Please check that this question paper contains 11 printed pages.

Code number given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.

Please check that this question paper contains 26 questions.

Please write down the Serial Number of the question before attempting it.

15 minute time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the students will read the question paper only and will not write any answer on the answer-book during this period.

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**General Instructions:**

(i) There are a total of 26 questions and five sections in the question paper. All questions are compulsory.

(ii) Section A contains questions number 1 to 5, very short-answer type questions of 1 mark each.

(iii) Section B contains questions number 6 to 10, short-answer type I questions of 2 marks each.

(iv) Section C contains questions number 11 to 22, short-answer type II questions of 3 marks each.

(v) Section D contains question number 23, value based question of 4 marks.

(vi) Section E contains questions number 24 to 26, long-answer type questions of 5 marks each.

(vii) There is no overall choice in the question paper, however, an internal choice is provided in one question of 2 marks, one question of 3 marks and all the three questions of 5 marks. In these questions, an examinee is to attempt any one of the two given alternatives.
1. An electrostatic precipitator in a thermal power plant is not able to generate high voltage of several thousands. Write the ecological implication because of it.

2. Bt-toxins are released as inactive crystals in the bacterial body. What happens to it in the cotton boll worm body that it kills the boll worm?

3. State two postulates of Oparin and Haldane with reference to origin of life.

4. Name the type of cross that would help to find the genotype of a pea plant bearing violet flowers.

5. A herd of cattle is showing reduced fertility and productivity. Provide one reason and one suggestion to overcome this problem.
 SECTION B

6. CFCs का उपयोग बंद करने से मानव जीवन को होने वाले चार लाभों की सूची बनाएँ।

अथवा

उन दो विधियों का एक-एक उदाहरण देते हुए सुझाव दीजिए, जो विरले अथवा संकटपूर्ण स्पेशिज की सुरक्षा करने में सहायता करती हैं।

List four benefits to human life by eliminating the use of CFCs.

OR

Suggest two practices giving one example of each, that help protect rare or threatened species.

7. यीस्ट के दो प्रकारों के द्विपदाय नाम लिखिए और उनकी सहायता से उत्पन्न व्यावसायिक जैवसंक्रिय उत्पादों को भी बताएँ।

Give the binomials of two types of yeast and the commercial bioactive products they help to produce.

8. नीचे दिए गए आनुवंशिक कूटों में अंतर बताएँ:

(a) असंदिध और सार्वत्रिक

(b) अपहरित और प्रारंभिक

Differentiate between the genetic codes given below:

(a) Unambiguous and Universal

(b) Degenerate and Initiator

9. परागकोश में से झड़ते समय परागकणों में कितनी कोशिकाएं उपस्थित होती हैं? कोशिकाओं के नाम बताएँ।

How many cells are present in the pollen grains at the time of their release from anther? Name the cells.
10. Name the group of cells the HIV enters after getting into the human body. What happens in these cells and what are these cells subsequently referred to as? Name the next group of cells the HIV attacks from here.

खण्ड C

SECTION C

11. Rearrange Ramapithecus, Australopithecus and Homo habilis in the order of their evolution on the Earth. Comment on their evolutionary characteristics.

12. (a) Explain the significance of ‘palindromic nucleotide sequence’ in the formation of recombinant DNA.

(b) Write the use of restriction endonuclease in the above process.

13. मानव मल पदार्थ से संदर्भित जल और भोजन के सेवन के कारण मानवों में फैलने वाला रोग, उसका रोगकारक जीव, रोगलक्षण (कोई तीन) तथा उसके वेक्टर का नाम बताएँ।

अथवा

(a) अभिभावकों को इस बात का धर क्यों रहता है कि कहीं उनके किशोर आश्रित बच्चों को नशीले पदार्थ/मदिरा की लत न पड़ जाए?

(b) किशोर बच्चों को नशीले पदार्थों/मदिरों की लत पड़ जाने के संदर्भ में ‘व्यस्न’ और ‘निर्भरता (dependence)’ की व्याख्या कीजिए।
Name a human disease, its causal organism, symptoms (any three) and vector, spread by intake of water and food contaminated by human faecal matter.

**OR**

(a) Why is there a fear amongst the guardians that their adolescent wards may get trapped in drug/alcohol abuse?

(b) Explain ‘addiction’ and ‘dependence’ in respect of drug/alcohol abuse in youth.

14. (a) यांव जीनोम परियोजना में निहित दो प्रणालियों की सूची बनाइए। बताइए कि उन्हें किस प्रकार प्रयुक्त किया गया था।

(b) ‘YAC’ का पूरा नाम बताइए और उल्लेख कीजिए कि उसे किसके लिए इस्तेमाल किया गया था।

(a) List the two methodologies which were involved in human genome project. Mention how they were used.

(b) Expand ‘YAC’ and mention what was it used for.

15. हीमोफिलिया और थलासिमिया मानवों के दो रुधिर-संबंधित विकार हैं। उनके कारण बताइए तथा दोनों के बीच अंतर भी स्पष्ट कीजिए। आनुवंशिक विकार की उस श्रेणी का नाम बताइए जिसके अंतर्गत ये दोनों आते हैं।

Both Haemophilia and Thalassemia are blood related disorders in humans. Write their causes and the difference between the two. Name the category of genetic disorder they both come under.
16. (a) Trace the development of an endosperm after fertilisation with reference to coconut. Mention the importance of endosperm development.
(b) Write the importance of ‘pollen bank’.

17. PCR प्रक्रिया में ताप, प्राइमर्स और जीवाणु थर्मस एक्सट्रिकस की भूमिकाओं का वर्णन कीजिए।
Describe the roles of heat, primers and the bacterium Thermus aquaticus in the process of PCR.

18. वातिल मल के द्वितीयक उपचार को जैविक उपचार भी कहते हैं। इस कथन की पुष्टि कीजिए तथा प्रक्रिया की व्याख्या कीजिए।
Secondary treatment of the sewage is also called Biological treatment. Justify this statement and explain the process.

19. क्रूर्त्रिम इंसुलिन के उत्पादन में निषिद्ध विभिन्न चरणों की व्याख्या कीजिए।
Explain the various steps involved in the production of artificial insulin.

20. उत्पादकता, सकल प्राथमिक उत्पादकता और शुद्ध उत्पादकता के बीच पारस्परिक संबंध का वर्णन कीजिए।
Describe the inter-relationship between productivity, gross primary productivity and net productivity.

21. (a) कोई किसान अपनी गात्र की फ़सल में कौन-से बांछित लक्षण देखना चाहता है?
(b) बांछित लक्षणों वाला गात्र उगाने में पादप प्रजनन तकनीकों ने उत्तरी भारत के किसानों की किस प्रकार मदद की?
(a) Write the desirable characters a farmer looks for in his sugarcane crop.
(b) How did plant breeding techniques help north Indian farmers to develop cane with desired characters?
How do kangaroo rats and desert plants adapt themselves to survive in their extreme habitat? Explain.

**SECTION D**

23. It is commonly observed that parents feel embarrassed to discuss freely with their adolescent children about sexuality and reproduction. The result of this parental inhibition is that the children go astray sometimes.

(a) Explain the reasons that you feel are behind such embarrassment amongst some parents to freely discuss such issues with their growing children.

(b) By taking one example of a local plant and animal, how would you help these parents to overcome such inhibitions about reproduction and sexuality?
24. (a) A pea plant bearing axial flowers is crossed with a pea plant bearing terminal flowers. The cross is carried out to find the genotype of the pea plant bearing axial flowers. Work out the cross to show the conclusions you arrive at.

(b) State the Mendel’s law of inheritance that is universally acceptable.

OR

(a) Absence of lactose in the culture medium affects the expression of a lac-operon in *E. coli*. Why and how? Explain.

(b) Write any two ways in which the gene expression is regulated in eukaryotes.
25. (a) When a seed of an orange is squeezed, many embryos, instead of one are observed. Explain how it is possible.

(b) Are these embryos genetically similar or different? Comment.

OR

(a) Explain the following phases in the menstrual cycle of a human female:

(i) Menstrual phase
(ii) Follicular phase
(iii) Luteal phase

(b) A proper understanding of menstrual cycle can help immensely in family planning. Do you agree with the statement? Provide reasons for your answer.
26. (a) Compare, giving reasons, the J-shaped and S-shaped models of population growth of a species.

(b) Explain “fitness of a species” as explained by Darwin.

OR

(a) What is an ecological pyramid? Compare the pyramids of energy, biomass and numbers.

(b) Write any two limitations of ecological pyramids.