

General Instructions :

Read the following instructions very carefully and strictly follow them :

- (i) Question paper comprises five sections – A, B, C, D and E.
- (ii) There are 27 questions in the question paper. All questions are compulsory.
- (iii) Section A question number 1 to 5 are multiple choice questions, carrying one mark each.
- (iv) Section B question number 6 to 12 are short answer questions type-I, carrying two marks each.
- (v) Section C question number 13 to 21 are short answer questions type-II, carrying three marks each.
- (vi) Section D question number 22 to 24 are short answer questions type-III, carrying three marks each.
- (vii) Section E question number 25 to 27 are long answer questions, carrying five marks each.
- (viii) Answer should be brief and to the point also the above word limit be adhered to as far as possible.
- (ix) There is no overall choice in the question paper. However, an internal choice has been provided in two questions of 1 mark, one question of 2 marks, two questions of 3 marks and three questions of 5 marks questions. Only one of the choices in such questions have to be attempted.
- (x) The diagram drawn should be neat proportionate and properly labelled, wherever necessary.
- (xi) In addition to this, separate instructions are given with each section and question, wherever necessary.

SECTION – A

1. Which one of the following part of the plant when put into the soil is likely to produce new offspring ?
 - (a) Part of an internode
 - (b) A stem cutting with a node
 - (c) Part of a primary root
 - (d) A flower

1

2. In a bacterium when RNA-polymerase binds to the promoter on a transcription unit during transcription, it
 - (a) terminates the process
 - (b) helps remove introns
 - (c) initiates the process
 - (d) inactivates the exons

1

3. The hypothesis that "Life originated from pre-existing non-living organic molecules was proposed by
 - (a) Oparin and Haldane
 - (b) Louis Pasteur
 - (c) S.L. Miller
 - (d) Hugo de Vries

1

4. Mating of a superior male of a breed of a cattle to a superior female of another breed is called
 - (a) in breeding
 - (b) out crossing
 - (c) out breeding
 - (d) cross breeding

1

OR

Large-holes in 'Swiss-Cheese' are due to

- (a) *Propionibacterium sharmanii*
- (b) *Saccharomyces cerevisiae*
- (c) *Penicillium chrysogenum*
- (d) *Acetobacter aceti*

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5. Increased concentration of DDT in fish-eating birds is due to

- (a) eutrophication
- (b) bio-magnification
- (c) cultural eutrophication
- (d) accelerated eutrophication

1

OR

Species-Area relationship is represented on a log scale as

- (a) hyperbola
- (b) rectangular hyperbola
- (c) linear
- (d) inverted

1

SECTION – B

6. State two advantages of an apomictic seed to a farmer.

2

7. Explain when is a genetic code said to be

- (a) Degenerate
- (b) Universal

2

8. Differentiate between opioids and cannabinoids on the basis of their

- (a) specific receptor site in human body.
- (b) mode of action in human body.

2

9. (a) Name the two techniques employed to meet the increasing demand of fish in the world.
- (b) Name any two fresh water fishes. 2

OR

Describe the contributions of Alexander Fleming, Ernest Chain and Howard Florey in the field of microbiology. 2

10. All cloning vectors do have a 'selectable marker'. Describe its role in recombinant DNA-technology. 2

11. Mention how have plants developed mechanical and chemical defence against herbivores to protect themselves with the help of one example of each. 2

12. Name and explain the processes earthworm and bacteria carry on detritus. 2

SECTION – C

13. Explain three different modes of pollination that can occur in a chasmogamous flower. 3

OR

Explain the formation of placenta after implantation in a human female. 3

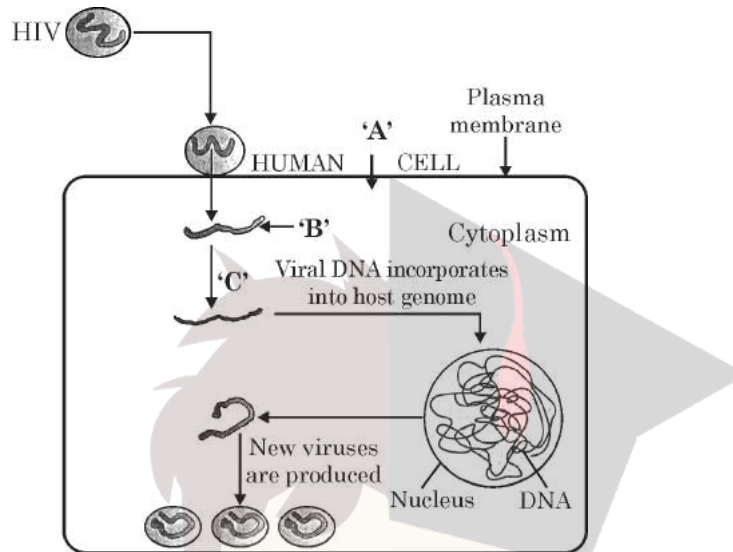
14. State Mendel's law of dominance. How did he deduce the law ? Explain with the help of a suitable example. 3

15. What are 'SNPs' ? Where are they located in a human cell ? State any two ways the discovery of SNPs can be of importance to humans. 3

16. (a) State what does the study of Fossils indicate.
- (b) Rearrange the following group of plants according to their evolution from Palaeozoic to Cenozoic periods :
- Rhynia; Arborescent Lycopods; Conifers; Dicotyledon. 3
17. (a) Explain the mode of action of Cu⁺⁺ releasing IUDs as a good contraceptive. How is hormone releasing IUD different from it ?
- (b) Why is 'Saheli' a preferred contraceptive by women (any two reasons) ? 3
18. (a) Explain why bee-hives are setup on the farms for some of our crop-species. Name any two such crop species.
- (b) List any three important steps to be kept in mind for successful bee keeping. 3
19. Why GMOs are so called ? List the different ways in which GMO plants have benefitted and have become useful to humans. 3
20. Differentiate between "Pioneer-species"; "Climax-community" and "Seres". 3
- OR
- Explain any three ways other than zoological parks, botanical gardens and wildlife safaries, by which threatened species of plants and animals are being conserved 'ex situ'. 3
21. Explain 'Integrated organic' farming as successfully practiced by Ramesh C. Dagar, a farmer in Sonapat (Haryana). 3

SECTION – D

22. Study the diagram showing the entry of HIV into the human body and the processes that are followed :



- (a) Name the human cell ' A ' HIV enters into.
- (b) Mention the genetic material ' B ' HIV releases into the cell.
- (c) Identify enzyme ' C '.
- 3
23. Following a road accident four injured persons were brought to a nearby clinic. The doctor immediately injected them with tetanus antitoxin.
- (a) What is tetanus antitoxin ?
- (b) Why were the injured immediately injected with this antitoxin ?
- (c) Name the kind of immunity this injection provided.
- 3
24. "The population of a metro city experiences fluctuations in its population density over a period of time."
- (a) When does the population in a metro city tend to increase ?
- (b) When does the population in metro city tend to decline ?
- (c) If 'N' is the population density at the time 't', write the population density at the time 't + 1'.
- 3

SECTION – E

25. (a) Describe the process of megasporogenesis, in an angiosperm.
(b) Draw a diagram of a mature embryo sac of angiosperm, label its any six parts. 5

OR

- (a) Where and how in the testes process of spermatogenesis occur in humans.
(b) Draw diagram of human sperm and label four parts. 5
26. (a) Why did T.H. Morgan select Drosophila melanogaster for his experiments?
(b) How did he disprove Mendelian dihybrid F₂ phenotypic ratio of 9 : 3 : 3 : 1 ? Explain giving reasons. (2 + 3)

OR

- (a) List any four major goals of Human Genome project.
(b) Write any four ways the knowledge from HGP is of significance for humans.
(c) Expand BAC and mention its importance. (2 + 2 + 1)
27. (a) Name the insect that attacks cotton crops and causes lot of damage to the crop. How has Bt cotton plants overcome this problem and saved the crop ? Explain.
(b) Write the role of gene Cry IAb. 5

OR

- (a) Explain the different steps carried out in Polymerase Chain Reaction, and the specific roles of the enzymes used.
(b) Mention application of PCR in the field of
(i) Biotechnology
(ii) Diagnostics 5

P.T.O.