has **12** questions of **02** marks each.
- Section C has **06** questions of **03** marks each.
- Section D has **03** questions of **05** marks each.

(*iv*) The total number of questions is **34**.

(*v*) There is no overall choice, however an internal choice is provided in *two* questions of Section B, *one* question of Section C and *two* questions of Section D.

(*vi*) Multiple choice questions should be attempted only once, if attempted more than once it will not be evaluated. Choose the correct option and rewrite on the answer-sheet.

Section-A (1 mark each)

1. The spread of cancerous cells to distant places is called _____.
   - Malignancy
   - Metastasis
   - Mutations
   - Carcinogens

2. Choose the pair of viral diseases from the following sets :

- Ringworm, AIDS
- Common Cold, AIDS
- Dysentery, Common Cold
- Typhoid, Tuberculosis

3. During gel electrophoresis, you are asked to examine a gel on which DNA fragments have been separated.

Where would you find the smallest fragments of DNA ?

- Near the positive electrode, farthest away from the wells.
- Near the negative electrode, farthest away from the wells.
- Near the negative electrode, close to wells.
- In the middle, since fragments tend to slow down.

4. The process by which inorganic nutrients go down into the soil horizon and gets precipitated as unavailable salts is called .....

- Fragmentation
- Leaching
- Catabolism
- Fermentation

5. RNA interference helps in developing resistance in tobacco plant against nematode infection by .....

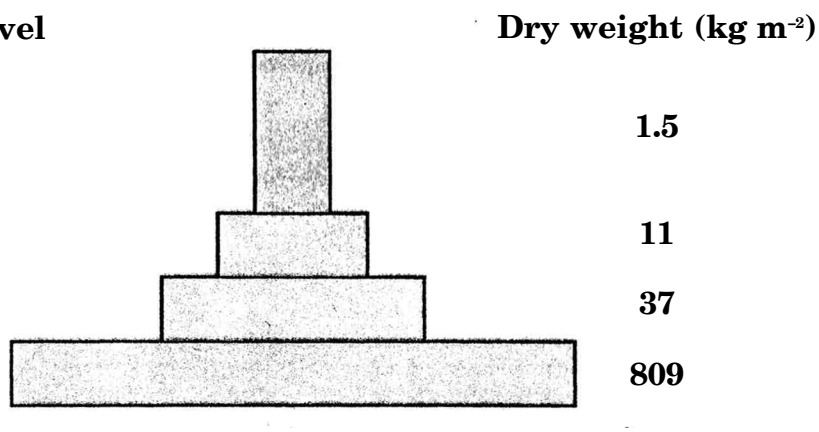
- Silencing of specific mRNA due to complementary dsRNA molecule
- Silencing of t-RNA due to complementary RNA molecule
- Interference of DNA in RNA synthesis
- Interference of rRNA in RNA synthesis

6. During spermatogenesis, meiotic division results in the formation of spermatozoa from primary spermatocytes.

The total number of meiotic divisions required to produce 400 spermatozoa will be :

- 200
- 300
- 100
- 50

7. The following ecological pyramid represents :



- Pyramid of Number
- Pyramid of Biomass
- Inverted Pyramid of number
- Inverted Pyramid of energy

8. In a biotechnological experiment, blue & white colonies were observed on the plates with chromogenic substrate.

With reference to the above observation, choose the correct option from the following :

- A recombinant DNA was inserted in the coding sequence of ampicillin resistance gene.
- A recombinant DNA was inserted in the coding sequence of ß-galactosidase gene.
- A recombinant DNA was inserted in the coding sequence of penicillin resistance gene.
- A recombinant DNA was inserted in the coding sequence of kannamycin resistance gene.

9. What is amniocentesis ?

10. *Bacillus thuringiensis* produce a toxic protein that kills insects but not the bacteria. After consuming the toxic proteins, which changes will occur in the gut of the insect.

11. Human insulin when synthesized in the body needs to be processed before it can act. Give reason.

12. State the examples of physical barriers in innate immunity

13. How GM plants have been useful to humankind (Any **2** points)

Section B (2 marks each)

14. Describe the process of microsporogenesis in Angiosperms.

OR

Describe the process of megasporogenesis in Angiosperms.

15. Write a note on Parturition.

OR

Write a note on the events occurring after fertilisation upto implantation of the blastocyst in the uterus.

16. Explain the role of anaerobic bacteria in secondary treatment of sewage water in sewage treatment plant.

17. Describe any *two* causes of biodiversity loss.

18. Distinguish between primary and secondary succession.

19. Explain how in biodiversity conservation, threatened animals and plants are taken out from their natural habitat and placed in special settings.

20. Draw a neat labelled diagram of DNA double Helix.

21. On a field trip, students observed an inflorescence with colourless flowers, well exposed stamens and large feathery stigma.

On the basis of your knowledge, mention the pollinating agent and give *two* characteristics of the pollen grains produced by such flowers.

22. During an agricultural training programme for farmers in organic farming, the expert advised the use of Nucleopolyhedrovirus for pest management.

Is the expert advice correct ?

Support your answer with reasons.

23. A sequence of heterogenous nuclear mRNA (hnRNA) is given below :

5' AUG GGG CCG GAG CUG AAU GGU UAG 3'

Assuming that codons containing 'C' are introns :

(a) Derive the processed mRNA that would be formed from the above sequence.

(b) Write down the number of amino acids in the protein molecule formed after translation.

24. Draw a neat diagram of an Anatropous ovule in Angiosperms.

25. A molecular scissor in biotechnology cleaves DNA sequence as shown in the figure below :

5' — A C ↓ T A G T — 3'

3' — T G A T ↑ C A — 5'

(a) Mention the term used for such type of sequences.

(b) What would be the result of the cleaving by the enzyme ?

Section-C (3 marks each)

26. Describe Haemophilia as a Mendelian disorder.

OR

Describe Thalessemia as Mendelian disorder.

27. A green stemmed plant (GG) is dominant over brown stemmed plant (gg). These plants were crossed with each other. List your observations regarding :

(a) Colour of the stem in F_1 progency [Work out the Cross]

(b) Percentage of brown stemmed plants in F_2 progeny if plants of F_1 generation are self pollinated [Support with Punnett Square].

(c) Ratio of GG and Gg in F_2 progeny.

28. In eukaryotes, the packaging of DNA helix is much more complex than in prokaryotes. Give reasons.

29. Draw a neat diagram of female reproductive system in humans.

30. Enlist the various steps involved in the Isolation of the Genetic material (DNA) in recombinant DNA technology.

31. In a family planning camp, couple with complete families were advised for permanent methods of contraception.

Explain the methods which they can adopt. Also comment on the principle involved.

Section-D (5 marks each)

32. Give a detailed account of the origin and evolution of man. Add a note on Miller's experiment.

OR

Give a detailed account of paleontological and anatomical and morphological evidences of evolution.

Add a note on the example supporting evolution by natural selection observed in England.

33. Describe the physiological, morphological and behavioural adaptations with example of organisms for coping with extreme in their environment.

34. Discuss the various methods of detection and treatment of cancer.

OR

Discuss the causative agent, mode of transmission and symptoms of typhoid, amoebiasis and filariasis.