



## **BIOLOGY**

### **BOOKS - XII BOARD PREVIOUS YEAR PAPER**

## **ENGLISH**

## **XII BOARDS**

### **Section A**

1. How many pollen grains and ovules are likely to be formed in the another and the ovary of an

angiosperm bearing 25 microspore mother cells and 25 megaspore mother cells respectively ?



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2. In case of polyembryony, an embryo A develops from the synergids and the embryo B develops from the nucellus. State the ploidy of embryo A and B.



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3. Give the scientific name of the source organism from which the first antibiotic was produced.



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4. The prophase I stage of meiosis plays a vital role in r-DNA formation. Justify with reason.



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5. Name the technique by which Gene expression can be controlled with the help of RNA molecule.



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6. Define Diapause.



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7. Define the term standing crop.



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8. What causes speciation according to Hugo-de-Vries ?



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9. When and why do some animals like frogs hibernate ?



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**10.** List any two economically important products for humans obtained from *Apis Indica*.



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**11.** Name the Indian variety of rice patented by an American Company.

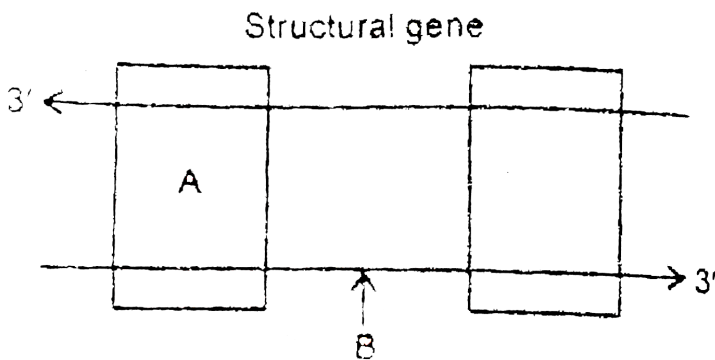


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12. What role of macrophages play. in providing immunity to humans ?

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13. Name the parts 'A' and 'B' of the transcription unit given below.



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14. What is the major difference you observe in the offsprings produced by asexual reproduction and in the progeny produced by sexual reproduction ?



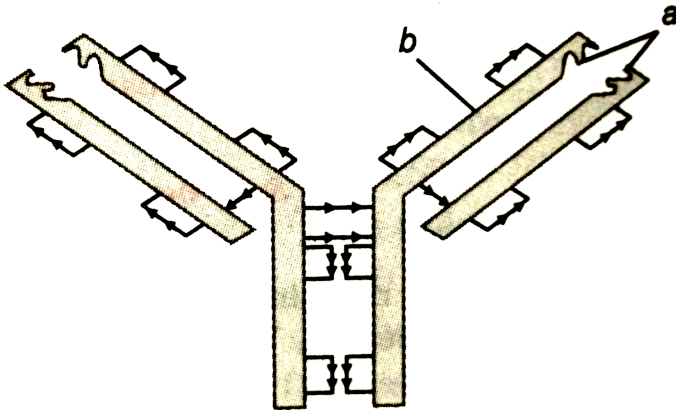
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15. Name the world's most problematic aquatic weed.  
What in the nature of the water body in which the weeds grow abundantly ?



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1. The figure given below represents a molecule present in the body of a mammal.



(a) Name the parts labelled 'a' and 'b' in the molecule shown above.

(b) Name the type of cells that produce this molecule.

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2. Life style diseases are increasing alarmingly in india .we are also dealing with large scale malnutrition in the population Is there any method by which we can address both of these problems together ?



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3. Why does the lac operon shut down some time after the addition of lactose in the medium where *E.coli* was growing ? Why low level expression of lac operon is always required ?



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4. a) While cloning vectors, which of the two will be preferred by biotechnologists bacteriophages or plasmids, Justify with reason.

b) Name the first transgenic cow developed and state the improvement in the quality of the product produced by it.

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5. Explain the impact of removal of thymus gland on the immune system of a human body.

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6. A farmer maintained beehives in his Brassica field during its flowering season. How will he be benefitted ?



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7. How do automobiles filled with catalytic converters reduce air pollution ? Suggest the best fuel for such vehicles.



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8. State the Mendelian principle which can be derived from a dihybrid cross and not from monohybrid cross.



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9. Comment upon the mode of pollination in Vallisneria and Eichhornia which have emergent flowers.



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10. The flower of brinjal is referred to as chasmogamous while that of bean's cleistogamous.

How are they different from each other ?



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11. Name the interaction in each of the following:

(a) Cuckoo lay: her eggs in the crew's nest.

(b) Orchid grows on a mango tree.

(c) Ticks live on the skin of doze. \ (d) Sea anemone in often found on the shell of hermit crab?



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**12.** The male fruit fly and female fowl are heterogametic while the female fruit fly and the male fowl are homogametic. Why are they called so ?



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**13.** Aman with blood group A married a woman With B greup. They have a son with AB blood group and a daughter with blood group O. Work out the cross and show the possibility of such inheritance.



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**14.** Why is using tobacco in any form injurious to, the health explain.

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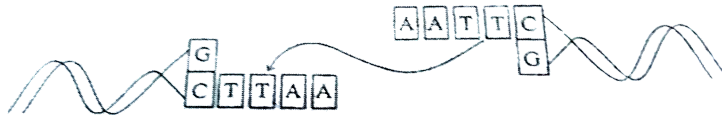
**15.** Differentiate between a productivity and decomposer giving an examples.

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**16.** A mother of one year old daughter wanted to space her second child. Her doctor suggested CuT. Explain its contraceptive actions.



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17.

study the linking of DNA fragments shown above.

(i) Name 'a' DNA and '1' DNA.

(ii) Name the restriction enzyme that recognises this Palindrome,

(iii) Name the enzyme that can link these two DNA fragments.



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18. What is divergent evolution? Explain taking an example of plants.

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19. Name the blank spaces a, b, c and d in the table given below

Type of Microbe	Name Product	Commercial
Fungus	a	Penicillin
Bacterium	Acetobacter aceti	b
c	Aspergillus niger	citric acid
Yeast	d	ethanol

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**20.** Thermal power plants are inevitable in an industrial and densely populated country like ours. What harm do they do the environment ?Also mention any precaution that could be taken to save our environment.



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## Section C

**1.** Alien species are a threat to native species. Justify taking example of an animal and a plant alien species.





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2. The embryo sac in female gametophyte is seven cells and eight nucleated structure. Justify the statement with the help of a labelled diagram.



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3. List the changes that occur when an ovule matures into seed.



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4. Compare and contrast the theories of evolution proposed by Darwin and Hugo De Vries.



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5. Secondary treatment of sewage



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6. Microbes can be used to decrease the use of chemical fertilizers. Explain how this can be accomplished.

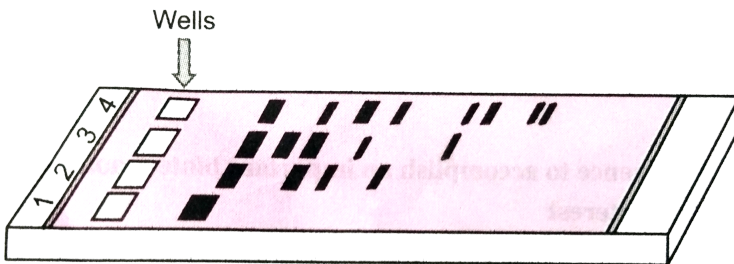


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7. a) How do DNA fragments migrate and resolve in a Gel electrophoresis?

b) How lane one is different from lane 2,3 and 4 in the GEL electrophoresis set up?

c) How pure DNA fragments are made observable in the visible light?



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8. Suggest and explain assisted reproductive techniques which will help a couple to have children, where the female had a blockage in the fallopian tube and the male partner had a low sperm count.

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9. (a) Construct a complete transcription unit with promoter and terminator on the basis of the hypothetical template strand given below :



(b) Write the RNA strand transcribed from the above transcription unit along with its polarity.



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**10. (A)** Mention two events in which DNA is unzipped.

**(B)** Predict the consequences when both the template and the coding strands of a DNA segment participate in transcription process.



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**11.** As a biologist explain the technique to a dairy farmer for increasing the yield of herd size of cattle in a short time.



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**12.** The Indian Government refuted the attempt by a multinational company (MNC) to patent the antiseptic property of curcumin derived from Turmeric. Analyze the unethical practice adopted by the MNC, state its implications and suggest provisions in the Indian Law to prevent such malpractices.

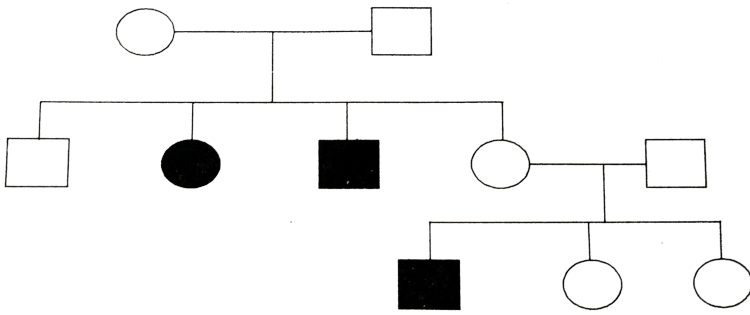
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**13.** A 17-year old boy is suffering from high fever with profuse sweating and chills. Choose the correct option from the following diseases which explains these symptoms and rule out the rest with adequate reason.

(a) Typhoid (b) Viral Fever (c) Malaria

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**14.** Study the given pedigree chart and answer the question that follow.



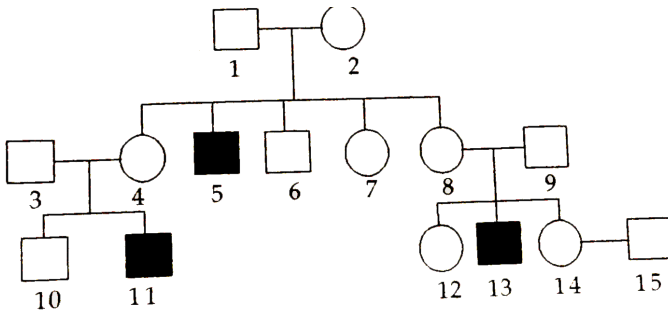
- (a) In the trait recessive or dominant ?
- (b) Is the trait sex-linked or autosomal ?
- (c) Give the genotypes of the parents in generation I and of their third and fourth child in generation.

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**15.** Haemophilia is a sex linked recessive disorder of humans. The pedigree chart given below shows the inheritance of Haemophilia in one family. Study the



pattern of inheritance and answer the questions given.



(a) Give all the possible genotypes of the members 4, 5 and 6 in the pedigree chart.

(b) A blood test shows that the individual 14 is a carrier of gaemophilia. The member numbered 15 has recently married the member numbered 14. What is the probability that their first child will be a haemophilic male ? Show with the help of Punnett square.



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**16.** In a pond there were 200 frogs , 40 more were born in the year . Calculate the birth rate of the population.

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**17.** Draw a labelled diagram of the microscopic structure of a human sperm.

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**18.** Expand MOET. Explain the procedure of this technology in cattle improvement.

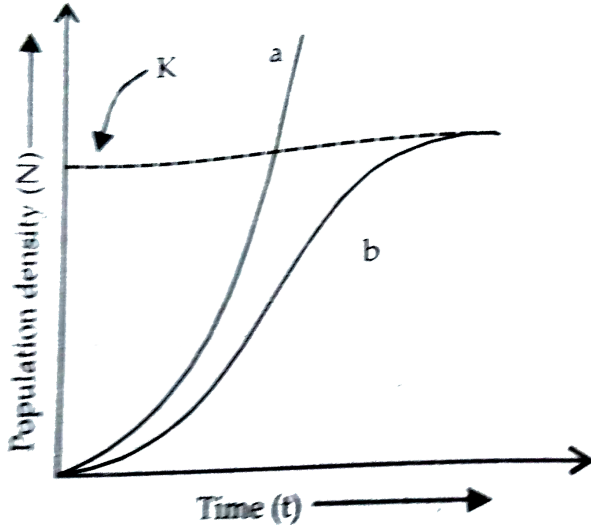
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**19.** One of the codons on mRNA is AUG. Draw the structure of tRNA adapter molecule for this codon. Explain the uniqueness of this tRNA?

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**20.** Study the population growth curves in the graph given below and answer the questions which follow :

(i) Identify the growth curves 'a' and 'b'.



(ii) Which one of them is considered a more realistic one and why?

If  $\frac{dN}{dt} = rN \left( \frac{K - N}{K} \right)$  is the equation of the

logistic growth curve, what does K stand for?

(iv) What is symbolised by N?



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21. How and why is bacterium *Thermus aquaticus* employed in recomb technology ? Explain.

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22. (a) What are 'molecular scissors' ? Give one example.

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23. Given below is a part of the template strand of a structural gene  $\overline{\text{TAC}} \quad \overline{\text{CAT}} \quad \overline{\text{TAG}} \quad \overline{\text{GAT}}$

(a) Write its transcribed mRNA strand with its

polarity.

(b) Explain the mechanism involved in initiation of the transcription of this strand.

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**24.** (i) How and at what stage does Plasmodium enter into a human body ?

(ii) With the help of a flow-chart only show the stages of asexual reproduction in the life-cycle of the parasite in the infected human.

(iii) Why does the victim show symptoms of high fever ?

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**25.** It has been recorded that the temperature of the earth's atmosphere has increased by  $0.6^{\circ}C$ .

(a) What has caused this increase ?

(b) Explain its consequences.



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**26.** Explain the pattern of inheritance of haemophilia in humans. Why is the possibility of a human female becoming haemophilic extremely rare ? Explain.



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**27.** Draw a labelled diagram of the sectional view of a mature pollen grain in angiosperms. Explain the functions of its different parts.



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**28.** Give a schematic representation of oogenesis in humans . Mention the number of chromosomes at each stage .Correlate the life phases of the individual with the stage of the process .



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**29. A:** DNA ligase plays an important role in recombinant DNA technology.

**R:** The linking of antibiotic resistance gene with plasmid vector became possible by enzyme DNA ligase



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**30.** What is meant by faraday 's constant?



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31. Among the following characters, which one was not considered by Mendel in his experiments on pea ?



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32. In pea plants, yellow seeds are dominant to green . If a heterozygous yellow seeded plant is crossed with a green seeded plant, what ratio of yellow and green seeded plants would you expect in  $F_1$  generation ?



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**33.** A few residents in your locality, for business gains, have established small-scale industrial/commercial activities such as pathological labs and fabric dyeing centres without obtaining 'No objection certificates' from municipal authorities. Would you support these activities ? Give any three reasons in support of your answer.



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**34.** Name the two end products of double fertilization in angiosperms. How are they formed ? Write their fate during the development of seed.

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**35.** Morgan carried out several dihybrid crosses in *Drosophila* and found  $F_2$ -ratios deviated very significantly from the expected Mendelian ratio. Explain his findings with the help of an example.

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**36.** Write the help of a schematic diagram the location and the role of the following in a transcription unit :

Promoter, Structural gene, Terminator.



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**37.** According to the Darwinian theory, the rate of appearance of new forms is linked to their life cycles. Explain.



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**38.** (a) Name the causative organisms for the following diseases :

(i) Elephantiasis

(ii) Ringworm

(iii) Amoebiasis

(b) How can public hygiene help control such diseases ?



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39. Draw a neat labelled diagram of a biogas plant.



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## Section D

1. People living in the coastal areas are forced evict their dwelling units as the sea has inundated into

the land area. State the possible reasons and suggest measures that could be taken to reduce the deleterious changes in the environment.



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2. A young sperm whale, 33-foot long was found dead off the coast. It has a large amount of human trash like trash bags, polypropylene sacks, ropes, net segments etc. amounting to 29 kilograms in its digestive system. The whale died because of inflammation of the abdominal lining. Analyze the possible reasons for such mishaps and suggest measures that can be taken to reduce such incidents.



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3. Aneuploidy of chromosomes in human beings results in certain disorders. Draw out the possibilities of the karyotype in common disorders of this in human beings and its consequences in individuals.



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4. In a dihybrid cross, white eyed, yellow bodied female *Drosophila* was crossed with red eyed, brown bodied male *Drosophila*. The cross produced 1.3



percent recombinants and 98.7 percent progeny with parental type combination in the F<sub>2</sub> generation.

Analyze the above observation and compare with the Mendelian dihybrid cross.

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5. Differentiable between spermatogenesis and oogenesis.

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6. Parturition is induced by a complex neuroendocrine mechanism. Explain.



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7. Draw a simplified model of phosphorus cycling in a terrestrial ecosystem.



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8. Write the importance of nutrient cycles in ecosystems.



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9. (a) Explain the narrowly utilitarian, broadly utilitarian and ethical arguments in favour of conservation of biodiversity.

(b) How is designation of certain areas as hotspots a step toward biodiversity conservation ? Name any two hotspots in India.



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10. (a) How is sex determined in humans ?



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11. (a) What is a genetic code ?



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## Delhi Board Set II Section A

1. Which one of the two, stenothermals or eurythermals, shows wide range of distribution on earth and why ?



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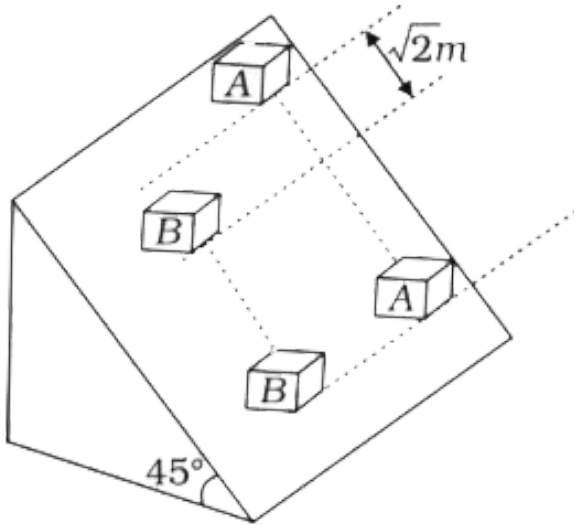
2. Recently chikungunya cases were reported from various parts of the country. Name the vector responsible for it.



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3. Two identical blocks A and B of equal masses are placed on rough inclined plane as shown in the figure. Initially the block A is  $\sqrt{2}m$  behind the block B. Coefficient of kinetic friction for the blocks A and B are 0.2 and 0.3 respectively ( $g = 10m/s^2$ ). By the time the two blocks come on the same line on the inclined plane if they are released simultaneously,

the distance moved by B is  $\beta m$  Find the value of  $\beta$



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4. Name the technique used for separating DNA fragments in the laboratory.

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## Delhi Board Set II Section B



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2. Name the blank spaces a, b, c and d given in the following table :

Type of Microbe	Name	Commercial Product
Bacterium	a	Lactic acid
Fungus	b	Cyclosporin A
c	<i>Monascus purpureus</i>	Statins
Fungus	<i>Penicillium notatum</i>	d



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3. Which of the following phenomena leads to variation in DNA ?



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Delhi Board Set II Section C

1. The ovary is half inferior in flowers of



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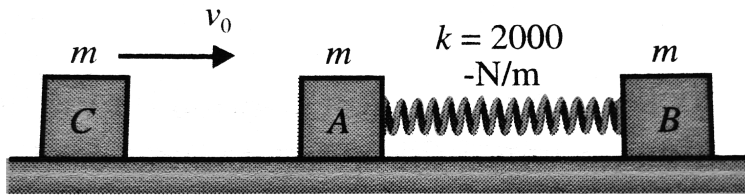


2. Why should biological control of pests and pathogens be preferred to the conventional use of chemical pesticides?



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**Delhi Board Set II Section D**



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1.

Two identical blocks A and B, each of mass  $m = 3\text{kg}$ , are connected with the help of an ideal spring and placed on a smooth horizontal surface as shown in Fig.

Another identical blocks C moving velocity  $v_0 = 0.6 \frac{m}{s}$  collides with A and sticks to it, as a result, the motion of system takes place in some way

Based on this information answer the following questions:

Q. After the collision of C and A, the combined body

and block B would

Option1

oscillate about centre of mass of system and centre of mass is at rest.

Option2

oscillate about centre of mass of system and centre of mass is moving.

Option3

oscillate but about different location other than the centre of mass.

Option4

not oscillate.



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2. In which of the sex determination both male and female same number of chromosomes ?

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## Delhi Board Set Iii Section A

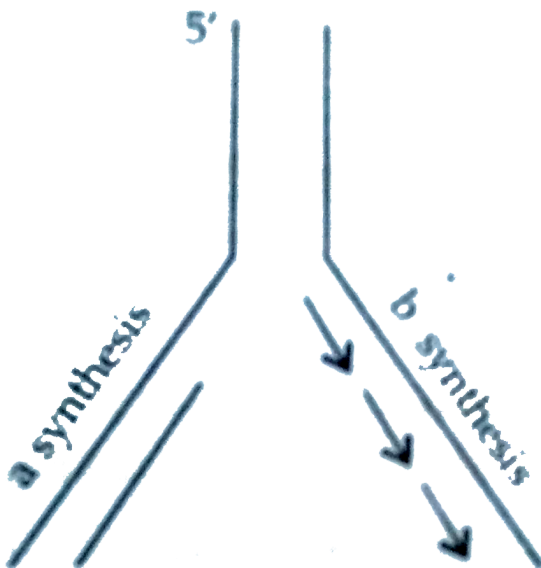
1. What causes swelling of the lower limbs in patients suffering from filariasis?

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2. List any two adaptive features evolved in parasites enabling them to live successfully on their hosts .

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3. Name the types of synthesis 'a' and 'b' occurring in the replication fork of DNA as shown below:





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## Delhi Board Set Iii Section B

1. Name the interaction in each of the following :

(a) Ascaris worms living in the intestine of human

(b) Sucker fish attached to the shark

(c) Smaller barnacles disappeared when Balanus dominated in the coast of Scotland



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2. Name the blank spaces a, b, c and d given in the following table

Type of Microbe Scientific	Name	Commercial Product
Bacterium	a	Clot buster enzyme
b	<i>Aspergillus niger</i>	Citric acid
Fungus	<i>Trichoderma polysporum</i>	c
Bacterium	d	Butyric acid



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## Delhi Board Set Iii Section C

1. Explain the process of charging of tRNA. Why is it essential in translation?



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2. How do organisms manage with stressful conditions existing in their habitat for short duration? Explain with the help of one example each.



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3. A non-haemophilic couple was informed by their doctor that there is possibility of haemophilic child being born to them. Explain the basis on which the doctor conveyed this information. Give the genotype.



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1. (a) Explain Griffith's series of experiments where he witnessed transformation in bacteria he worked with.

(b) Name the scientists responsible for determining the biochemical nature of "transforming principle" in Griffith's experiments. What did they prove ?



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2. A true breeding pea plant homozygous for axial violet flowers is crossed with another pea plant with terminal white flowers (aavv).

(a) What would be the phenotype and genotype of  $F_1$  and  $F_2$  generations?

(b) Give the phenotype ratio of  $F_2$  generations.

(c) List the Mendel's generalisations that can be derived from the above cross.



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## Section A

1. A bilobed, dithecous anther has 100 microspore mother cells per microsporangium. How many male gametophytes this anther can produce ?



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2. Mention two functions of the codon AUG.

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3. Name the scientist who disproved spontaneous generation theory.

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4. What is it that prevents a child to suffer from a disease he/she is vaccinated against? Give one reason.

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5. Why is the enzyme cellulase needed for isolating genetic material from plant cells and not from the animal cells?

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6. Name a molecular diagnostic technique to detect the presence of a pathogen in its early stage of infection ?

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7. If 8 individuals in a laboratory population of 80 fruit flies died in a week, then what would be the death rate for population for the said period ?



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8. Mention one positive and one negative application of amniocentesis.



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9. An anther with malfunctioning tapetum often fails to produce viable male gametophytes. Give one reason.



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10. How do animals like fish and snails avoid summer related unfavorable conditions?



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11. "Sweet potato tubers and potato tubers are the result of convergent evolution." Justify the statement.



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**12.** Our government has intentionally imposed strict conditions for M.T.P. In our country. Justify giving a reason.



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**13.** State the fate of a pair of autosomes during gamete formation.



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**14.** What role does an individual organisms play as per Darwin's theory of natural selection?



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**15.** Suggest a method to ensure an anamnestic response in humans.



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**16.** Name and describe any three causes of biodiversity losses.



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17. Mention the site where syngamy occurs in amphibians and reptiles respectively.



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18. How is snow-blindness caused in humans ?



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19. Name one autosomal dominant and one autosomal recessive. Mendelian disorder in human.



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**20.** How is the action of exonuclease different from that of endonuclease ?



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**21.** India has more than 50,000 strains of rice. Mention the level of biodiversity it represents.



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**22.** Mention the information that the health workers derive by measuring BOD of a water body.



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**23.** Name the enzyme involved in the continuous replication of DNA strand. Mention the polarity of the template strand.



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**24.** Offsprings derived by asexual reproduction are called clones. Justify giving two reasons.



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25. Write the genotype of (i) an individual who is carrier of sickle cell anaemia gene but apparently unaffected, and (ii) an individual affected with the disease.



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26. Mention a characteristic feature and a function of zoospores in some algae.



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27. A human being suffering from Down's Syndrome shows trisomy of  $21^{st}$  chromosome. Mention the cause

of this chromosomal abnormality.



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**28.** Pea flowers produce assured seed sets. Give a reason.



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**29.** British geneticist R.C. Punnett developed a graphical representation of genetic cross called "Punnett Square". Mention the possible result this representation predicts of the genetic cross carried.



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**30.** State the two principal outcomes of the experiments conducted by Louis Pasteur on origin of life.



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**31.** Name the layer of the atmosphere that is associated with 'good ozone'.

OR

Mention the term used to describe a population

interaction between an orchid growing on a forest tree.



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**32.** What are 'flocs', formed during secondary treatment of sewage ?

OR

Write any two places where methanogens can be found.



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**33.** At what stage does the meiosis occur in an organism exhibiting haploidic life cycle and mention the fate of the products thus produced.



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**34.** Mention two objectives of-setting up GEAC by our Government.



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**35.** Write the palindromic sequence that EcoRI recognises.





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**36.** Trace the route of Sporozoite of Plasmodium when it enters the human body through the bite of infected female Anopheles mosquito till its entry into the R.B.C.



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**37.** List any two characters of Pea plants used by Mendal in his experiments other than height of the plants and the colour of the seed.



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**38.** Name the disorder caused due to the absence of one of the X-chromosomes in a human female.



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**39.** Write one difference between binary fission and budding.



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**40.** Mention two objectives of-setting up GEAC by our Government.



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41. Write the palindromic sequence that EcoRI recognises.

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42. Trace the route of Sporozoite of Plasmodium when it enters the human body through the bite of infected female Anopheles mosquito till its entry into the R.B.C.

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**43.** List any two characters of Pea plants used by Mendel in his experiments other than height of the plants and the color of the seed.



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**44.** Name the disorder caused due to the absence of one of the X-chromosomes in a human female.



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**45.** Write one difference between binary fission and budding.



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## Section B

1. A moss plant produces a large number of antherozoids but relatively only a few egg cells. Why?



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2. Mention the reasons for difference in ploidy of zygote and primary endosperm nucleus in an angiosperm.



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3. How does an electrostatic precipitator work to remove particulate pollutants released from the thermal power plants ?



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4. Name the type of food chains responsible for the flow of larger fraction of energy in an aquatic and a terrestrial ecosystem respectively. Mention one difference between the two food chains.



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5. Name the host and the site where the following occur in the life cycle of a malarial parasite :

(a) Formation of gametocytes.

(b) Fusion of gametocytes.



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6. Honey collection improves when beehives are kept in crop-fields during flowering season. Explain.



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7. How does addition of a small amount of curd to fresh milk help formation of curd ? Mention a nutritional quality that gets added to the curd.



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8. Why is the introduction of genetically engineered lymphocytes into a ADA deficiency patient not a permanent cure ? Suggest a possible permanent cure.



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9. How does a test-cross help in identifying the genotype of the organism ? Explain.



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10. How does the floral pattern on Mediterranean orchid *Ophrys* guarantee cross pollination ?



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11. Biodiversity is the combined diversity at all levels of biological organisation what are those levels ?



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**12.** In a pond there were 20 Hydrilla plants. Through reproduction 10 new Hydrilla plants were added in a year. Calculate the birth rate of the population.



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**13.** Biodiversity must be conserved as it plays an important role in many ecosystem services that nature provides.

Explain any two services of the ecosystem.



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**14.** How many haploid cells are present in mature female gametophyte of a flowering plant? Name them.



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**15.** When a tall pea plant was selfed, it produced one-fourth of its progeny as dwarf. Explain with the help of a cross.



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**16.** Chlorofluorocarbons (CFCs) are widely used as refrigerants. Then why it is suggested to reduce its

emission as far as possible ? Explain.



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17. In a pond there were 200 frogs, 40 more were born in a year. Calculate the birth rate of the population.



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18. Where does triple fusion take place in a flowering plant? Why is it so called? Mention its significance.



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19. Why certain regions have been declared as biodiversity "hot spots" by environmentalists of the world? Name any two "hot spot" regions of India



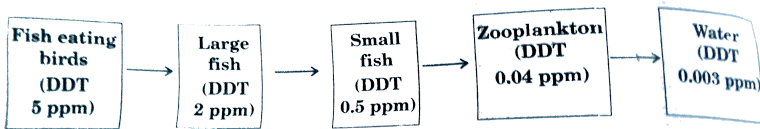
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20. How does an electrostatic precipitator work to remove particulate pollutants released from the thermal power plants ?



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21. Study the given aquatic food chain and answer the questions that follow:



- (i) Give reasons why there is a continuous increase in the DDT content in different trophic levels of the chain.
- (ii) Name the phenomenon responsible for the increase in DDT content.



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22. Why are  $F_2$  phenotypic and genotypic ratios same in a cross between red-flowered snapdragon and

white-flowered snapdragon plants. Explain with the help of a cross.



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23. Geitonogamous flowering plants are genetically autogamous but functionally cross-pollinated. Justify.



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24. When and where do chorionic villi appear in humans ? State their function.



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**25.** In a cross between two tall pea plants some of the offsprings produced were dwarf. Show with the help of Punnett square how this is possible.

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**26.** A student on a school trip started sneezing and wheezing soon after reaching the hill station for no explained reasons. But, on return to the plains, the symptoms disappeared. What is such a response called? How does the body produce it?

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27. Name two commonly used bioreactors. State the importance of using a bioreactor.



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28. (a) How does cleistogamy ensure autogamy?

(b) State one advantage and one disadvantage of cleistogamy to the plant.



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**29.** A mature, embryo-sac in a flowering plant may possess 7-cells, but 8-nuclei. Explain with the help of a diagram only.



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**30.** Describe the structure of a nucleosome.



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**31.** Mention the evolutionary significance of the following organisms :

(i)Shrews (ii)Lobefins (iii)Homo habilis (iv)Homo erectus



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**32.** In an agricultural field there is a prevalence of the following organisms and crop diseases which are affecting the crop yield badly:

- a) White rust
- b) Leaf and strips rust
- dc) Black rot
- d) Jassids

Recommend the varieties of crops the farmers should grow to get rid of the existing problem and thus improve the crop yeild



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**33.** How does the applications of the fungal genus, Glomus, to the agricultural farm increase the farm output?



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**34.** Plenty of algal bloom is observed in a pond in your locality.

a) Write what has caused this bloom and how does it affect the quality of water.

b) Suggest a preventive measure.



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**35.** Mention the role of ribosomes in peptide-bond formation. How does ATP facilitate it?



**Watch Video Solution**

**36.** How do copper and hormone releasing IUDs act as contraceptives? Explain.



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**37.** If you squeeze a seed of orange you might observe many embryos of different sizes. How it possible ?

Explain.



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**38.** A recombinant DNA is formed when sticky ends of vector DNA and foreign DNA join. Explain how the sticky ends are formed and get joined.



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**39. (i)** Mention the number of primers required in each cycle of polymerase chain reaction (PCR). Write the role of primers and DNA polymerase in PCR.

(ii) Give the characteristic feature and source organism of the DNA polymerase, in PCR.



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40. Define the term 'health'. Mention any two ways of maintaining it.



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41. Why does a doctor administer tetanus antitoxin and not a tetanus vaccine to a child injured in a roadside accident with a bleeding wound? Explain.



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**42.** Giving two reasons explain why there is more species biodiversity in tropical latitudes than in temperate ones.

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**43.** Name an opioid drug and its source plant. How does the drug affect the human body?

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**44.** Mention the major cause of air pollution in metro cities. Write any three ways by which it can be reduced.

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**45.** Placenta acts as an endocrine tissue. Justify.

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**46.** Differentiate between menarche and menopause.

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**47.** List the features that make a stable biological community.



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**48.** Mention how e-waste is produced and disposed off.  
Write the solution for its treatment.



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**49.** Differentiate between major structural changes in the human ovary during the follicular and luteal phase of the menstrual cycle.



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**50.** Alien species are a threat to native species. Justify taking example of an animal and a plant alien species.



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**51.** Explain giving reasons the cause of appearance of peaks 'a' 'b' in the graph shown below.



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**52.** Explain the zygote intra fallopian transfer technique ZIFT. How is intra uterine transfer technique (IUT) different from it



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**53.** Name the organic materials the exine and latine of an angiosperm pollen grains are made up of. Explain the role of exine.



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54. i) Name the scientist who suggested that the genetic code should be made of a combination of three nucleotides.

ii) Explain the basis on which he arrived at this conclusion.



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55. How can healthy potato plants be obtained from a desired potato variety which is viral infected? Explain.



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**56.** What is bio-piracy? State the initiative taken by the Indian Parliament against it



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**57.** Write the role of 'Ori' and 'restriction' site in a cloning vector pBR322.



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**58.** You are conducting artificial hybridization on papaya and potato. Which one of them would require the step of emasculation and why? However for both

you will use the process of bagging. Justify giving one reason.



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**59.** How would the gene flow or genetic drift affect the population in which either of them happen to take place ?



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**60.** Differentiate between the roles of B-lymphocytes and T-lymphocytes in generating immune responses.

OR

Principle of vaccination is based on the property of "memory" of the immune system. Taking one suitable example, justify the statement.

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61. Explain the relevance of "Totipotency" and "Somaclones" in raising healthy banana plants from virus infected banana plants.

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**62.** List any four ways by which GMO's have been useful for enhanced crop output.

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**63.** Mention four significant services that a healthy forest ecosystem provide.

OR

Substantiate with help of one example that in an ecosystem mutualists (i) tend to coevolve and (ii) are also one of the major causes of biodiversity loss.

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**64.** Name a free-living and symbiotic bacterium that serve as bio-fertilizer. Why are they so called ?



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**65.** Name the type of immunity a baby is born with. How is it different from the one he gets from the mother's milk after birth ?



**Watch Video Solution**

**66.** 'Niche is a part of a habitat.' Explain with the help of an example.



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**67.** State the roles of AUG codon at 5' end UAG at 3' end of a certain m-RNA during translation.



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**68.** 'Degenerate' and 'Universal' are salient features of a genetic code. Explain.



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**69.** Both nucellus and endosperm have abundant reserve food materials. How is their food reservoir utilised in angiosperms ?

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**70.** What is a vaccine ? How do they act to provide long term immunity to an individual who is vaccinated ?

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**71.** Name the type of immunity the colostrum provides to a newborn baby . Write giving an example where this

type of immunity should be provided to a person.

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72. Write the binomials of two fungi and mention the products/bioactive molecules they help to produce.

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## Section C

1. Draw a longitudinal section of a post-pollinated pistil showing entry of Pollen, tube into a mature embryo-sac. Label filiform apparatus, chalazal end, Hilium, antipodals, male gametes and secondary nucleus.



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2. Draw a labelled sectional view of seminiferous tubule of a human male.



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3. During the studies on genes in *Drosophila* that were sex-linked T.H. Morgan found F<sub>2</sub>-population phenotypic ratios deviated from expected 9 : 3 : 3 : 1. Explain the conclusion he arrived at.



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4. Describe the initiation process of transcription in Bacteria.



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5. Explain convergent and divergent evolution with the help of one example of each.

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6. Name the type of human cell HIV attacks on its entry into the body. Explain the events that occur in the cell which further lead to cause immuno deficiency syndrome.

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7. Explain the efforts which must be put in to improve, hygiene and milk yield of cattle in a dairy farm.

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8. Identify a, b, c, d, e and f in the table given below :

Organism	Bioactive molecule	Use
1. <i>Monascus purpureus</i> (yeast)	a	b
2. c	d	antibiotic
3. e	Cyclosporin A	f

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**9.** Eco RI is used to cut a segment of foreign DNA and that of a vector DNA to form a recombinant DNA. Show with the help of schematic diagrams.

(i) The set of palindromic nucleotide sequence of bases pairs the Eco RI will recognise in both the DNA segment. Mark the site at which Eco RI will act and cut both the segments.

(ii) Sticky ends are formed on both the segments where the two DNA segments will join later to form a recombinant DNA.



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10. How does RNA interference help in developing resistance in tobacco plant against nematode infection?

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11. Describe the elongation process transcription in bacteria.

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12. Why is an antibody molecule represented as  $H_2L_2$  ?

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**13.** (a) Explain how to overcome inbreeding depression in cattle.

(b) List three advantages of inbreeding in cattle.

(c) Name an improved breed of cattle.



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**14.** Draw the following diagrams related to human reproduction and label them.

(a) The zygote after the first cleavage division

(b) Morula stage

(c) Blastocyst stage (sectional view)



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**15. a)** List the three stages the annuals and biennial angiosperms have to pass through during their life cycle.

**b)** List and describe any two vegetative propagules in flowering plants.



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**16.** Draw a labelled sectional view of seminiferous tubule of a human male.



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**17.** During a medical investigation, an infant was found to possess an extra chromosomes 1. Describe the symptoms the child is likely to develop later in the life.

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**18.** A number of passengers were severely burnt beyond recognition during a train accident. Name and describe a modern technique that can help hand over the dead to their relatives.

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19. If  $p^2 + 2pq + q^2 = 1$ . Explain this algebraic equation on the basis of Hardy Weinberg's principle.



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20. a) What precautions(s) would you recommend to a patient requiring repeated blood transfusion?

b) If the advise is not followed by the patient, there is an apprehension that the patient might contract a disease that would destroy the immune system of his/he body. Explain with the help of schematic diagram only how the immune system would get affected and destroyed.

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**21. a) What is inbreeding depression?**

b) Explain the importance of "selection" during inbreeding in cattle.

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**22. Describe how do 'flocs' and 'activated sludge' help in Sewage Treatment.**

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23. Which one of the following is not a gaseous biogeochemical cycle in ecosystem?

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24. Write the steps you would suggest to be undertaken to obtain a foreign-gene-product.

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25. Why do lepidopterans die when they feed on Bt cotton plant? Explain how does it happen.

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26. 'in-situ' conservation can help endangered/threatened species. Justify the statement.

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27. (i) Write the characteristic features of anther, pollen and stigma of wind-pollinated flowers.

(ii) How do flowers reward their insect pollinators? Explain.

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28. (i) Why are grasshopper and *Drosophila* said to show male heterogamity? Explain.

(ii) Explain female heterogamity with the help of an example.



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29. (a) How does the Hardy-Weinberg's expression  $(p^2 + 2pq + q^2 = 1)$  explain that genetic equilibrium is maintained in a population?

(b) List any two factors that can disturb the genetic equilibrium.



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**30. (i)** Mention the property that enables the explants to regenerate into a new plant.

**(ii)** A banana herb is virus-infected. Describe the method that will help in obtaining healthy banana plants from this diseased plant.



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**31.** Mention the product and its use produced by each of the microbes listed below:

**(i)** Streptococcus. **(ii)** Lactobacillus. **(iii)** Saccharomyces Cerevisiae.

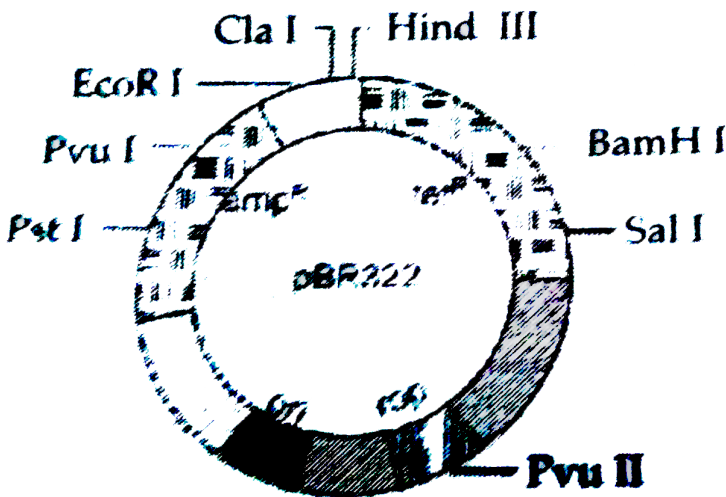


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32. (i) Name the organism in which the vector shown in inserted to get the copies of the desired gene.

(ii) Mention the area labelled in the vector responsible for controlling the copy number of the inserted gene.

(iii) Name and explain the role of a selectable marker in the vector shown.





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**33.** How do organisms like fungi, zooplanktons and bears overcome the temporary short-lived climatic stressful conditions? Explain.



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**34.** Explain the process of artificial hybridisation to get improved crop, variety in (i) plants bearing bisexual flowers (ii) female parent producing unisexual flowers.



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**35.** Explain the sex determination mechanism in humans. How is it different in birds ?



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**36.** Explain the mechanism of sex determination in insects like *Drosophila* and grasshopper.



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**37.** (a) Mention any four strategies adopted by flowering plants to prevent self-pollination.

(b) Why is geitonogamy also referred to as genetical autogamy?



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**38.** Pollen banks are playing a very important role in promoting plant breeding programme the world over.

How are pollens preserved in the pollen banks ?

Explain. How are such banks benefitting our farmer ?

Write any two ways.



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**39.** Draw a labelled diagram to show inter-relationship of four accessory ducts in a human male reproductive system.

OR

Draw a sectional view of the human ovary showing the different stages of developing follicles, corpus luteum and ovulation.



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**40.** Compare in any three ways the chromosomal theory of inheritance as proposed by Sutton and Boveri

with that of experimental results on pea plant presented by Mendel.



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41. (a) Write two differences between *Homo erectus* and *Homo habilis*.

(b) Rearrange the following from early to late geologic periods :

Carboniferous, Silurian, Jurassic.



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**42.** Name the group of bacteria involved in setting milk into curd. Explain the process they carry in doing so. Write another beneficial role of such bacteria.



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**43.** Bee keeping practice is a good income generating industry. Write the different points to be kept in mind for successful bee keeping. Write the scientific name of the most common Indian species used for the purpose.



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**44.** (a) Match the microbes listed under Column -A with the products mentioned under Column - B.

Column - A		Column - B	
(H) <i>Penicillium notatum</i>	(i)	Station	
(I) <i>Trichoderma polysporum</i>	(ii)	ethanol	
(J) <i>Monascus purpurea</i>	(iii)	antibiotic	
(K) <i>Saccharomyces cerevisiae</i>	(iv)	Cyclosporin - A	

(b) Why does 'Swiss Cheese' Develop large holes ?

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**45.** Describe the formation of recombinant DNA by the action of EcoRI.

OR

Describe the process of amplification of "gene of interest" using PCR technique.



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**46.** Two children, A and B aged 4 and 5 years respectively visited a hospital with a similar genetic disorder. The girl A was provided enzyme-replacement therapy and was advised to revisit periodically for further treatment. The girl, B was, however, given a therapy that did not require revisit for further treatment.

(a) Name the ailments the two girls were suffering from ?



(b) Why did the treatment provided to girl A required repeated visits ?

(c) How was the girl B cured permanently ?

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47. List six advantages of "ex-situ" approach to conservation of biodiversity.

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48. While on a visit to a pond in the city-neighbourhood, the visitors were delighted to find

large expanse of water covered with colourful algal mass.

(a) As a student of biology, do you agree with their delight ? Give reasons in support of your answer.

(b) Explain the cause of such algal growth.



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**49.** (a) Name the organic material exine of the pollen grain is made up of. How is this material advantageous to pollen grain ?

(b) Still it is observed that it does not form a continuous layer around the pollen grain. Give reason.

(c) How are 'pollen banks' useful ?



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50. Differentiate between divergent and convergent evolution. Give one example of each.



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51. Are humming birds and fish regulators or conformers ? Give reasons in support of your answer.



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**52. (a)** What is green revolution ? Mention the steps that led to it

**(b)** Name the scientist whose contribution led to the development of semi-dwarf wheat varieties in India.



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**53.** Expand 'ELISA'. Why is this method preferred over conventional methods of diagnosis of diseases ?



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**54.** State the objective with which a dairy farm is set up .Describe the essential steps to be followed for dairy farm management.



**Watch Video Solution**

**55.** Write in what context did Darwin use the terms ' fitness', survival and selection while elaborating on the mechanism of evolution.



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**56.** Name the specific enzyme responsible for nucleotide polymerisation in DNA replication. Write characteristic features of this enzyme. Name the region on *E. coli* DNA where this enzyme can initiate replication.



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**57.** Write the causative agent of filariasis in human. Mention its mode of transmission and symptoms of the disease.



**Watch Video Solution**

**58.** (a) Name a terminal method to prevent pregnancy in humans.

(b) Describe the procedure of the terminal method carried in human male and female.



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**59.** (a) Do all pollen grains remain viable for the same length of time ? Support your answer with two suitable examples.

(b) How are pollen grains stored in pollen banks ? State the purpose of storing pollen grains in these banks

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**60.** GM plants are useful in many ways. How would you convince farmers to grow GM plants on their field ? Explain giving three reasons.

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**61.** Name and explain the technique that helps in the separation of DNA fragments for DNA recombinant technology experiments. How can these separated DNA fragments be visualised ?

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**62.** When Morgan conducted dihybrid cross on *Drosophila* like Mendel did with pea plants, the  $F_2$  ratios deviated significantly from than of Mendel's  $F_2$  ratio. Write the explanation Morgan and his group gave to the observations they obtained from their experiment.



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**63.** Name the male accessory glands in human and write their functions.



**Watch Video Solution**

**64.** Describe the interrelationship between productivity , gross primary productivity and net productivity.

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**65.** Explain the process of pollination in Vallisneria .How is it different in water- lily , which is also an aquatic plant ?

 [Watch Video Solution](#)

**66.** What is disturbance in Hardy- Weinberg genetic equilibrium indicative of Explain how it is caused.

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**67.** Different animals respond to changes in their surroundings in different ways . Taking one example each explain some animals undergo aestivation while some others hibernation " .How do fungi respond to adverse climatic conditions ?

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[Watch Video Solution](#)

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## Section D

1. (a) How does a chromosomal disorder differ from a Mendelian disorder?

(b ) Name any two chromosomal aberration associated

disorders.

(c) List the characteristics of the disorders mentioned above that help in their diagnosis.



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2. Fitness is the end result of the ability to adapt and get selected by Nature. Explain with suitable example.



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3. When and where are primary oocytes formed in a human female ? Trace the development of these

occytes till ovulation (in menstrual cycle).

How do gonadotropins influence this developmental process ?



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4. (a) Explain the events taking place at the time of fertilization of an ovum in a human female.

(b) Trace the development of the zygote upto the implanantion in the uterus.

(c) Name and draw a labelled sectional view of the embryonic stage that gets implanted.



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5. Draw and explain a logistic curve for a population of density (N) at time (t ) whose intrinsic rate of natural increase is (r) and carrying capacity is (k).



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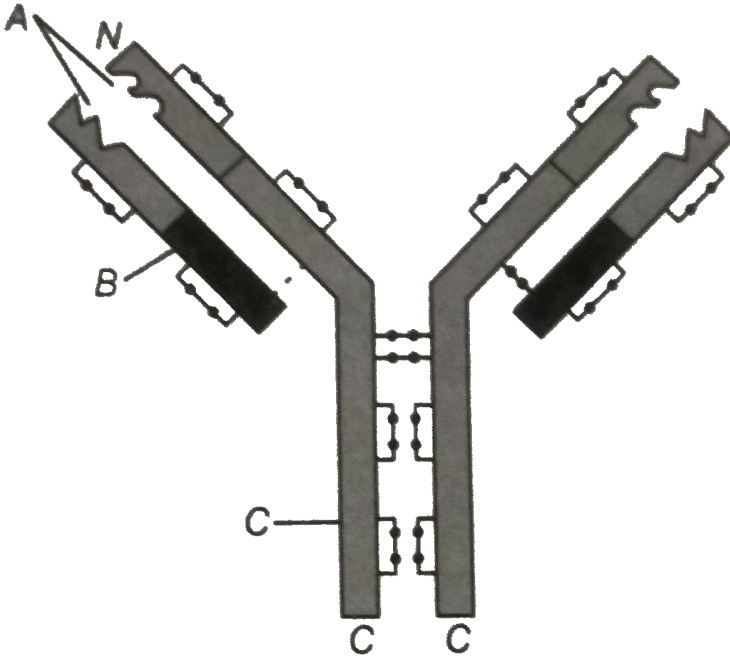
6. Describe the process of decomposition of detritus under the following heads : Fragmentational leaching, catabolism, humification and mineralization.



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7. In the figure, structure of an antibody molecule is shown. Name the parts A, B and C.



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**8.** Describe the elongation process transcription in bacteria.

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**9.** Explain the causes, inheritance pattern and symptoms of any two Mendelian genetic disorders .

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**10.** (a) Natural selection operates when nature selects for fitness. Explain.

(b) The rate of appearance of new forms is linked to

the life span of an organism.

Explain with the help of a suitable example.



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**11.** Write the symptoms of haemophilia and sickle-cell anaemia in humans. Explain how the Inheritance pattern of the two diseases differs from each other.

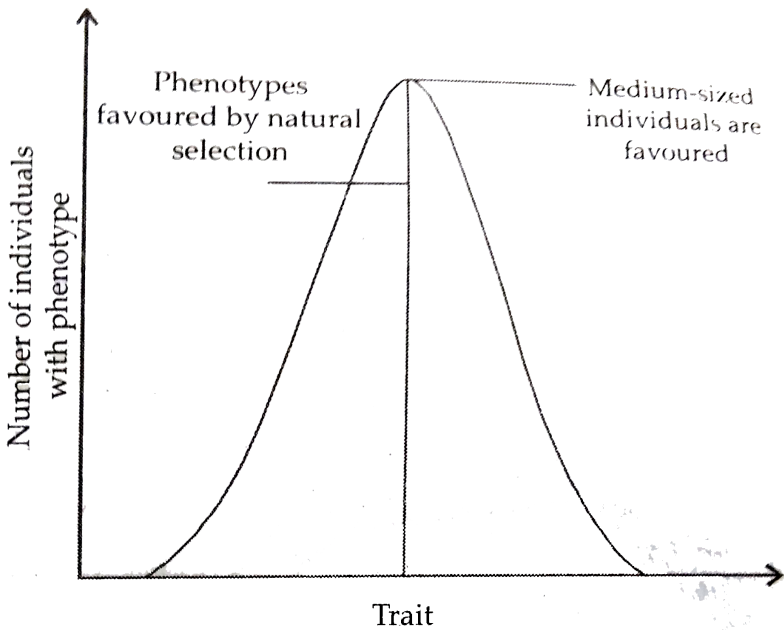


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**12.** (a ) Write the Hardy-Weinberg principle.

(b) Explain the three different ways in which natural

selection can affect the frequency of a heritable trait in a population shown in the graph given below.



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13. (a) Draw a diagrammatic sectional view of a mature anatropous ovule and label the following parts in it :

(i) that develops into seed coat.

(ii) that develops into an embryo after fertilization.

(iii) that develops into an endosperm in an albuminous seed.

(iv) through which the pollen tube gains entry into the embryo sac.

(v) that attaches the ovule to the placenta.

(b) Describe the characteristic features of wind pollinated flowers.



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**14.** (a) Draw a labelled schematic diagram of the transverse section of a mature anther of an

angiosperm plant.

(b) Describe the characteristic features of an insect pollinated flower.



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**15.** Public all over India is very much concerned about the deteriorating air quality in large parts of North India. Alarmed by this situation the Resident's Welfare Association of your locality organized an awareness programme entitled "Bury not burn" They involved you justify your arguments that promote burying and discourage burning and discourage burning? (Give two reasons).

b) With the help of flow charts, one for each practice depict the chain of events that follow.



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**16.** Read the following statement and answer the questions that follows:

"A guava fruit has 200 viable seeds."

a) What are viable seeds?

b) Write the total number of:

i) Pollen grains , ii) Gametes in producing 200 viable guava seeds.

c) Prepare a flow-chart to depict the post-pollination

events leading to viable-seed production in a flowering plant.



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17. a) Arrange the following hormones in sequences of their secretion in a pregnant woman.

b) Mention their source and the function they perform:

hcG, LH, FSH, Relaxin.



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**18.** State and explain the "law of independent assortment" in a typical Mendelian dihybrid cross.

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**19. a)** How do the observations made during moth collection in pre- and postindustrialized era in England support evolution by Natural Selection?

**b)** Explain the phenomenon that is well represented by Darwin's finches other than natural selection.

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**20. a) What is an age-pyramid?**

b) Name three representative kinds of age-pyramids for human population and list the characteristics for each one of them.



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**21. Discuss the role of healthy ecosystem services as a pre-requisite for a wide range of economic, environmental and aesthetic goods and services.**



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**22.** Describe in sequence the events that lead to the development of a 3-celled pollen grain from microscope mother cell in angiosperms.



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**23. (a)** Give a schematic representation showing the events of spermatogenesis in human male.

**(b)** Describe the structure of a human sperm.



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**24.** (a) State the law of independent assortment.

(b) Using Punnett Square demonstrate the law of independent assortment in a dihybrid cross involving two heterozygous parents.



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**25.** (a) Why are herbivores considered similar to predators in the ecological context ? Explain.

(b) Differentiate between the following interspecific interactions in a population :

(i) Mutualism and Competition.

(ii) Commensalism and Amensalism.

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- 26.** (a) Trace the succession of plants on a dry bare rock.
- (b) How does phosphorus cycle differ from carbon cycle. ?

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- 27.** (a ) Draw a labelled L.S. view of an albuminous 'seed'.
- (b) How are seeds advantageous to flowering plants ?

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**28. (a)** Write the fate of egg cell and polar nuclei after fertilization.

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**29.** How does the process of natural selection affect Hardy-Weinberg equilibrium? Explain List the other four factors that disturb the equilibrium.

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**30. (a)** Explain Mendel's law of independent assortment by taking a suitable example.

(b) How did Morgan show the deviation in inheritance pattern in *Drosophila* with respect to this law?



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**31.** (a) Explain one application of each one of the following :

(A) Amniocentesis.

(B) Lactational amenorrhea.

(C) ZIFT.

(b) Prepare a poster for the school programme depicting the objectives of :

"Reproductive and Child Health Care Programme."

OR

(a) Explain any two ways by which apomictic seed can develop.

(b) List one advantage and one disadvantage of a apomictic crop.

(c) Why do farmers find production of hybrid seeds costly ?



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**32.** Differentiate between incomplete dominance and co-dominances. Substantiate your answer with one example of each.

OR

(a) Write the contributions of the following scientists



in deciphering the genetic code.

George Gamow, Hargobind Khorana, Marshall Nirenberg, Severo Ochoa.

(b) State the importance of genetic code in protein biosynthesis.



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**33.** (a) What is "population" according to you as a biology student ?

(b) "The size of a population for any species is not a static parameter." Justify the statement with specific reference to fluctuations in the population density of a region in a given periods pf time.

OR

(a) What is hydrarch succession ?

(b) Compare the pioneer species and climax communities of hydrarch and xerarch succession respectively.

(c) List the factors upon which the type of invading pioneer species depend in secondary hydrarch succession. Why is the rate of this succession faster than that of primary succession ?



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**34.** A large number married couples in the world over are childless. It is shocking to know that in India the

female partner is often blamed for the couple being childless.

(a) Why in your opinion the female partner is often blamed for such situations in India? Mention any two values that you as biology student can promote to check this social evil.

(b) State any two reasons responsible for the cause of infertility.

(c) Suggest a technique that can help the couple to have a child where the problem is with the male partner.



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**35.** Waste Disposal and Waste Management poses a major problem in present times. Generation of garbage and its disposal is a major threat and consequently leads to serious environmental issues. The problem is not with biodegradable and recycled wastes. We realise that the need is to reduce non-biodegradable wastes.

(a) Why is there a great concern of managing non-biodegradable waste in comparison to biodegradable waste? Explain.

(b) As a member of eco club of your school, suggest any two ways that you will discuss with your fellow members to organise for a "Zero garbage day" once in a month in the school.



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**36.** (a) Indiscriminate human activities such as alien species invasion, fragmentation and habitats loss have accelerated the loss of biodiversity. Justify by taking one example of each.

(b) State the importance of (i) IUCN Red data list and (ii) Hot spots in conservation of biodiversity.



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**37.** (a) Explain the development of female gametophyte from a megaspore mother cell in an angiosperm.

(b) Draw a labelled diagram of a fully developed embryo sac.



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**38.** (a) Draw a diagrammatic sectional view of a seminiferous tubule (enlarged) of human male and label (i) Spermatogonium, (ii) Sertoli cell, (iii) Primary spermatocyte. Write the function of each labelled part.

(b) Differentiate between spermatogenesis and spermiogenesis.



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**39.** (a) How are polygenic inheritance and multiple allelism different ? Explain with the help of an example each.

(b) List the criteria a chemical molecule must fulfill to be able to act as a genetic material.



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**40.** State the hypothesis proposed by Oparin and Haldane. How was it experimentally proved by S.L. Miller ? Explain.



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41. Explain the carbon cycle with the help of a simplified model.



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**Section A**

1. What is "fitness of an individual" according to Darwin?

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2. How does the applications of cyanobacteria help improve agriculture output?

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3. In a flowering plant is microscope mother cell produce four male gametophytes while a megaspore

mother cell form only one female gametophyte.

Explain.



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4. Write the sex of a human having XXY chromosomes with 22 pairs of autosomes.



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5. Why do DNA fragments move towards the anode during gel electrophoresis ?



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6. How do monocytes act as a cellular barrier in humans to provide innate immunity ?



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7. Name one amino acid, which is coded by only one codon.



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[Watch Video Solution](#)

11. Name one amino acid, which is coded by only one codon.



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## Section B

1. By taking two examples how has bio-fortification helped in improving food quality.



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2. Why is the structure of an antibody molecule represented as  $H_2L_2$  ? Name any two types of antibodies produced in a human body.

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3. Differentiate between out-crossing and cross breeding

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4. Why are microbes like Spirulina being produced on a commercial scale ? Mention its two advantages.



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5. A hemophilic father can never pass the gene for hemophilia to his son. Explain.



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6. (A) Why do organisms like algae and fungi shift from asexual mode of reproduction to sexual mode ?  
(b) What is a juvenile phase in organisms ?



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7. Why is the structure of an antibody molecule represented as  $H_2L_2$  ? Name any two types of antibodies produced in a human body.

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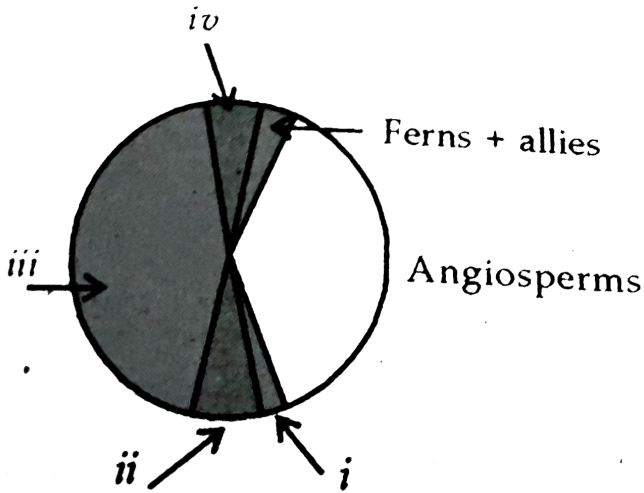
**10.** A hemophilic father can never pass the gene for hemophilia to his son. Explain.



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**11.** Identify the areas labelled (i), (ii), (iii) and (iv) in the pie chart given below representing the biodiversity of plants showing their proportionate number of species

of major taxa.



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12. (A) Why do organisms like algae and fungi shift from asexual mode of reproduction to sexual mode ?

(b) What is a juvenile phase in organisms ?

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## Section C

1. Differentiate between an annual and a biennial plant.

Provide one example of each.



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2. A criminal blew himself up in a local market when was chased by cops. His face was beyond recognition.

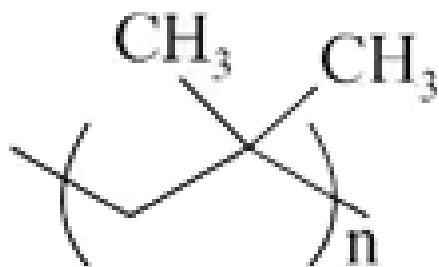
Suggest and describes a modern technique that can help establish his identity?



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3. The correct name of the following polymer is :



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4. a) Name the hormones secreted and write their functions:

i) by corpus luteum and placenta (any two).

ii) During Follicular phase and parturition.

b) Name the stages in a human female where:

i) Corpus luteum and placenta co-exist.

ii) Corpus luteum temporarily ceases to exist.



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5. Parthenocarpy and apomixis have been observed in some plants. Give an example of each. State a similarity and a difference observed between the two processes.



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6. Show with the help of a flow chart only, the life cycle of malarial parasite in humans.



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7. What are Methanogens? Name the animals they are present in and the role they play there.



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8. There are many animals that have become extinct in the wild but continue to be maintained in Zoological park.

i) What type of biodiversity conservation is observed in this case?

ii) Explain any other two ways which help in this type of conservation.



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9. Name the three RNA polymerases found in eukaryotic cells and mention their functions.



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10. Explain the post transcriptional modifications the hn-RNA undergoes in eukaryotic cell.



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**11.** What is biofortification ? Mention the contribution of Indian Agricultural Research Institute towards it with the help of any two examples.

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**12.** Explain the 'Ex-situ conservation' of Biodiversity. How is the in-situ conservation different from it ?

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**13.** Do you think apomixis can be compared with asexual reproduction ? Support your answer, giving one reason.

How is apomixis beneficial to farmers ? Explain.



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**14.** Why is DNA molecule considered as a better hereditary material than RNA molecule ?



**Watch Video Solution**

**15.** Explain three steps involved in polymerase chain reaction.



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**16.** Giving three reasons, write how Hardy-Weinberg equilibrium can be affected.



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**17.** Baculoviruses are good example of bio-control agents. Justify giving three reasons.



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**18.** If the meiocyte of a maize plant contains 20 chromosomes. Write the number of chromosomes in the endosperm and embryo of the maize grain and give reasons in support of your answer.



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**19. (a)** What are transgenic animals ?

Name the transgenic animal having the largest number amongst all the existing transgenic animals. (c) Mention any three purposes for which these animals are produced.



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**20.** The three microbes are listed below. Name the product produced by each one of them and mention their use.

(a) *Aspergillus niger*

(b) *Trichoderma polysporum*

(c) *Monascus purpureus*



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**21.** Can a plant flowering in Mumbai be pollinated by pollen grains of the same species growing in New Delhi ? Provide explanations to your answer



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**22.** Both Hemophilia 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.



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**23.** List the two methodologies which were involved in human genome project. Mention how they were used. Explain YAC and mention what was it used for.



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**24.** Write the characteristics of Ramapithecus , Dryopithecus and Neanderthal man.

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**25.** Name a human disease , its causal organism , symptoms (any three ) and vector, spread by intake of water and food contaminated by human fecal matter.

 [Watch Video Solution](#)

26. (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.



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27. (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 ?

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**28.** Secondary treatment of the sewage is also called Biological treatment Justify this statement and explain the process.

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**29.** (a) Explain the significance of palindromic nucleotide sequence in the formation of recombinant DNA.

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



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## Section E

1. Read the statement and answer the questions that follow:

A flower of brinjal has 520 ovules in its ovary. However, it produces a fruit with only 480 viable seeds.

a) Describe the development of a dicot embryo in a viable seed

b) Why certain angiospermic seeds are albuminous while others are exalbuminous? Explain.



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2. 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 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 animals, how would you help these parents to overcome such inhibitions about reproduction and sexuality?



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3. (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.



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4. Explain the following phases in the menstrual cycle of a human female :

(i) Menstrual phase

(ii) Follicular phase

(iii) Luteal phase

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5. (a) Compare , giving reasons , the J- shaped and S-shaped models of population growth of a species.

(b) Explain " fitness of a species " as mentioned by Darwin.

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

(b) Write any two limitations of ecological pyramids.

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7. (a) Describe the structure and function of a t-RNA molecules . Why is it referred to as an adapter molecules ?

(b) Explain the process of splicing of hn - RNA in a eukaryotic cell.



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8. Write the different components of a lac - operon in E . Coli Explain its expression while in an 'open' state.



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1. How do mycorrhizae help the plants to grow better?

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2. Mention the ploidy of the different types of cells present in the female gametophyte of an angiosperm.

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1. State from where do the signals for parturition originate in human females.



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2. Name the pattern of inheritance where  $F_1$  phenotype :

(a) resembles only one of the two parents.

(b) does not resemble either of the two parents and is in between the two.



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3. According to the Hardy-Weinberg principle, the allele frequency of a population remains constant. How do you interpret the change of frequency of alleles in a population ?

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4. Coelacanth was caught in South Africa. State the significance of discovery of Coelacanth in the evolutionary history of vertebrates.

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5. State the functions of mast cells in allergy response.

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6. State the function of interferons .

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7. What is the cell that receives a recombinant gene called ?

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8. Name an organism where cell division in itself is a mode of reproduction.



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9. When does a human body elicit an anamnestic response?



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10. Name any two diseases the 'Himgiri' variety of wheat is resistant to.



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**11.** State the role of transposons in silencing of mRNA in eukaryotic cells.



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**12.** Why are green algae not likely to be found in the deepest strata or the ocean ?



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**13.** State what does 'standing crop' of a trophic level represent.



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14. Why is it desirable to use unleaded petrol in vehicles fitted with catalytic converters?



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15. Name the type of biodiversity represented by the following:

- i) 1000 varieties of mangoes in India.
- ii) Variations in terms of potency and concentration of compounds represented in *Rauwolfia vomitoria* growing in different regions of Himalayas.



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**16.** Write the name of the organism that is referred to as the "Terror of Bengal".



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**17.** What are 'true breeding lines' that are used to study inheritance pattern of traits in plants?



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**18.** Name any two types of cells which act as "Cellular barriers" to provide Innate Immunity in humans.



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**19.** Mention the type of host cells suitable for the gene guns to introduce an alien DNA.



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**20.** How is 'stratification' represented in a forest ecosystem?



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21. Give an example of an organism that enters 'diapause' and why.

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22. Identify 'a' and 'b' in the figure given below representing proportionate number of major vertebrate taxa.

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**23.** State the cause of Accelerated Eutrophications.



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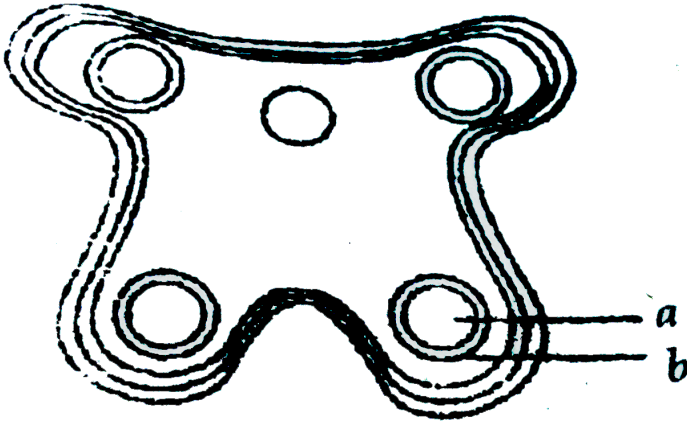
## Section B

**1.** Name a disorder a human suffers from as a result of monosomy of the sex chromosome. Give the karyotype and write the symptoms.



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2. In the T.S. of a mature anther given below, identify "a" and "b" and mention their functions.



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3. What is cleistogamy ? Write one advantage and one disadvantage of it, to the plant.

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4. 'Artificial insemination helps overcome several problems of normal mating in cattle'. Do you agree ?  
Support your answer with any three reasons.



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5. Which type of population interaction is found between clown fish and sea anemone?

A. Broad parasitism

B. Parasitism

C. Mutualism

## D. Commensalism

**Answer: 4**

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6. Justify the need for signing of 'Montreal Protocol' by the participating nations in 1987.

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7. In angiosperms, zygote is diploid while primary endosperm cell is triploid. Explain

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8. A cross between a red flower bearing plant and a white flower bearing plant of *Antirrhinum* produced all plants having pink flowers. Work out a cross to explain how this is possible.



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9. List the two main propositions of Opain and Haldane.



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10. Write the events that take place when a vaccine for any disease is introduced into the human body.

Or " "

Why is a person with cuts and bruises following an accident administered tetanus antitoxin? Give a reasons.



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11. Name the bacterium responsible for the large holes seen in "Swiss Cheese" What are these holes due to?



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**12.** Name the source of the DNA polymerase used in PCR technique. Mention why it is used.



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**13.** Write any four ways used to introduce a desired DNA segment into a bacterial cell in recombinant technology experiments.



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**14.** Why is pro insulin so called ? How is insulin different from it?



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**15.** "It is possible that a species may occupy more than one trophic level in the same ecosystem at the same time." Explain with the help of one example.



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**16.** Why are human females rarely haemophilic? Explain.  
How do haemophilic patients suffer?



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**17.** Describes how biogas is generated from activated sludge. List the components of biogas.



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**18.** Name the pest that destroys the cotton bolls. Explain the role of bacillus thuringensis in protecting the cotton crop against the pest to increase the yields.



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19. a) Write the importance of measuring the size of a population in a habitat or an ecosystem.

b) Explain with the help of an example how the percentage cover is a more meaningful measure of population size than mere numbers.



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20. Differentiate between two different types of pyramids of biomass with the help of one example of each.



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21. a) Describe the endosperm development in coconut.

b) Why is tender coconut considered a healthy source of nutrition?

c) How are pea seeds different from castor seeds with respect to endosperm?



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22. "Stability of a community depends on its species richness." Write how did David Tilman show this experimentally.



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**23.** Name all the haploid cells present in an unfertilized mature embryo-sac of a flowering plant. Write the total number of cells in it.



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**24.** In a typical monohybrid cross the  $F_2$ -population ratio is written as 3:1 for phenotype but expressed as 1:2:1 for genotype. Explain with the help of an example.



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25. Mention the contribution of S.L. Miller's experiments on Origin of Life.



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26. Alien species are a threat to native species. Justify taking example of an animal and a plant alien species.



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27. Differentiate between the two cells enclosed in a mature male gametophyte of an angiosperm.



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**28.** Work out a cross to find the genotype of a tall pea plant. Name the type of cross.

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**29.** Why do algae and fungi shift to sexual mode of reproduction just before the onset of adverse conditions?

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**30.** A cross was carried out between two pea plants showing the contrasting traits of height of the plant. The result of the cross showed 50% of parental characters.

- i) Work out the cross with the help of a Punnett square.
- ii) Name the type of the cross carried out.

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**31.** How does the gene 'I' control ABO blood groups in humans? Write the effect the gene has on the structure of red blood cells.'

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**32.** Write the types of sex-determination mechanisms the following crosses show. Give an example of each type.

i) Female XX with Male XO

ii) Female ZW with male ZZ



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**33.** i) Name the scientist who suggested that the genetic code should be made of a combination of three nucleotides.

ii) Explain the basis on which he arrived at this conclusion.



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**34.** State the disadvantage of inbreeding among cattle.

How it can be overcome?



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**35.** Explain with the help of a suitable example, the naming of a restriction endonuclease.



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**36.** Construct an age pyramid which reflects a stable growth status of human population.



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**37.** Apart from being part of the food chain, predators play other important roles. Mention any two such roles supported by examples.



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**38.** How are 'sticky ends' formed on a DNA strand? Why are they so called ?

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**39.** i) Name the scientist who suggested that the genetic code should be made of a combination of three nucleotides.

ii) Explain the basis on which he arrived at this conclusion.

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**40.** What is gene therapy? Name the first clinical case where it was used.

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**41.** Why does the Bt toxin not kill the bacterium that produces it but kills the insect that ingests it?

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**42.** Identify the following pairs of Homologous or Analogous organs:

i) Sweet potato and potato

ii) Eye of octopus and eye of mammals

iii) Thorns of Bougainvillea and tendrils of Cucurbits.

iv) Fore limbs of Bat and Whale.



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**43.** List the post-fertilization events in angiosperms.



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**Section C**

1. (a) Draw an L.S. of pistil showing pollen tube entering into the embryo sac. Label the following :

(i) Nucellus (ii) Antipodals

(iii) Synergids (iv) Micropyle

(b) Write the functions of the following :

(i) Synergids (ii) Micropyle



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2. Name the kind of diseases/disorders and any two symptoms that are likely to occur in humans if:

(a) Mutation in the gene that codes for an enzyme



phenylalanine hydroxylase occurs.

(b) The karyotype is XXY.



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3. Name the technique and the property of plant cells that can help to grow somaclones of certain desired variety of apple. Explain how somaclones of apple can be obtained in the lab so as to get the desired variety on a large scale.



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4. Give reasons why :

(a) DNA cannot pass into a host cell through the cell membrane.

(b) Proteases are added during isolation of DNA for genetic engineering.

(c) Single cloning site is preferred in a vector.



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5. State the medicinal value and the bioactive molecules produced *Penicillium notatum*, *Monascus purpureus* and *Trichoderma polysporum*.



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6. Explain the steps in the formation of an ovum from an oogonium in humans.

or " "

Suggest and explain any three Assisted Reproductive Technologies (ART) to an infertile couple.



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7. a) Explain "birth rate" in a population by taking a suitable example.

b) Write the other two characteristics which only a population shows but an individual cannot.



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8. a) Explain DNA polymorphism as the basis of genetic mapping of human genome.

b) State the role of VNTR in DNA fingerprinting.



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9. a) Explain "death rate" in a population by taking a suitable example.

b) Write the other two characteristics which only a population shows but an individual cannot.



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**10.** Explain any three advantages the seeds offer to angiosperms.

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**11.** Name and explain the role of inner and middle walls of the human uterus.

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**12.** A color-blind child is born to a normal couple. Work out a cross to show how it is possible. Mention the sex of this child.



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**13.** Mendel published his work on inheritance of characters in 1865, but it remained unrecognized till 1900. Give three reasons for the delay in accepting his work.



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**14.** Women are often blamed for producing female children. Consequently, they are ill treated and ostracized. How will you address this issue scientifically if you were to conduct an awareness programme to highlight the values involved?



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**15. a)** Name the tropical sugar cane variety grown in South India. How has it helped in improving the sugar cane quality grown in North India?

b) Identify 'a', 'b' and 'c' in the following table:

No.	Crop	Variety	Insect Pests
1.	Brassica	Pusa Gaurav	(a)
2.	Flat bean	Pusa Sem 2 Pusa Sem 3	(b)
3.	(c)	Pusa Sawani Pusa A-4	Shoot and fruit borer



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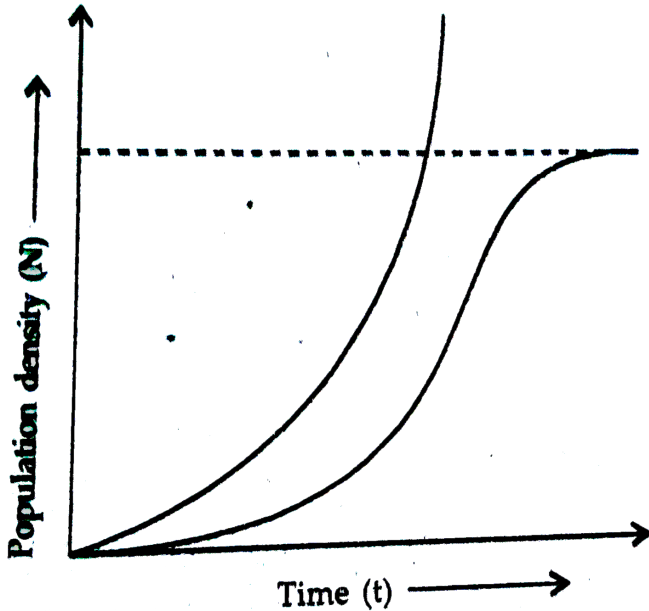
16. Why are beehives kept in crop field during flowering period? Name any two crop fields where this is practiced.



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17. Study the graph given below and answer the questions that follow:



- i) Write the status of food and space in the curves a) and b).
- ii) In the absence of predators, which one of the two curves would appropriately depict the prey population?
- iii) Time has been shown on X-axis and there is a

parallel dotted line above it. Give the significance of this dotted line.



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**18. i)** What is primary productivity? Why does it vary in different types of ecosystem?

**ii)** State the relation between gross and net primary productivity.



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**19.** A cross between a normal couple resulted in a son who was haemophilic and a normal daughter. In course of time, when the daughter was married to a normal man, to their surprise, the grandson was also haemophilic.

a) Represent this cross in the form of pedigree chart.

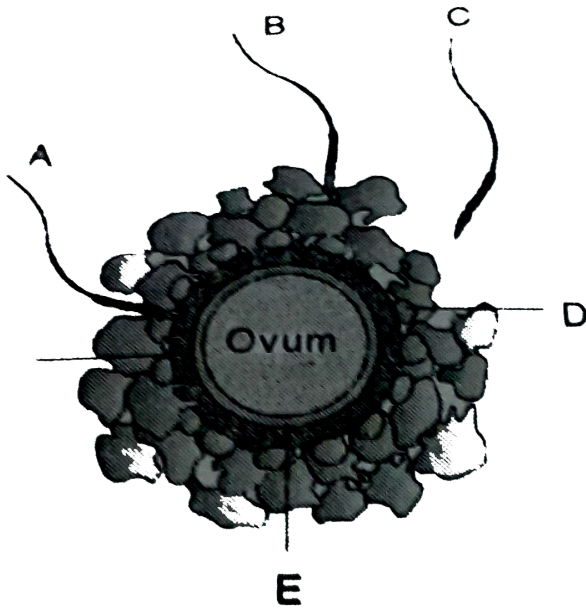
Give the genotypes of the daughter and her husband.

b) Write the conclusion you draw of the inheritance pattern of this disease.



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1. Given below is the diagram of a human ovum surrounded by a few sperms. Study the diagram and answer the following questions :



(a) Which one of the sperms would reach the ovum earlier ?

(b) Identify 'D' and 'E'. Mention the role of 'E'.

(c ) Mention what helps the entry of sperm into the

ovum and write the changes occurring in the ovum during the process.

(d) Name the specific region in the female reproductive system where the event represented in the diagram takes place.



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2. Study the schematic representation of the genes involved in the lac operon given below and answer the questions that follow :

*p i p o z y a*

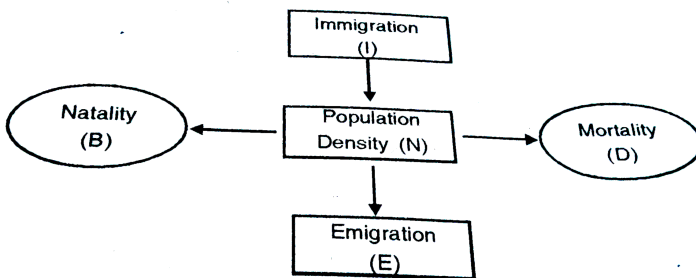
(a) Identify and name the regulatory gene in this operon. Explain its role in 'switching off' the operon.

(b) Why is the lac operon's regulation referred to as negative regulation ?

(c) Name the inducer molecule and the products of the genes 'z' and 'y' of the operon. Write the functions of these gene products.

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3. (a) Study the flow chart given below and complete the equation that follows by identifying 1, 2, 3 and 4.



(b) Mention the different ways by which the population density of different species can be measured.



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4. Draw a diagrammatic sectional view of a human seminiferous tubule, and label sertoli cells, primary spermatocyte, sperm-atogonium and spermatozoa init.

b) Explain the hormonal regulation of the process of spermatogenesis in humans.



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5. Explain the mechanism of sex-determination in humans.

b) Differentiate between male heterogamety and female heterogamety with the help of an example of each.



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6. A person in your colony has recently been diagnosed with AIDS. People/residents in the colony want him to leave the colony for the fear of spread of AIDS.

a) Write your view on the situation, giving reasons.

b) List the possible preventive measures that you



would suggest to the residents of your locality in a meeting organised by you so that they understand the situation.

c) Write the symptoms and the causative agents of AIDS.



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7. a) Write the specific features of the genetic code AUG.

b) Genetic codes can be universal and degenerate. Write about them, giving one example of each.

c) Explain aminoacylation of the tRNA.



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8. a) Differentiate between dominance and co-dominance.

b) Explain co-dominance taking an example of human blood groups in the population.

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9. How does the process of natural selection affect Hardy-Weinberg equilibrium? Explain List the other four factors that disturb the equilibrium.

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10. Explain Mendel's law of independent assortment by taking a suitable example.

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11. How did Morgan show the deviation in inheritance pattern in *Drosophila* with respect to this law?

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12. a) Why does endosperm development precede development in angiosperm seeds? State the role of endosperm in mature albuminous seeds.

b) Describe with the help of three labelled diagrams the different embryonic stages that include mature embryo of dicot plants.

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**13.** Explain the ovarian and uterine events that occur during a menstrual cycle in a human female, under the influence of Pituitary and Ovarian hormones respectively.

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1. Why is banana considered a good example of parthenocarpy?



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2. State two different roles of spleen in the human body.



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3. A garden pea plant produced axial white flowers. Another of the same species produced terminal violet flowers. Identify the dominant traits.



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4. Why is it desirable to use unleaded petrol in vehicles fitted with catalytic converters?



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5. Where is acrosome present in humans? Write its function.



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**6.** Write the name of the following:

(a) The most common species of bees suitable for apiculture

(b) An improved breed of chicken



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**7.** Comment of the similarity between the wing of a cockroach and the wing of a bird. What do you infer from the above, with reference to evolution?



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8. Mention the role of cyanobacteria as a biofertiliser.

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## Set I Section B

1. (a) Draw a neat labelled diagram of a nucleosome.

(b) Mention what enables histones to acquire a positive charge.

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2. State one advantage and one disadvantage of cleistogamy.

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3. (a) Where do the signals for parturition originate from in humans?

(b) Why is it important to feed the newborn babies on colostrum?

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4. (a) A recombinant vector with a gene of interest inserted within the gene of beta-galactosidase enzyme, is introduced into a bacterium. Explain the method that would help in selection of recombinant colonies from non-recombinant ones.

(b) Why is this method of selection referred to as "insertional inactivation"?

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5. Explain brood parasitism with the help of an example.

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6. Give reasons for the following:

(a) The human testes are located outside the abdominal cavity.

(b) Some organisms like honey-bees are called parthenogenetic animals.



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7. Name the plant source of ganja. How does it affect the body of the abuser?

Or

Name the two special types of lymphocytes in humans.

How do they differ in their roles in immune response?



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8. The two special types of lymphocytes in humans are :



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9. (a) Mention the cause and the body system affected by ADA deficiency in humans.

(b) Name the vector used for transferring ADA-DNA

into the recipient cells in humans. Name the recipient cells.



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**10.** How did Ahmed Khan, plastic sacks manufacturer from Bangalore, solve the ever-increasing problem of accumulating plastic waste?



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**11.** Name the bacterium that causes typhoid. Mention two diagnostic symptoms. How is this disease

transmitted to others?



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## Set I Section C

1. (a) Explain the phenomena of multiple allelism and co-dominance taking ABO blood group as an example.

(b) What is the phenotype of the following :

(i)  $I^A i$

(ii)  $ii$



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2. How does industrial melanism support Darwin's theory of Natural Selection? Explain.



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3. (a) What is the programme called that is involved in improving success rate of production of desired hybrid and herd size of cattle?

(b) Explain the method used for carrying this programme for cows.



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4. Explain the function of each of the following :

(a) Coleorhiza , ( b) Umbilical cord ,( c) Germ pores



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5. Trace the life-cycle of malarial parasite in the human body when bitten by an infected female Anopheles.



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6. List the salient features of double helix structure of DNA.



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7. Alien species are highly invasive and are a threat to indigenous species. Substantiate this statement with any three examples.



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## Set I Section D

1. (a) Taking one example each of habitat loss and fragmentation, explain how are the two responsible for biodiversity loss.

(b) Explain two different ways of biodiversity conservation.



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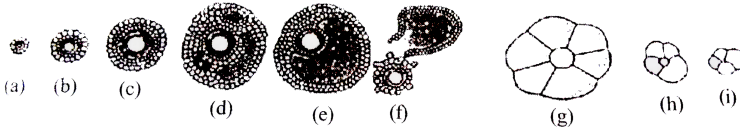
2. (a) What depletes ozone in the stratosphere? How does this affect human life?

(b) Explain biomagnification of DDT in an aquatic food chain. How does it affect the bird population?



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3. The following is the illustration of the sequence of ovarian events "a" to "i" in a human female :



(a) Identify the figure that illustrates corpus luteum and name the pituitary hormone that influences its formation.

(b) Specify the endocrine function of corpus luteum.

How does it influence the uterus? Why is it essential?

(c) What is the difference between "d" and "e"?

(d) Draw a neat labelled sketch of Graafian follicle.

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4. (a) Why is fertilisation in an angiosperm referred to as double fertilisation? Mention the ploidy of the cell involved. (b) Draw a neat labelled sketch of L.S. or an endospermous monocot seed.



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5. (a) Explain a monohybrid cross taking seed coat colour as a trait in *Pisum sativum*. Work out the cross upto F generation.

(b) State the laws of inheritance that can be derived from such a cross.

(c) How is the phenotypic ratio of F<sub>2</sub> generation different in a dihybrid cross?



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## Set II Section A

1. How do the pollen grains of *Vallisneria* protect themselves?



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2. Name the respective pattern of inheritance where F<sub>2</sub> phenotype (a) does not resemble either of the two parents and is in between the two. (b) resembles only one of the two parents.



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3. How is the entry of only one sperm and not many ensured into an ovum during fertilisation in humans?



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## Set II Section B

1. Name the source organism that possesses Taq polymerase. What is so special about the function of this enzyme?



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2. Name the source of cyclosporin-A. How does this bioactive molecule function in our body?

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3. (a) Name the group of viruses responsible for causing AIDS in humans. Why are these viruses so named?

(b) List any two ways of transmission of HIV infection in humans, other than sexual contact.

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1. Differentiate between perisperm and endosperm giving one example of each



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2. (a) List any three ways of measuring population density of a habitat.

(b) Mention the essential information that can be obtained by studying the population density of an organism.



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## Set II Section D

1. (a) Explain the significance of ecological pyramids with the help of an example.  
  
(b) Why are the pyramids referred to as 'upright' or 'inverted'? Explain.



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2. ( a) Explain giving reasons why the tourists visiting Rohtang Pass or Mansarovar are advised to resume normal 'active life' only after a few days of reaching

there.

(b) It is impossible to find small animals in the polar regions. Give reasons.



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## Set Iii Section A

1. Identify the figure given below and the part labelled “A”.



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2. How do interferéns protect us?

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3. Name the interaction between a whale and the barnacles growing on its back.

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4. In a dihybrid cross, when would the proportion of parental gene combinations be much higher than non-parental types, as experimentally shown by Morgan and his group?



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## Set Iii Section B

1. Name and explain the two types of immune responses in humans.



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2. How does the study of different parts of a flower help in identifying wind as its pollinating agent?



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1. Explain how do the following act as contraceptives :

(a) CuT (b) “Saheli”



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2. (a) Why is it that the father never passes on the gene for haemophilia to his sons? Explain.

(b) State the functions of the following in a prokaryote

:

(i) tRNA, (ii) rRNA



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## Set Iii Section D

1. (a) A garden pea plant bearing terminal, violet flowers, when crossed with another pea plant bearing axial, violet flowers, produced axial, violet flowers and axial, white flowers in the ratio of 3 : 1.

Work out the cross showing the genotypes of the parent pea plants and their progeny.

(b) Name and state the law that can be derived from this cross and not from a monohybrid cross.



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2. (a) Describe this process of synthesis of fully functional mRNA in a eukaryotic cell.

(b) How in the process of mRNA synthesis different from that in prokaryotes?

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## Outside Delhi Set II Section A

1. Write the basis on which an organism occupies a space in its community/natural surroundings.

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2. Name an alga that reproduce asexually through zoospores. Why are these reproductive units so called?

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## Outside Delhi Set Iii Section A

1. What is a detritus food chain made up of? How do they meet their energy and nutritional requirements?

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2. Name the phenomenon and one bird where the female gamete directly develops into a new organism.

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## Section D

1. a) Coconut palm is monoecious, while date palm is dioecious. Why are they so called?

b) Draw a labelled diagram of sectional view of a mature embryo sac of an angiosperm.

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2. a) Explain the process of DNA replication with the help of a schematic diagram.

b) In which phase of the cell cycle does replication occur in Eukaryotes? What would happen if cell-division is not followed after DNA replication?



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3. a) Explain Darwinian theory of evolution with the help of one suitable example. State the two key concepts of the theory.

b) Mention any three characteristics of Neanderthal man that lived in near east and central Asia.

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4. a) Name the technology that has helped the scientists to propagate on large scale the desired crops in short duration, List the steps carried out to propagate the crops by the somatic technique.

b) How are somatic hybrids obtained?

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5. a) Cancer is one of the most dreaded diseases of humans. Explain 'Contact inhibitions' and 'Metastasis' with respect to the disease.

b) Name the group of genes which have been identified in normal cells that could lead to cancer and how they do so?

c) Name any two technique which are used to detect cancers of interorgans?

d) Why are cancer pateints often given a-interferon as part of the treatment.



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6. Mention how does DNA polymorphism arise in a population.



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7. Write the name of the organism that is referred to as the "Terror of Bengal".

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8. a) Draw a labelled diagrammatic view of human male reproductive system.

b) Differentiate between:

i) Vas deferens and vasa efferentia

ii) Spermatogenesis and spermeogenesis

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9. a) Explain the phenomenon of double fertilization.
- b) Describe the post-zygotic events leading to implantation and placenta formation in humans. Mention any two functions of placenta.



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10. A national newspaper reported that a 50 metre high 'Sanitary landfill', the dumping site of city's garbage in one of the metro-cities crashed and caused heavy damage and disaster in and around the area. A couple of cars, two-wheelers and cattle were swept away in the nearby overflowing canal. Three persons including a

young girl were crushed under the garbage and died.

(a) Write any two points that in your opinion could have caused this landfill crash.

(b) Mention any four preventive measures to be adhered to as a policy which could have avoided this a accident.

(c) Write any two suggestions that you would like to give to the citizens so as to help in preventing such a disaster in future.



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**11.** (a) Draw a diagram of the adult human female reproductive system and label the different :

(i) parts of fallopian tube It,brgt (ii) layers of uterus wall

(b) Explain the events during fertilization of an ovum in humans.



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**12.** (a) Draw a diagrammatic sketch of a transverse section of an anther of an angiosperm . Label its different walls and the tissue forming microspore mother cells.

(b) Describe the process of microsporogenesis upto the formation of a microspERM.



(c) Write the function of 'germ pore' in a pollen grain of an angiosperm.



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**13.** (a) Why does DNA replication occur in small replication forks and not in its entire length ?

(b) why is DNA replication continuous and discontinuous in a replication fork ?

(c) State the importance of origin of replication in a replication fork.



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**14.** Draw the pyramids of biomass in sea and in a forest.

Explain giving reasons why are the two pyramids different ?



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**15.** Describe the roles of heat , primers and the bacterium *Thermus aquaticus* in the process of PCR.



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**16.** Explain the steps involved in the production of genetically engineered insulin .



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17. (a) " Organisms may be conformers or regulators . "

Explain this statement and give one example of each.

(b) Why are there more conformers than regulators in the animals world ?



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18. Describe the inter - relationship between productivity , gross primary productivity and net productivity.



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**19.** A national newspaper reported that a 50 metre high 'Sanitary landfill', the dumping site of city's garbage in one of the metro-cities crashed and caused heavy damage and disaster in and around the area. A couple of cars, two-wheelers and cattle were swept away in the nearby overflowing canal. Three persons including a young girl were crushed under the garbage and died.

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(b) Describe the process of microsporogenesis upto the formation of a microspore.

(c) Write the function of 'germ pore' in a pollen grain of an angiosperm.



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22. (a) Why does DNA replication occur in small replication forks and not in its entire length ?

(b) why is DNA replication continuous and discontinuous in a replication fork ?

(c) State the importance of origin of replication in a replication fork.

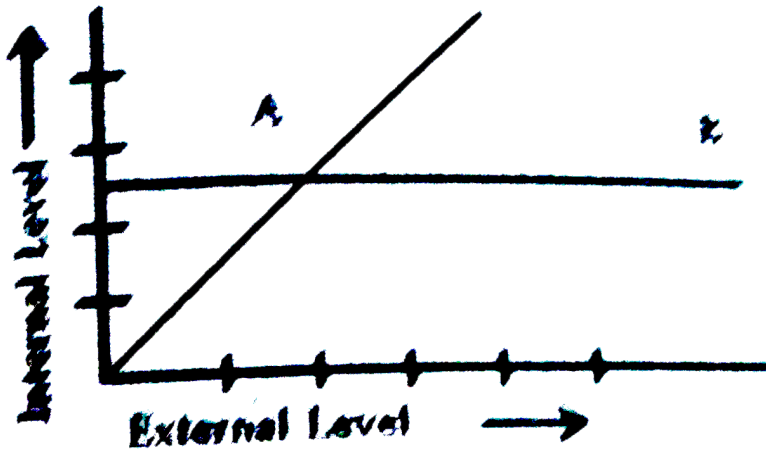
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**23.** (a) The graph given below represents the organisms response to temperature as an environmental condition.

(i) Which one of the two lines represents conformers and why ?

(ii) What does the other line in the graph represent and why ?

(b) Mention the different adaptations the parasites have evolved with, to be able to successfully complete their life cycles in their hosts.



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24. Draw the pyramids of biomass in sea and in a forest.

Explain giving reasons why are the two pyramids different ?





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25. Describe the roles of heat , primers and the bacterium *Thermus aquaticus* in the process of PCR.



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26. Explain the various steps involved in the production of artificial insulin



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27. (a) " Organisms may be conformers or regulators . "

Explain this statement and give one example of each.

(b) Why are there more conformers than regulators in the animals world ?

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28. Describe the inter - relationship between productivity , gross primary productivity and net productivity.

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## Delhi Board Set Ii Section A

1. Name the two intermediate hosts which the human liver fluke depends on to complete its life cycle so as to facilitate parasitization of its primary host.



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## Delhi Board Set Iii Section A

1. How is repetitive/satelite DNA separated from bulk genomic DNA for various genetic experiments?



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2. Name the Green House gas that contribute to total global warming.



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## Section A

1. Write the two pre-fertilization events from the list give below :

Syngamy, Gametogenesis, Embroyogenesis, Pollination



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2. Name an IUD that you would recommend to promote the cervix hostility to the sperms.

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3. what is 'saltation' according to de Vries ?

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4. Identify the two correct statements from the following :

- (i) Apiculture means apical meristem culture.
- (ii) Spinach is iron-enriched.

(iii) Green revolution has resulted in improved pulse-yields.

(iv) Aphids cannot infest rapeseed mustard.

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5. A boy has been diagnosed with ADA-deficiency. Suggest any one possible treatment.

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6. What does 'R' represent in the given equation for productivity in an ecosystem ?

$$GPP - R = NPP$$



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7. Where is good ozone present ? Why is it called so ?



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8. How many kinds of phenotypes would you expect in  $F_2$  generation in a monohybrid cross exhibiting co-dominance ?



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

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

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





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12. What are Cry genes ? In which organism are they present?



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13. 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 .



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

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

 [Watch Video Solution](#)

**16.** A herd of cattle is showing reduced fertility and productivity . Provide one reason and one suggestion to overcome this problem.



[Watch Video Solution](#)

**17.** What are Cry genes ? In which organism are they present?



[Watch Video Solution](#)

**18.** 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 .



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## Section B

1. Banana crop is cultivated by farmers without sowing of seeds. Explain how the plant is propagated.



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2. List the different parts of the human oviduct through which the ovum travels till it meets the sperm for fertilization.



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3. Explain aminoacylation of t-RNA.

 [Watch Video Solution](#)

4. Name an allergen and write the response of the human body when exposed to it.

 [Watch Video Solution](#)

5. List four causes of biodiversity loss.

 [Watch Video Solution](#)

6. Name two metals used in a catalytic converter. How do they help in keeping the environment clean ?



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7. A pollen grain in angiosperm at the time of dehiscence from an anther could be 2-celled or 3-celled . Explain . How are the cells placed within the pollen grain when shed at -a 2 - celled stage ?



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**8. Differentiate between the genetic codes given below**

:

(a) Unambiguous and Universal

(b) Degenerate and Initiator :



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**9. Mention one application for each of the following :**

(a) Passive immunization

(b) Antihistamine

(c) Colostrum

(d) Cytokinin - barrier



**Watch Video Solution**

**10.** Name the microbes that help production of the following products commercially :

(a) Statin

(b) Citric acid

( c) Penicillin

(d) Butyric acid



**Watch Video Solution**

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



**Watch Video Solution**



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



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## Delhi Board Set Ii Section A

1. Name the type of evolution that has resulted in the development of structures like wings of butterfly and bird. What are such structures called ?

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1. Explain commensalism, with the help of an example.

 [Watch Video Solution](#)

2. Show DNA replication with the help of a diagram only.

 [Watch Video Solution](#)

3. Write the scientific name of the source plant of the drugs, marijuana and hashish and mention their effect

on the human body.

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## Delhi Board Set II Section C

1. Name two commonly used bioreactors.

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2. Explain polygenic inheritance with the help of a suitable example.

 [Watch Video Solution](#)

3. Explain the process of translation.



[Watch Video Solution](#)

## Set I

1. Name the enzyme that transcribes hnRNA in eukaryotes.



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2. Name the interaction that exists between *Cuscuta* and shoe-flower plant.



[Watch Video Solution](#)

3. State the chromosomal defect in individuals with Turner's syndrome.

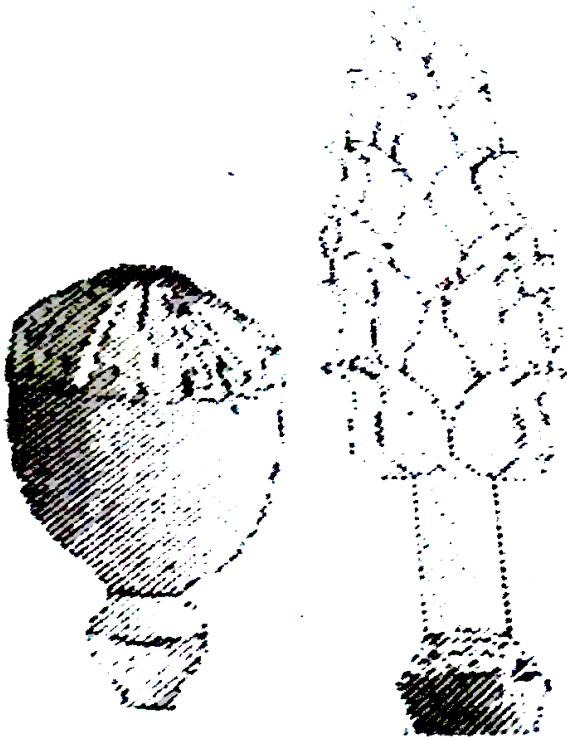


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4. These pictures show the gynoecium of (A) *Papaver* and (B) *Michelia* flowers. Write the difference in the



structure of their ovaries.



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5. Mention the economic value of *Apis indica*.

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6. Shark is eurythermal while polar bear is stenothermal. What is the advantage the former has and what is the constraint the later has ?

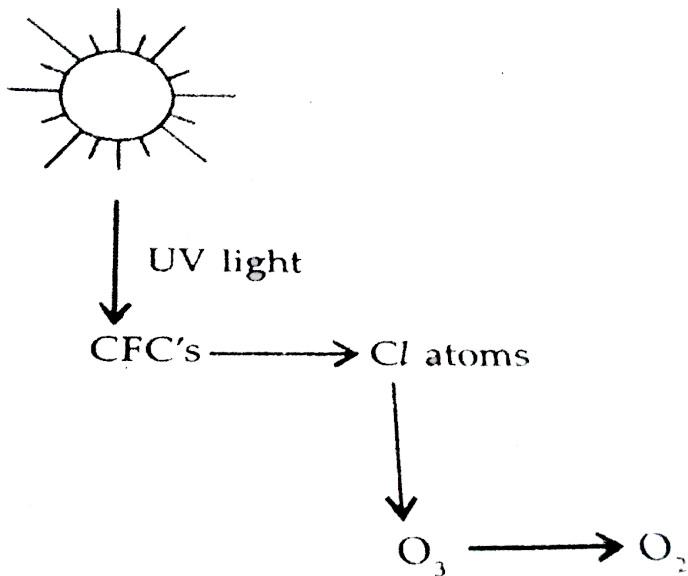


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7. What is EcoRI ? How does EcoRI differ form an exonuclease ?



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8.

(a) What are the after effects of the degradation of ozone ?

(b) How does it affect human health ?

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**9.** A childless couple has agreed for a test tube baby programme. List only the basic steps the procedure would involve to conceive the baby.



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**10.** Banana fruit is said to be parthenocarpic where as turkey is said to be parthenogenetic. Why ?



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**11.** Is sweet potato analogous or homologous to potato tuber ? Give reasons to support your answer.

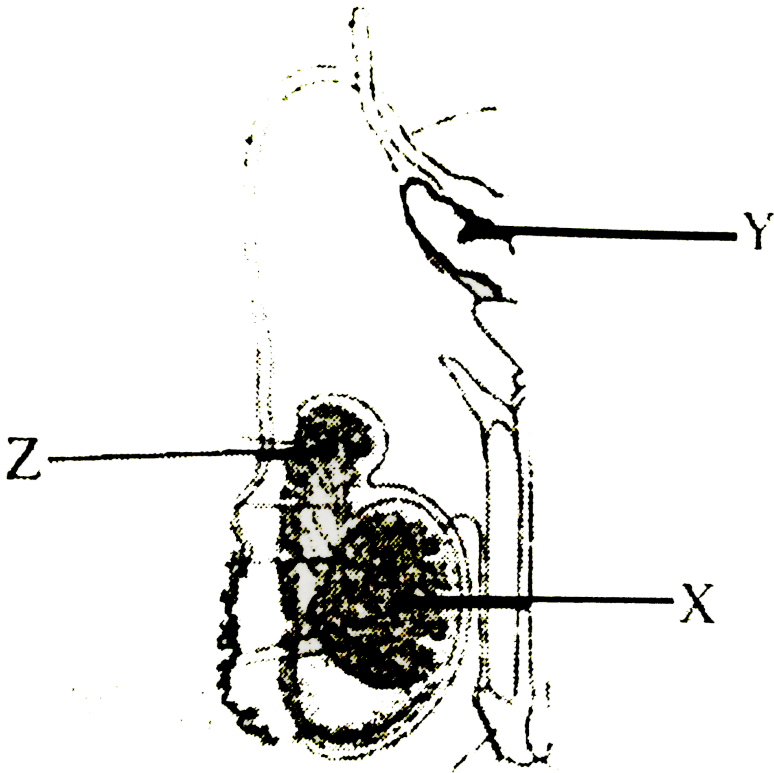


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**12.** Our farmers still use DDT. How is the affecting the local bird population ?



**Watch Video Solution**



13.

The above diagrams shows human male reproductive system (one side only )

- (a) Identify 'X' and write its location in the body .
- (b) Name the accessory gland 'Y' and its reaction.
- (c) Name and state the function of 'Z'.





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14. What do you infer from the resemblance between flying squirrel and flying phalanger with reference to their evolution.



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15. (a) Differentiate between a template strand and coding strand of DNA.

(b) Name the source of energy for the replication of DNA



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**16.** Explain succession of plants in xerophytic habitat until it reaches climax community .



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**17.** A sugarcane has been affected by virus. How can a virus free can be developed from it ? Explain the procedure.



**Watch Video Solution**



**18.** Why is DNA a better genetic material when compared to RNA ?

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**19.** How does a detritivore differ from a decomposer ?  
Explain with an example each.

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**20.** Explain the events in a normal woman during her menstrual cycle on the following days.

Ovarian event from 13-15 days

(b) Ovarian hormones level from 16 to 32 days

(c) Uterine events from 24 to 29 days.



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**21.** A youth in his twenties met with an accident and succumbed to the injuries. His parents agreed to donate his organs. List any two essential clinical steps to be undertaken before any organ transplant. Why is the transplant rejected sometimes ? What views would you share with your health club members to promote organ donation ?



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22. (a) Dihybrid cross between two garden pea plant one homozygous tall with round seeds and the other with wrinkled seeds was carried.

(i) Write the genotype and phenotype of the  $F_1$  progeny obtained from this cross.

(ii) Give the different types of gametes of the  $F_1$  progeny.

(iii) Write the phenotypes and its ratios of the  $F_2$  generation obtained in this cross along with the explanation provided by Mendel.

(b) How were the observations of  $F_2$  progeny of dihybrid crosses in Philosophical by Morgan different

from that of Mendel carried in Pea plants ? Explain giving reasons.



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**23.** Unless the vector and source DNA are cut, fragments separated and joined, the desired recombinant vector molecule cannot be created.

- (a) How are the desirable DNA sequences cut ?
- (b) Explain the technique used to separate the cut fragments.
- (c) How are the resultant fragments joined to the vector DNA molecule ?



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24. (a) Draw a diagram of a fertilized embryo sac of a dicot flower. Label all its cellular components.

(b) Explain the development of a mature embryo from this embryo



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Set li

1. Why is RNA more reactive in comparison to DNA ?



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2. Name the interaction that exists between sucker fish and shark.



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3. In what way is monocyte a cellular barrier with reference to immunity?



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4. Mention the function of (a) Zona pellucida (b) Coleorhiza



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5. Explain with the help of an example the type of evolution homology is based on.

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6. Why do people suffer from altitude sickness after reaching the high altitude regions ? How does their body acclimatized after a couple of days ?

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7. What is the functional difference between B cells and T cells.

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8. (b) Name the source used to produce hepatitis B vaccine rDNA technology.

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9. How do "Pleiotropy", "incomplete dominance", "co-dominance" and "polygenic inheritance" deviate from



the observation made by Mendel ? Explain with the help of one example for each.



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## Set Iii

1. Name the negatively charged and positively charged components of a nucleosome.



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2. Name the interaction between a whale and the barnacles growing on its back.



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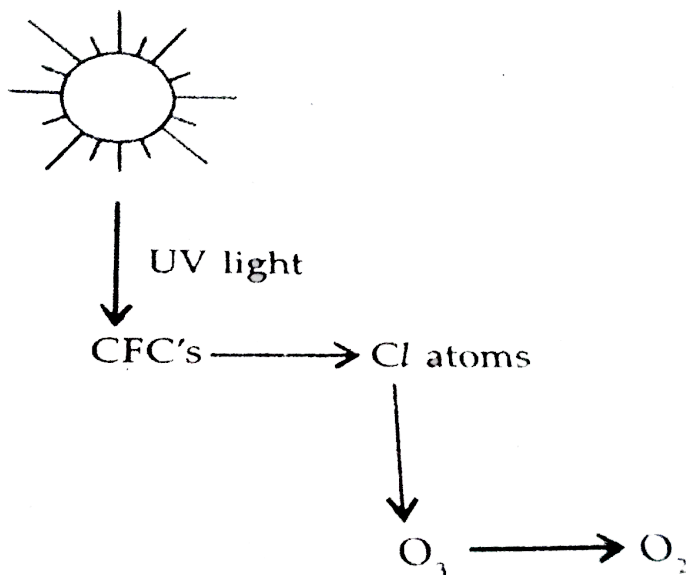
3. How do cytokine barriers help in evading viral infections ?



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4. How do mammals living in colder regions and seals living in polar regions able to reduce the loss of their body heat ?

 Watch Video Solution



5.

(a) What are the after effects of the degradation of ozone ?

(b) How does it affect human health ?

 Watch Video Solution

6. What is chance mutation ? Explain this phenomenon using application of DDT as an example .



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7. (a) State what happens in the human body when malarial parasites infected RBCs burst to release the parasites in the blood.

(b) Mention the specific sites in the host body where production of

(i) sporozoites and (ii) gametocytes take place in the life cycle of the malarial parasites.



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8. (a) Draw a labelled diagram of the sectional view of microsporangium of an angiosperm.

(b) Explain the development of male gametophyte in the microsporangium.

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9. (a) Name the hormone that initiates spermatogenesis in humans. Describe the process of spermatogenesis in sequence mentioning the ploidy of the cells at each step.

(b) Draw the diagram of a mature human sperm and

label the parts that : (i) helps it reaching to the ovum .

(ii) providing energy for it to reach the ovum. (iii)

helping it to gain entry into the ovum.

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## Set I Section A

1. Write the two specific codons that a translational unit of mRNA is flanked by one on either sides.

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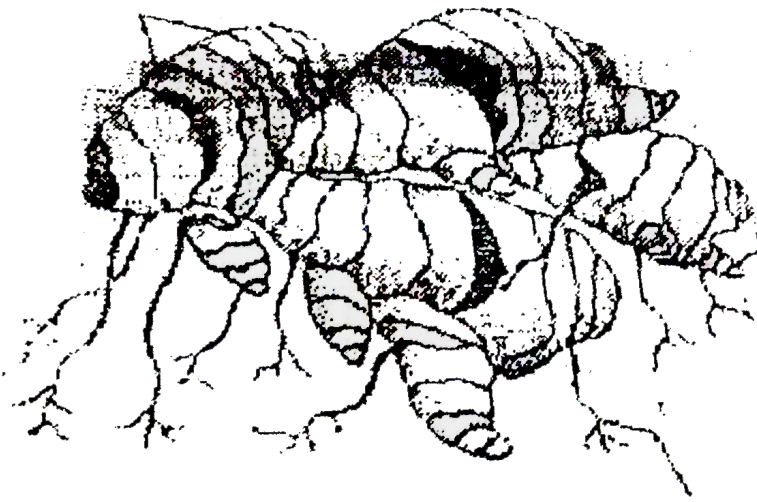
2. State the type of interaction that exists between ticks and dogs.

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3. Write the chromosomal defect in individuals affected with Klinefelter's syndrome.

 [Watch Video Solution](#)

4. Identify the picture and mention the vegetative part that helps it to propagate.



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5. State the economic value of *Saccharum officinarum* in comparison to *S. barberi*.



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1. State the functions of Ribosome and release factor in protein synthesis respectively.



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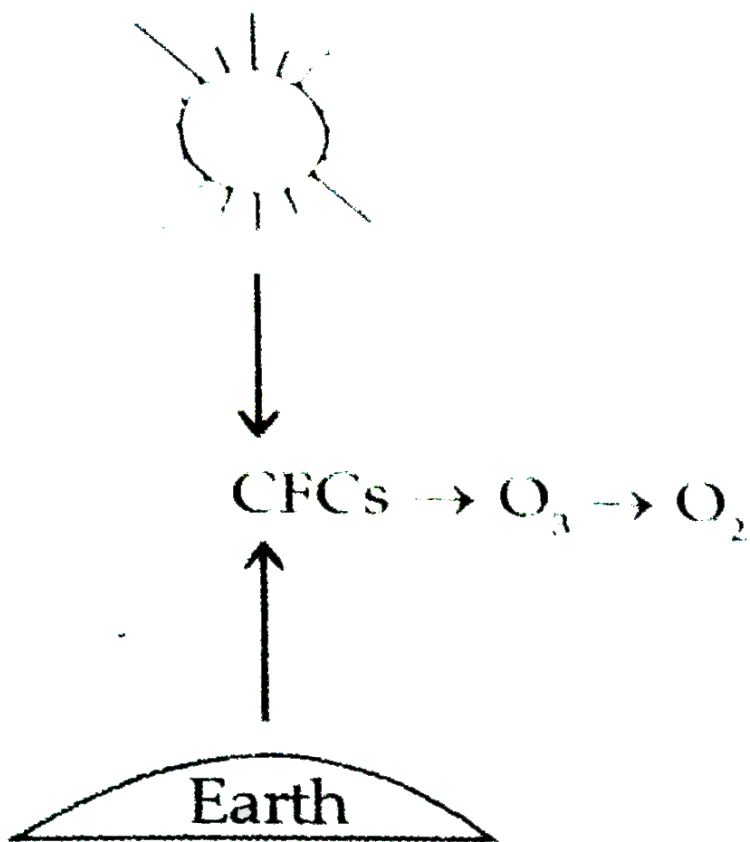
2. Write the functions of

(a) cry IAC gene

(b) RNA interference (RNAi)



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3.

(a) Expand CFC.

(b) How does it reduce ozone to oxygen ?

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4. What happens to corpus luteum in human female if the ovum is (i) fertilized, (ii) not fertilized ?



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5. Write the difference between the tender coconut water and the thick, white kernel of a mature coconut and their ploidy.



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6. State the evolutionary relationship giving reasons between the thorn of Bougainvillea and tendril of

cucurbit.



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## Set I Section C

1. Mention the cause of ADA deficiency in humans. How has genetic engineering helped patients suffering from it ?



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2. Drinking water problem in our urban' areas is caused mainly because we fail to protect our water bodies.

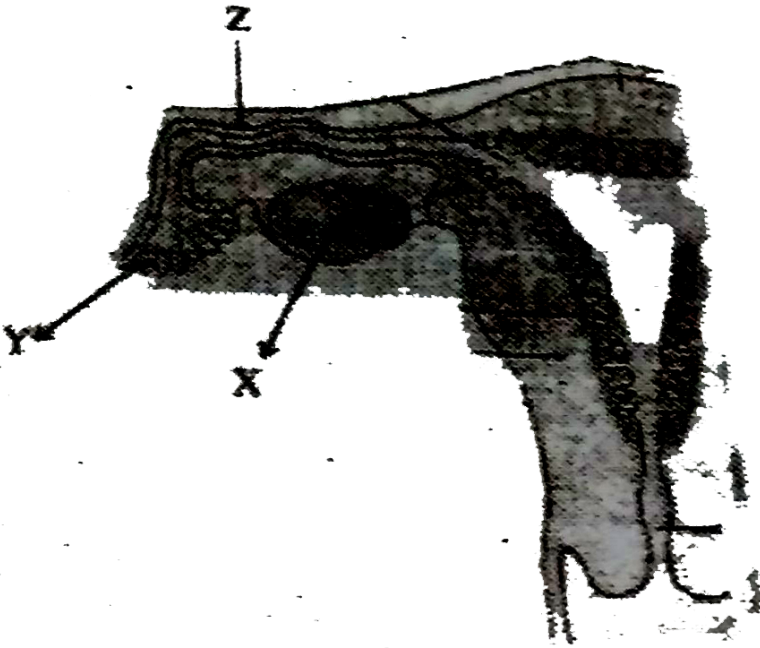
Explain how accelerated eutrophication chokes our water bodies to death.

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3. (a) Differentiate between benign and malignant tumours.

(b) Why is colostrum a boon to the newborn baby ?

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4.

The diagram above shows a part of the human female reproductive system.

(a) Name the gamete cells that would be present in 'X' if taken from a newborn baby.

(b) Name 'Y' and write its function.

(c) Name 'Z' and write the events that take place here.



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5. How does the study of fossils support evolution ?

Explain.



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6. What does Hardy-Weinberg Principle of equilibrium indicate? List any two factors that could alter the equilibrium. What would such an alteration lead to?



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7. mention any two human diseases caused by round worms. Name their causative agents and their mode of transmission into the human body.



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8. (a) Differentiate between exons and introns.

(b) What is a plasmid? Why is it selected as vector?



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9. What is ecological succession? Where and why would the rate of succession be faster in newly created pond



or a forest destroyed by a forest fire ?



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**10.** High yielding cattle is a good solution for food enhancement. How does the MOET technology help to increase the herd size ?



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**11.** If there is a history of haemophilia in the family, the chances of male members becoming haemophilic are more than that of the female.

(a) Why is it so ?

(b) Write the symptoms of the disease.



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**12.** Why do tribes who live in high altitude of Himalayas experience discomfort in respiration? How do they get adapted to survive in such a situation?



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**13.** Explain the events in a normal woman during her menstrual cycle on the following days :

(a) Pituitary hormone levels from 8 to 12 days.

(b) Uterine events from 13 to 15 days.

(c) Ovarian events from 16 to 23 days.



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## Set I Section D

1. Peer pressure plays a negative role in triggering smoking habits in adolescents. As a school captain list any two activities you would like to organize with the help of senior students of your school and any other two activities you would like your school authorities to

organize for the students to tackle this problem.

Explain how the activities will help in doing so.



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## Set I Section E

1. (a) What is Central dogma? Who proposed it?

(b) Describe Meselson and Stahl's experiment to prove that the DNA replication is tsemi-conservative.



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2. (a) A couple with blood groups 'A' and 'B' respectively have a child with blood group 'O'. Work out a cross to show how it is possible and the probable blood groups that can be expected in their other off-springs.

(b) Explain the genetic basis of blood groups in human population.

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3. Explain the application of rDNA technology to produce insulin.

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4. (a) Describe the different steps in one complete cycle of PCR.

(b) State the purpose of such an amplified DNA sequence.



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5. (a) Describe the process of microsporogenesis in angiosperms.

(b) Draw a labelled diagram of a two celled final structure formed.



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6. (a) Draw a sectional view of a seminiferous tubule of human. Label sertoli cell, spermatagonia and leydig cell on it and write their functions.

(b) Explain the role of pituitary and sex hormones in the process of spermatogenesis.



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## Set II Section A

1. Name the type of interaction seen between fig and wasps.



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2. Why do we add an inoculum of curd to milk for curdling it



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## Set II Section B

1. Koel is clever enough to lay eggs in a Crow's nest. Write the reason for this peculiar behaviour. Name the type of interaction.



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1. Why do hermaphrodite angiosperms develop out breeding devices? Explain any two such devices with the help of examples.



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2. Draw pBR 322 cloning vector. Label 'ORI', '\_ROP' and any one antibiotic resistance site on it and state their functions.



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3. At what stage is Plasmodium picked up by the female Anopheles ? Describe the life cycle of the parasite in this insect.

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4. Why is predation important and required in a community with rich biodiversity ? Explain with the help of suitable examples.

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1. Sketch a schematic diagram of lac operon in switched on position. How is operon switched off? Explain.

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2. A tall pea plant bearing violet flowers is given with its unknown genotypes. Explain by working out the crosses how would you find the correct genotypes with respect to the two traits mentioned only by "selfing" the given plants.

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1. On what basis is the skin colour in humans considered polygenic ?



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2. How is lactic acid bacteria beneficial to us other than helping in curdling the milk?



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3. Why Western Ghats in India have been declared as biological hot-spots?

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Set Iii Section B

1. C-peptide of human insulin is :

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2. Name the first human like hominid. Mention his food habit and brain capacity.



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## Set Iii Section C

1. State the functions of the following in the cloning vector pBR322 :

(i) Ori,

(ii) rop, and

(iii) Hind III sites.



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2. What is 'predation' ? Explain with the help of suitable examples why is it required in a community with rich biodiversity.

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## Set Iii Section E

1. Explain the structure of t-RNA with the help of a diagram. Describe its role in the process of translation.

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2. Write the two specific codons that a translational unit of mRNA is flanked by one on either sides.



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## Set 1 Comptt

1. State one reason why breast-feeding the baby acts as a natural contraceptive for the mother.



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2. What will happen if DNA replication is not followed by cell division in a eukaryotic cell?



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3. State one reason for adding blue-green algae to the agricultural soil.



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4. Name the material used as matrix in gel-electrophoresis and mention its role.



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5. Write the level of biodiversity represented by a mangrove. Give another example falling in the same level.



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6. Name the two gases contributing maximum to the green house effect.



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7. What is amniocentesis? How is it misused ?



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8. Rearrange the following in increasing order of evolution?

Gnetales, Ferns, Zosterophyllum, Ginkgo



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9. Differentiate between active immunity and passive immunity.



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 [Watch Video Solution](#)

10. Differentiate between outbreeding and outcrossing.

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11. Name two groups of organisms which constitute 'flocs'. Write their influence on the level on BOD during biological treatment of sewage.

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**12.** Why is making cells competent essential for biotechnology experiments?

List any two ways by which this can be achieved.



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**13.** Write any two ways how genetically modified plants are found to be useful.



**Watch Video Solution**

**14.** Provide two reasons that make the counting of prokaryotic species difficult.



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**15.** How is apomixis different from parthenocarpy ?



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**16.** Describe any two modes by which apomictic seeds and be produced.



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17. What are the transcriptional products of RNA polymerase III?

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18. Differentiate between 'Capping' and 'Tailing'.

 [Watch Video Solution](#)

19. Expand hrRNA.

 [Watch Video Solution](#)

20. Giving three reasons, write how Hardy-Weinberg equilibrium can be affected.



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21. Do you support 'Dope' test being conducted on sportspersons participating in a prestigious athletic meet? Give three reasons in support of your answer.



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22. Draw and explain expanding age pyramids of human population. Why is it so called ?



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## Outside Delhi 2014 Set I Comptt

1. The carrying capacity of a population is determined by its

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2. All the following are limitations of ecological pyramids, except

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1. Identify and write the correct statement :

- (a) Drosophila male has one X and one Y chromosome.
- (b) Drosophila male has two X chromosomes.



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2. Give one example each of a plant that reproduces by

:

- (a) runner
- (b) offset



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3. Explain how natural selection operates in nature by taking an example of white winged and dark winged moths of England.



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4. Name a blood related autosomal Mendelian disorder. Why is it called Mendelian disorder? How is the disorder transmitted from parents to offsprings?



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5. Why are seeds of some grasses called apomictic?

Explain



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6. State two reasons to convince a farmer to use an apomictic crop.



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7. Explain the different phases of menstrual cycle and correlate the phases with the different levels, of ovarian hormones in a human female.



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**8.** Give one example each of a fungus which reproduces by :

(a) budding (b) conidia



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**9.** Identify and write the correct statement:

(a) In Grasshopper males two sex chromosomes are X and Y types

(b) In Grasshopper males there exist XO type of sex-determinants.



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## Outside Delhi Set Iii

1. Fish mortality increases with influx of nutrients in a fresh-water body' write two reasons. How will the influx of nutrients affect the BOD level of this water body?



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2. Name the disease that was first to get the gene therapy treatment. Write the cause of the disease and the effect it has on the patient.



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3. "Intra-cytoplasmic sperm injection" and "Gamete intra fallopian transfer" are two assisted reproductive technologies. How is one different from the other ?



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4. Differentiate between :

(a) Xenogamy and Geitonogamy

(b) Oviparous and Viviparous organisms

(c) Parthenogenesis and Parthenocarpy



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5. Explain with the help of a suitable example the inheritance of a trait where two different dominant alleles of a trait express themselves simultaneously in the progeny. Name this kind of inheritance pattern.



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6. Draw a longitudinal section of a pistil of an angiosperm showing the growth of the pollen tube up to the micropyle of the ovule.

Label (i) stigma, (ii) embryo sac, (iii) pollen tube (iv) micropyle.





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7. Explain the events that occur, upto fertilisation, when the compatible pollen grain lands on the stigma.



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8. Comment on the corresponding ovarian and pituitary hormone levels during these events.



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1. Name the condition in vertebrates where the body attacks self-cells.



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2. Write the function of a Bioreactor.



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3. A colour blind boy is born to a couple with a normal colour vision. Write the genotype of the parents.



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4. Mention any two conditions that enhance the chances of syngamy in organisms exhibiting external fertilization.



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5. a) Write the conclusion drawn by Griffith at the end of his experiment with *Streptococcus pneumoniae*.

b) How did O. Avery, C. MacLeod and M. McCarty prove that DNA was the genetic material? Explain.



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6. Plants like potato, sugarcane do not require seeds for producing new plants.

How do they produce new plants? Give two other examples where new plants are produced in the same way.



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7. Explain the role played by predators in a community.



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8. Name the first antibiotic discovered and by whom.



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9. What happens when chromatids fail to segregate during cell division cycle ?

Explain your answer with an example.



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10. ABO blood groups is a good example of co-dominance. Justify.



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11. What is the pathogenic property of baculovirus, used as a biological agents ?

Name the genus of these organisms.

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12. (a) What is an "allergic reaction"?

(b) Name any two drugs used to quickly reduce the symptoms of allergy.

(c) Why do more and more children in metro cities of India suffer from allergies and asthma ?

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**13.** List any two types of IUDs that are available for human females and state their mode of action.

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**14.** Mention the rule of (i) selectable marker, (ii) Ori and (iii) rop in E. coli cloning vector pBR322.

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**15.** Write the aim with which animal breeding programmes are carried. Describe the essential steps to be followed in Poultry management.



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**16. (a)** Draw a diagram of sectional view of human ovary and label (i) Primary follicle, (ii) Tertiary follicle, (iii) Graafian follicle and (iv) Corpus luteum.

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**17. (a)** Draw a diagram of Pistil showing pollen tube growth in angiosperm and label (i) Stigma, (ii) male gametes , (iii) micropyle and (iv) Ovule.

(b) Write the function of micropyle.

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**18.** What was the challenge for production of insulin using rDNA techniques ?

How did Eli Lilly produce insulin using rDNA technology?



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**19.** Name the organism from which the 'cry' genes are isolated. Mention with the help of suitable example why and how bio-technologists have made use of 'cry' genes.



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20. Excessive and continuous use of pesticides has resulted in evolution of some new species of pests. Explain what must have led to this. What is this type of evolution called ?

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21. Explain with the help of two examples how certain plants have evolved morphological and chemical defenses against primary consumers such as cows and goats.

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**22.** What type of organs eye of an Octopus and that of a human called? Give another example from the animal group and one from the plants of such organs.

Name and explain the evolutionery process they exhibit.



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**23.** With the revolution in information technology, now it has become an integral part of everybody's life, living in rural and urban India. You are asked to address the gathering of students of eco-clubs of your

neighbourhood schools on generation and management of e-waste.

(a) Write how e-waste is generated.

(b) Explain how would you address the awareness issue of e-waste management amongst the students.

(c) How have the developed countries exploited the developing countries with respect to e-waste managements ?



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**24.** (a) Explain the steps involved in in-vitro fertilisation popularly known as test tube baby programme.

(b) State the importance of this programme.



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**25.** (a) State one difference and one similarity between geitonogamy and xenogamy.

(b) Explain any three devices developed in flowering plants to discourage self pollination and encourage cross pollination.



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**26.** (a) Hershey and Chase carried their experiment in three steps : infection, blending, centrifugation. Explain each step.

(b) Write the conclusion and interpretation of the result they obtained.



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27. Taking an example of white-winged moths and dark-winged moths of England in pre and post industrialised era, explain evolution by natural selection .



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28. (a) Write the percentage of land area that was covered by forests by the end of the last century.
- (b) Describe any two practices that led to deforestation.
- (c) State the consequences of deforestation.
- (d) Suggest a method to overcome deforestation.



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29. (a) Comment on the pattern in which all communities undergo a change in composition and structure with changing environmental conditions.
- (b) Explain 'Climax community' and 'sere'.

Differentiate between primary and secondary succession with examples.



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30. Name the condition in vertebrates where the body attacks self-cells.



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31. Write the function of a Bioreactor.



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**32.** A colour blind boy is born to a couple with a normal colour vision. Write the genotype of the parents.



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**33.** Mention any two conditons that enhance the chances of syngamy in organisms exhibiting external fertilization.



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**34. a)** Write the conclusin drawn by Griffith at the end of his experiment with *Streptococcus pneumoniae*.

b) How did O.Avery, C.MacLeod and M. McCarty prove that DNA was the genetic material? Explain.



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**35.** Plants like potato, sugarcane do not require seeds for producing new plants.

How do they produce new plants? Give two other examples where new plants are produced in the same way.



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**36.** Explain the role played by predators in a community.



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**37.** Name the first antibiotic discovered and by whom.



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**38.** What happens when chromatids fail to segregate during cell division cycle ?

Explain your answer with an example.



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39. ABO blood groups is a good example of co-dominance. Justify.

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40. What is the pathogenic property of baculovirus, used as a biological agents ?

Name the genus of these organisms.

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41. (a) What is an "allergic reaction"?

(b) Name any two drugs used to quickly reduce the symptoms of allergy.

(c) Why do more and more children in metro cities of India suffer from allergies and asthma ?



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42. Identify a, b, c,d,e and f in the following table :

Name of Enzyme/ Bioactive Molecule	Source	Function
(i) a	Streptococcus	b
(ii) c	d	Immuno-suppressive agent in organ transplant patients
(iii) Statins	e	f



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**43.** List any two types of IUDs that are available for human females and state their mode of action.

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**44.** Mention the role of (i) selectable marker, (ii) Ori and (iii) rop in E. coli cloning vector pBR322.

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**45.** Write the aim with which animal breeding programmes are carried. Describe the essential steps to be followed in Poultry management.



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**46.** Draw a diagram of sectional view of human ovary and label (i) Primary follicle, (ii) Tertiary follicle, (iii) Graafian follicle and (iv) Corpus luteum.



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**47.** (a) Draw a diagram of Pistil showing pollen tube growth in angiosperm and label (i) Stigma, (ii) male gametes , (iii) micropyle and (iv) Ovule.

(b) Write the function of micropyle.



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**48.** What was the challenge for production of insulin using rDNA techniques ?

How did Eli Lilly produce insulin using rDNA technology?

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**49.** Identify A, B, C, D, E and F in the table given below :

S. No.	Component-I	Component-II	Chemical linkage bonding the two components	Product
(i)	A	B	C	Nucleoside
(ii)	Nucleoside	D	E	Nucleotide
(iii)	Nucleotide	Nucleotide	F	Dinucleotide

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**50.** Name the organism from which the 'cry' genes are isolated. Mention with the help of suitable example why and how bio-technologists have made use of 'cry' genes.



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**51.** Excessive and continuous use of pesticides has resulted in evolution of some new species of pests. Explain what must have led to this. What is this type of evolution called ?



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52. Explain with the help of two examples how certain plants have evolved morphological and chemical defenses against primary consumers such as cows and goats.



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53. What type of organs eye of an Octopus and that of a human called? Give another example from the animal group and one from the plants of such organs.

Name and explain the evolutionary process they exhibit.



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**54.** With the revolution in information technology, now it has become an integral part of everybody's life, living in rural and urban India. You are asked to address the gathering of students of eco-clubs of your neighbourhood schools on generation and management of e-waste.

(a) Write how e-waste is generated.

(b) Explain how would you address the awareness issue of e-waste management amongst the students.

(c) How have the developed countries exploited the developing countries with respect to e-waste managements ?



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Differentiate between primary and secondary succession with examples.



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## Section E

1. What does an Ecological Pyramid indicate ? Explain the three different types of upright Pyramids in nature with help of an example each.



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2. (a) Explain Polygenic inheritance and Multiple allelism with the help of suitable examples.

(b) Phenylketonuria is a good example that explains Pleiotropy Justify.



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3. (a) What is an operon ?

(b) Explain how a polycistronic structural gene is regulated by a common promoter and a combination of regulatory genes in a lac- operon.





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## Outside Delhi Set II Section A

1. Name the specific type of gene that is incorporated in a cotton plant to protect the plant against cotton boll worm infestation.



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2. Name the specific type of gene that is incorporated in a cotton plant to protect the plant against cotton boll worm infestation.



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## Set I Section A

1. Name the part of the flower which the tassels of the corn-cob represent.



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[Watch Video Solution](#)

2. Mention any two contrasting traits with respect to seeds in pea plant that were studied by Mendel.

 [Watch Video Solution](#)

3. Why is secondary immune response more intense than the primary immune response in humans ?

 [Watch Video Solution](#)

4. Why is it not possible for an alien DNA to become part of a chromosome anywhere along its length and replicate normally ?



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5. State the role of C peptide in human insulin.



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6. Name the enzymes that are used for the isolation of DNA from bacterial and fungal cells for recombinant DNA technology.



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7. State Gause's Competitive Exclusion Principle.



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8. Name the type of association that genus *Glomus* exhibits with higher plants.



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**Watch Video Solution**

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## Set I Section B

1. Why are the human testes located outside the abdominal cavity ? Name the pouch in the which they are present.



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2. In Snapdragon, a cross between true-breeding red flowered (RR) plants and true -breeding white flowered (rr) plants showed a progeny of plants with all pink

flowers.

(a) The appearance of pink flowers is not known as blending. Why?

(b) What is the phenomenon known as ?



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3. Write the scientific name of the fruit-fly. Why did Morgan prefer to work with fruit-flies for his experiments ? State any three reasons.



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4. Linkage and crossing-over of genes are alternatives of each other. Justify with the help of an example.



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5. List the symptoms of ascariasis. How does a healthy person acquire this infection?



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6. Explain the significant role of the genus Nucleopolyhedrovirus in an ecological sensitive area.



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 [Watch Video Solution](#)

7. How does a restriction nuclease function ? Explain.

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8. How have transgenic animals proved to be beneficial  
in :

(a) Production of biological products.

(b) chemical safety testing.

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9. Describe the mutual relationship between fig tree and wasp and comment on the phenomenon that operates in their relationship.



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10. Construct an age pyramid which reflects a stable growth status of human population.



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## Set I Section C

1. Make a list of any three outbreeding devices that flowering plants have developed and explain how they help to encourage cross-pollination.



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2. If implementation of better techniques and new strategies are required to provide more efficient care and assistance to people, then why is there a statutory

ban on amniocentesis ? Write the use of this technique and give reason to justify the ban.



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3. Why is pedigree analysis done in study of human genetics ? State the conclusions that can be drawn from it.



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4. Community service department of your school plans a visit to a slum area near the school with an objective

to educate the slum dwellers with respect to health and hygiene.

(a) why is there a need to organise such visit ?

(b) Write steps you will highlight, as a member of this department in your interaction with them to enable them to lead a healthy life.



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5. Name and describe that technique that helps in separating the DNA fragments formed by the use of restriction endonuclease.



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6. Since the origin of life on Earth, there were five episodes of mass extinction of species .

(i) How is the 'Sixth Extinction', presently in progress, different from the previous episodes ?

(ii) Who is mainly responsible for the 'Sixth Extinction' ?

(iii) List any four points that can help to overcome this disaster.



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11. Identify *a*, *b*, *c*, *d*, *e* and *f* in the table given below :

No.	Syndrome	Cause	Characteristics of affected individuals	Sex Male/Female/Both
1.	Down's	Trisomy of 21	'a' (i) (ii)	'b'
2.	'c'	XXY	Overall masculine development	'd'
3.	Turner's	45 with XO	'e' (i) (ii)	'f'



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12. The following graph shows the species area relationship. Answers the Questions as directed.

(a) Name the naturalist who studied the kind of relationship shown in the graph.

Write the observations made by him.

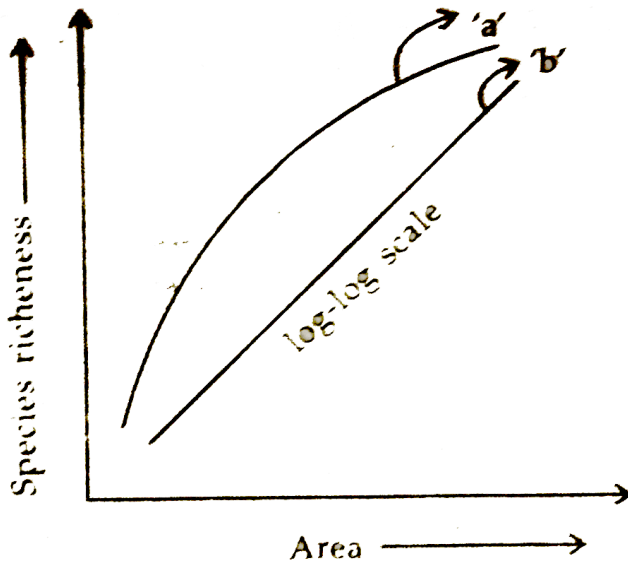
(b) Write the situations as discovered by the ecologists

when the value of 'Z' (slope of the line) lies between

(i) 0.1 and 0.2, (ii) 0.6 and 1.2

What does 'Z' stand for ?

(c ) When would the slope of the line 'b' become steeper ?



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## Set I Section D

1. (a) Where does fertilization occur in humans ?

Explain the events that occur during this process.

(b) A couple where both husband and wife are producing functional gametes, but the wife is still unable to conceive, is seeking medical aid. Describe any one method that you can suggest to this couple to become happy parents.

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2. (a) Explain the different ways apomictic seeds can develop. Give an example of each.

(b) Mention one advantage of apomictic seeds to farmers.

(c ) Draw a labelled mature stage of a dicotyledonous embryo.



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3. With advancements in genetics, molecular biology and tissue culture, new traits have been incorporated into crop plants.

Explain the main steps in breeding a new genetic variety of a crop.



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4. (a) State the objective of animals breeding.

(b) List the importance and limitations of inbreeding.

How can the limitation be overcome ?

(c ) Give example of a new breed each of cattle and poultry .



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## Outside Delhi Set Ii Section A

1. Why is Gambusia introduced into drains and ponds?

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2. Why are analogous structure a result of convergent evolution ?



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3. What are the vegetative propagules in the following :

(a) Agave (b) Bryophyllum



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[Watch Video Solution](#)

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 [Watch Video Solution](#)

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(a) Agave (b) Bryophyllum

 [Watch Video Solution](#)

Outside Delhi Set II Section B

1. State the difference between the structural genes in a Transcription Unit of Prokaryotes and Eukaryotes.

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2. Write the location and functions of the following in human testes :

(a) Sertoli cells (b) Leydig cells

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3. A woman has certain queries as listed below, before starting with contraceptive pills. Answer them.

(a) What do contraceptive pills contain and how do they act as contraceptives ?

(b) What schedule should be followed for taking these pills ?

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4. Explain , giving three reasons, why tropics show greatest levels of species diversity.

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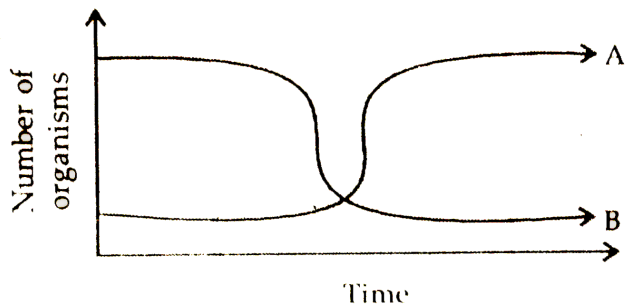
(b) What schedule should be followed for taking these pills ?



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8. Two types of aquatic organisms in a lake show specific growth patterns as shown below, in a brief period of time. The lake is adjacent to an agricultural land extensively with fertilisers.

Answer the question based on the facts given above :



- (i) Name the organisms depicting the patterns A and B.
- (ii) State the reason for the growth pattern seen in A.
- (iii) Write the effects of the growth patterns seen above.

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9. Explain , giving three reasons, why tropics show greatest levels of species diversity.

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## Outside Delhi Set Iii Section A

1. Name the stage of cell division where segregation of an independent pair of chromosomes occurs.

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2. Write an alternate source of protein for animal and human nutrition.

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3. Give an example of a plant which came into India as a contaminant and is a cause of pollen allergy.



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4. Name the type of association that genus *Glomus* exhibits with higher plants.



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## Outside Delhi Set Iii Section B

1. Explain the two factors responsible for conferring stability to double helix structure of DNA.



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2. Write the effect of the high concentration of L.H. on a mature Graafian follicle.

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3. Explain the two factors responsible for conferring stability to double helix structure of DNA.

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4. Write the effect of the high concentration of L.H. on a mature Graafian follicle.

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## Outside Delhi Set Iii Section C

1. (a) Explain adaptive radiation with the help of a suitable example.

(b) Cite an example where more than one adaptive radiations have occurred in an isolated geographical area. Name the type evolution your example depicts and state why it is so named.



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2. (a) Name any two copper releasing IUDs.

(b) Explain how do they act as effective contraceptives in human females .



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3. (a) State how the constant internal environment is beneficial to organisms.

(b) Explain any two alternatives by which organisms can overcome stressful external conditions.



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4. Explain the process of sewage water treatment before it can be discharged into natural water bodies .

Why is this treatment essential ?



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5. Explain the process of replication of a retrovirus after it gains entry into the human body.



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**C B S E Class Xii**

1. Name any two vertebrate body parts that are homologous to human forelimbs.



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2. When and why do some animals like snails go into aestivation ?



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3. What is the economic value of Spiurlina ?



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4. What was the speciality of the milk produced by the transgenic cow Rosie ?



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5. How do neutrophils act as a cellular barrier to pathogens in human ?

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6. Mention any two significant roles predation plays in nature.

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7. Why is the polar region not a suitable habitat for tiny humming birds ?

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**8. (i)** Expand IUD.

(ii) Why is hormone releasing IUD considered a good contraceptive to space children.



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**9.** Name the interaction in each of the following :

(a) Cuscuta growing on a shoe flower plant.

(b) Mycorrhizae living on the roots of higher plants

(c) Clown fish living among the tentacles of sea anemone

(d) Koel laying her eggs in crow's nest .



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**10.** A woman with blood group O married a man with AB group . Show the possible blood groups of the progeny . List the alleles involved in this inheritance.



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**11.** Why do sports persons of often fall a victim to cocaine addiction ?



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**12.** State the difference between the first trophic levels of detritus food chain and grazing food chain.



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**13.** Coconut palm is monoecious while date palm is dioecious. Why are they called so?



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**14.** How can DNA segment, separated by gel electrophoresis be visualised and isolated ?



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15. How do Darwin's finches illustrate adaptive radiation ?



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16. DDT content in the water of a lake that supplies drinking water to the nearby villages, is found to be 0.003 ppm. The kingfishers of that area reported to have 2 ppm of DDT. Why has the concentration increased in these birds ? What harm will this cause to the bird population ? Name the phenomenon.



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**17.** Explain the role of baculoviruses as biological control agents. Mention their importance in organic farming.



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**18. (a)** Draw the structure of the initiator tRNA adaptor molecule.

**(b)** Why is tRNA called an adaptor molecule ?



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**19.** Study the population growth curves shown above

(i) Identify curves '*a*' and '*b*'.

(ii) Mention the conditions responsible for the curves '*a*' and '*b*' respectively.

(iii) Give the necessary equation for the curve '*b*'



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**20.** Why is *Agrobacterium tumefaciens* a good cloning vector ? Explain.



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**21. (a)** Name the infective stage of Plasmodium which Anopheles mosquito take in along with the blood meal from an infected human.

**(b)** Why does the infection cause fever in human ?

Give a flow chart of the part of the life-cycle of this parasite passed in the insect.



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**22.** A factory drains its waste water into the nearby lake. It has caused algal bloom.

**(a)** How was the algal bloom caused ?

(b) What would be the consequences ?

(c) Name the phenomenon that caused it .



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**23.** (a) Draw a schematic labelled diagram of a fertilised embryo sac of an Angiosperm.

(b) Describe the stage in embryo development in a dicot plant.



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**24.** Draw a labelled diagram of a sectional view of human seminiferous tubule.

(b) Differentiate between gametogenesis in human males and females on the basis of

(i) time of initiation of the process.

(ii) Products formed at the end of the process.

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**25.** Explain the steps involved in the production of genetically engineered insulin .

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26. (a) Name the nematode that infects and damages tobacco roots.

(b) How are transgenic tobacco plants produced to solve this problem ?

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27. A homozygous tall pea plant with green seeds is crossed with a dwarf pea plant with yellow seeds.

(i) What would be the phenotype and genotype of  $f_1$  ?

(ii) Work out the phenotypic ratio of  $F_2$  generation with the help of a punnet square.

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**28.** What is 'semi- conservative' DNA replication ? How was it experimentally proved and by whom ?

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**29.** Between amphibians and birds, which will be able to cope with global warming? Give reason .

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**30.** Name the two types of cells in which the HIV multiplies after gaining entry into human body.





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**31.** A multinational company outside tried to sell new varieties of turmeric without proper patent rights. What is such an act referred to ?



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**32.** Certain species wasps are seen to frequently visit flowering fig trees . What type of interaction is seen between them and why ?



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**33.** Name the pathogen that causes amoebiasis in human . Given the symptoms and the mode of transmission of the disease.

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**34.** How does Darwin's theory of Natural Selection explain the appearance of new forms of life on earth?

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**35.** How is the bacterium *Thermus aquaticus* employed in recombinant DNA technology ?

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**36.** DNA being hydrophilic cannot pass through the cell membranes of a hot cell. Explain how does recombinant DNA get introduced into the host cell to transform the latter.

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37. A tall pea plant with yellow seeds (heterozygous for both the traits) is crossed with a dwarf pea plant with green seeds. Using a Punnett square work out the cross to show the phenotypes and the genotypes of  $F_1$  generation.



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38. (a) Why is DNA molecule a more stable genetic material than RNA? Explain.

(b) "Unambiguous", "degenerate" and "universal" are some of the salient features of genetic code. Explain.



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**39.** Suggest any two techniques which can help in early detection of bacterial / viral infections much before the symptoms appear in the body.

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**40.** Mention the carbon positions to which the nitrogenous base and the phosphate molecule are respectively linked in the nucleotide given below :

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**41.** Given below are some human organs. Identify one primary and one secondary lymphoid organs: Liver, Thymus, Stomach, Thyroid, Tonsils.



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**42.** The 'clown' fish lives among the tentacles of sea anemone. What is this interaction between them called and why ?



**Watch Video Solution**

**43.** Name the type of immunity that is present at the time of birth in humans. Explain any two ways by which it is accomplished .



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**44.** Draw a labelled schematic structure of a transcription unit. Explain the function of each component of the unit in the process of transcription unit.



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45. A snapdragon plant homozygous for red flower when crossed with a white flowered plant of the same species produced pink flowers in  $F_1$  generation.

(a) What is the phenotypic expression called ?

(b) Work out the cross to show the  $F_2$  generation when  $F_1$  was self-pollinated. Give the phenotypic and genotypic ratios of  $f_2$  generation.

(c) How do you compare the  $f_2$  phenotypic and genotypic ratios with those of Mendelian monohybrid  $f_2$  ?



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**46.** Name any two vertebrate body parts that are homologous to human forelimbs.

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**47.** When and why do some animals like snails go into aestivation ?

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**48.** What is economic value of Spirulina?

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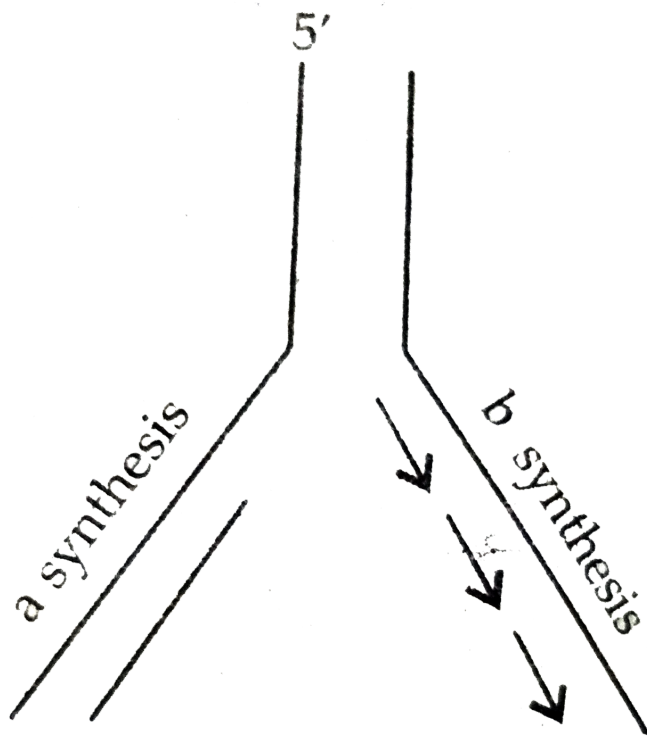
**49.** What was the speciality of the milk produced by the transgenic cow Rosie ?

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**50.** How do neutrophils act as a cellular barrier to pathogens in human ?

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**51.** Mention the polarity of DNA strands a - b and c - d shown in the replicating fork given below.



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52. Mention any two significant roles predation plays in nature.

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53. Why is the polar region not a suitable habitat for tiny humming birds ?



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54. (i) Expand IUD.

(ii) Why is hormone releasing IUD considered a good contraceptive to space children.



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**55.** Name the interaction in each of the following :

(a) *Cuscuta* growing on a shoe flower plant.

(b) Mycorrhizae living on the roots of higher plants

(c) Clown fish living among the tentacles of sea anemone

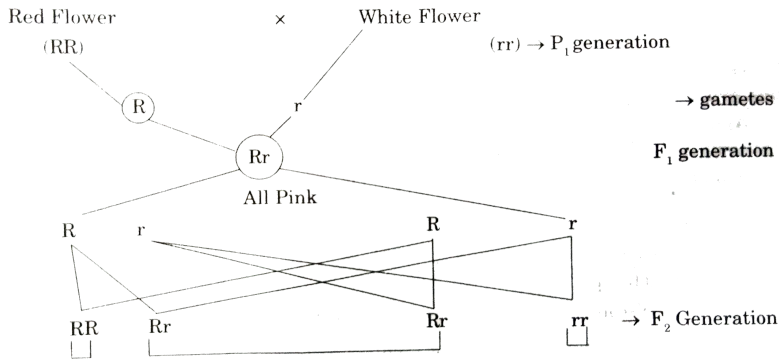
(d) Koel laying her eggs in crow's nest .



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**56.** Apant of *Antirrhinum majus* with red flowers was crossed with another plant of the same species with white flowers. The plants of the  $F_1$  generation bore pink flowers . Explain the pattrn o inheritance with

the help of a cross.



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57. A woman with blood group A married a man with B group. Show the possible blood groups of the progeny. List the alleles involved in this inheritance.

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**58.** Why do sports persons often fall a victim to cocaine addiction?



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**59.** State the difference between the first trophic levels of detritus food chain and grazing food chain.



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**60.** Coconut palm is monoecious while date palm is dioecious. Why are they called so?



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**61.** How can DNA segment, separated by gel electrophoresis be visualised and isolated ?

 [Watch Video Solution](#)

**62.** How do darwin' s finches illustrate adaptive radiation ?

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**63.** Name the blank spaces a, b, c and d from the table given below :

Type of Microbe	Scientific Name	Commercial Product
Bacterium	a	Lactic acid
Fungus	b	Cyclosporin A
c	<i>Monascus purpureus</i>	Statin
Fungus	<i>Penicillium notatum</i>	d

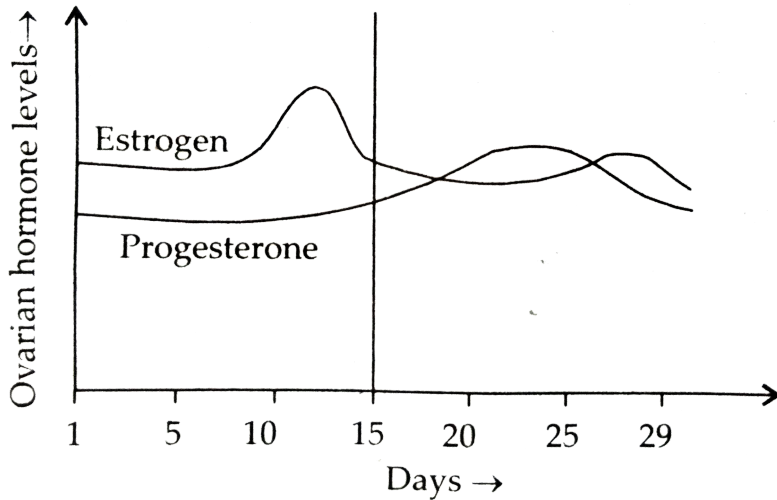


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**64.** DDT content in the water of a lake that supplies drinking water to the nearby villages, is found to be 0.003 ppm. The kingfishers of that area reported to have 2 ppm of DDT. Why has the concentration increased in these birds ? What harm will this cause to the bird population ? Name the phenomenon.



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65.

Read

the graph given above and correlate the uterine events that take place according to the hormonal levels on

(i) 6 - 15 days

(ii) 16 - 25 days

(iii) 26 - 28 days (if the ovum is not fertilised )

(b) Specify the sources of the hormones mentioned in the graph.



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**66.** Explain the role of baculoviruses as biological control agents. Mention their importance in organic farming.



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**67.** (a) Draw the structure of the initiator tRNA adaptor molecule.

(b) Why is tRNA called an adaptor molecule ?



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**68.** Study the population growth curves shown above

(i) Identify curves '*a*' and '*b*'.

(ii) Mention the conditions responsible for the curves '*a*' and '*b*' respectively.

(iii) Give the necessary equation for the curve '*b*'



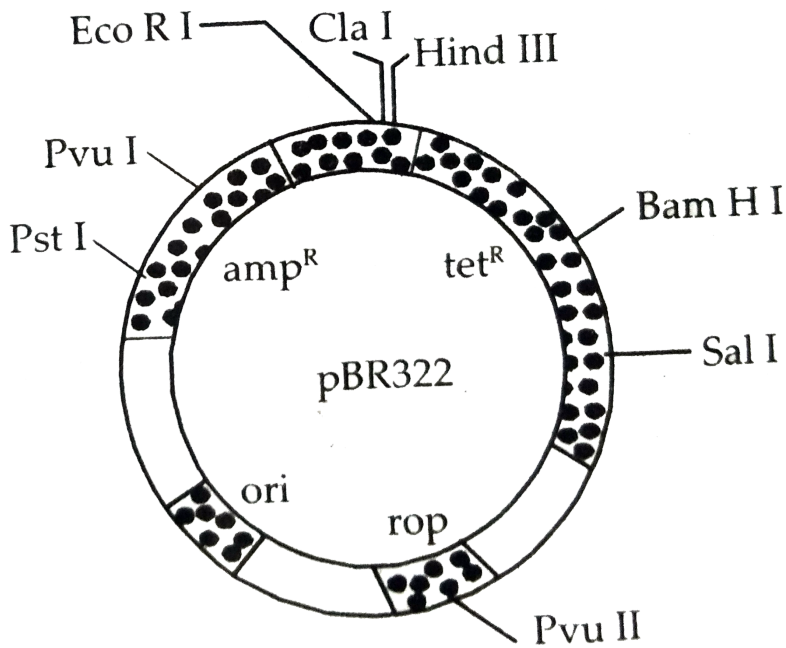
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69. Why is *Agrobacterium tumefaciens* a good cloning vector ? Explain.



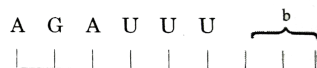
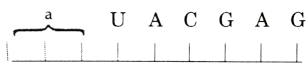
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70. Explain the importance of (a) *ori*, (b)  $amp^R$  and (c) *rop* in the E coil vector shown



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71.



Study the mRNA segment given above which is complete to be translated into a polypeptide chain.

(i) Write the codons 'a' and 'b'

(ii) What do they code for ?

(iii) How is peptide bond formed between two amino acids in the ribosome ?

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72. (a) Name the infective stage of Plasmodium which Anopheles mosquito take in along with the blood meal from an infected human.

(b) Why does the infection cause fever in human ?

Give a flow chart of the part of the life-cycle of this parasite passed in the insect.

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**73.** A factory drains its waste water into the nearby lake. It has caused algal bloom.

(a) How was the algal bloom caused ?

(b) What would be the consequences ?

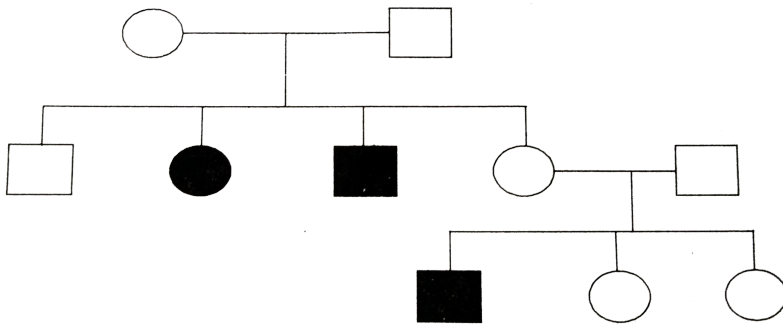
(c) Name the phenomenon that caused it .



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**74.** Study the given pedigree chart and answer the question that follow.





(a) In the trait recessive or dominant ?

(b) Is the trait sex-linked or autosomal ?

(c) Give the genotypes of the parents in generation I and of their third and fourth child in generation.



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75. (a) Draw a schematic labelled diagram of a fertilised embryo sac of an Angiosperm.

(b) Describe the stage in embryo development in a dicot plant.



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**76.** Draw a labelled diagram of a sectional view of human seminiferous tubule.

(b) Differentiate between gametogenesis in human males and females on the basis of

(i) time of initiation of the process.

(ii) Products formed at the end of the process.



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77. Explain the steps involved in the production of genetically engineered insulin .



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78. (a) Name the nematode that infects and damages tobacco roots.

(b) How are transgenic tobacco plants produced to solve this problem ?



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**79.** A homozygous tall pea plant with green seeds is crossed with a dwarf pea plant with yellow seeds.

(i) What would be the phenotype and genotype of  $f_1$  ?

(ii) Work out the phenotypic ratio of  $F_2$  generation with the help of a punnet square.



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**80.** What is 'semi- conservative' DNA replication ? How was it experimentally proved and by whom ?



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**81.** Between amphibians and birds, which will be able to cope with global warming? Give reason.

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**82.** Name the two types of cells in which the HIV multiplies after gaining entry into human body.

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**83.** A multinational company outside India tried to sell new varieties of turmeric without proper patent rights. What is such an act referred to?



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**84.** Certain species wasps are seen to frequently visit flowering fig trees .

What type of interaction is seen between them and why ?



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**85.** Name the pathogen that causes amoebiasis in human . Givn the symptoms and the mode of transmission of the disease.



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**86.** How does Darwin's theory of Natural Selection explain the appearance of new forms of life on earth ?



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**87.** How is the bacterium *Thermus aquaticus* employed in recombinant DNA technology ?



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**88.** DNA being hydrophilic cannot pass through the cell membranes of a host cell. Explain how does recombinant DNA get introduced into the host cell to transform the latter.

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**89.** A tall pea plant with yellow seeds (heterozygous for both the traits) is crossed with a dwarf pea plant with green seeds. Using a Punnett square work out the cross to show the phenotypes and the genotypes of  $F_1$  generation.

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**90.** (a) Why is DNA molecule a more stable genetic material than RNA? Explain.

(b) "Unambiguous", "degenerate" and "universal" are some of the salient features of genetic code. Explain.



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**91.** Suggest any two techniques which can help in early detection of bacterial / viral infections much before the symptoms appear in the body.



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**92.** Mention the carbon positions to which the nitrogenous base and the phosphate molecule are respectively linked in the nucleotide given below :

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**93.** Given below are some human organs. Identify one primary and one secondary lymphoid organs: Liver, Thymus, Stomach, Thyroid, Tonsils.

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94. The 'clown' fish lives among the tentacles of sea anemone. What is this interaction between them called and why ?

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95. Name the blank spaces a, b, c and d from the table given below :

Type of Microbe	Scientific name	Product	Medical application
(i) Fungus	<i>a</i>	Cyclosporin	<i>b</i>
(ii) <i>c</i>	<i>Monascus purpureus</i>	Statin	<i>d</i>

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**96.** Name the type of immunity that is present at the time of birth in humans. Explain any two ways by which it is accomplished .

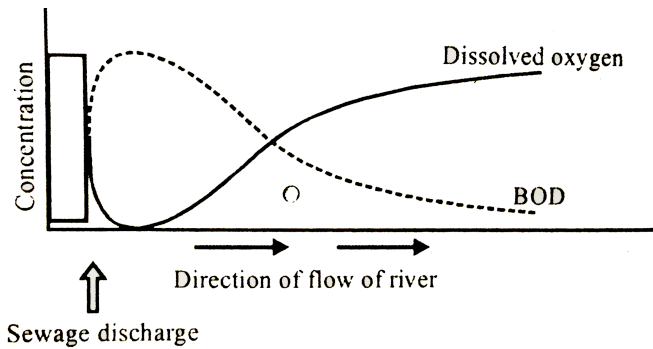


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**97.** Study the graph given below and answer the question that follow ?

(i) What is relationship between dissolved oxygen and biochemical oxygen Demand (BOD) ?

(ii) Mention their effect on aquatic life in the river.



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**98.** Draw a labelled schematic structure of a transcription unit. Explain the function of each component of the unit in the process of transcription. Explain the function of each component of the unit in the process of transcription .

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99. A snapdragon plant homozygous for red flower when crossed with a white flowered plant of the same species produced pink flowers in  $F_1$  generation.

(a) What is the phenotypic expression called ?

(b) Work out the cross to show the  $F_2$  generation when  $F_1$  was self-pollinated. Give the phenotypic and genotypic ratios of  $f_2$  generation.

(c) How do you compare the  $f_2$  phenotypic and genotypic ratios with those of Mendelian monohybrid  $f_2$  ?



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1. Identify 'A' in the given diagram and state its function .



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## Set I Comptt Section A

1. Write the technical term used in human ABO blood groups from  $I^A$ ,  $I^B$  and  $i$ .



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2. Give an example of a plant where the  $F_2$  Progeny of a monohybrid cross has same genotypic and phenotypic ratios.



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3. Name the technique that is used to alter the chemistry of genetic material (DNA,RNA) to obtain desired result.



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4. Provide an instance where the population size of species can be estimated indirectly without actually in natural parks is based on pugmarks.



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1. Explain the process of polliantion in Vallisnaria.



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2. Why does hnRNA to undergo splicing ? Where does splicing occur in the cell ?



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3. (i) Name any two causative organisms responsible for ringworm.

(ii) State any two symptoms of the disease.



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4. (I) Name any two helminths which are known to the pathogenic to human.

(ii) List any two symptoms of the diseases caused by any one of them.

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5. Give two reasons for keeping beehives in crop fields during flowering period.

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6. Write about 'humification ' and the 'mineralisation' occurring during the process of decomposition.



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## Set I Comptt Section C

1. Flowering plants have developed many devices to discourage self-pollination and to encourage cross-pollination. Explain three such devices.



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2. What does an interaction between pollen grains and its compatible stigma result in after pollination ? List two steps in sequence that follow after the process.



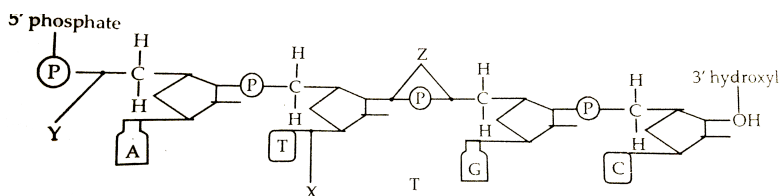
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3. State any three functions of placenta in human female.



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4. Study the diagram given below :



Name the linkage X,Y,Z and the respective molecules formed by them.

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5. Mendel published his work on inheritance of characters in 1865, but it remained unrecognized till 1900. Give three reasons for the delay in accepting his work.

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6. (a) How many codons code for amino acids and how many are unable to do so ?

(b) Why are codes said to be (i) degenerate and (ii) unambiguous ?



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7. Certain attributes of innate immunity are given in the table below. Identify A,B,C,D,E and F respectively in it.

	Type of barrier	Example of the barrier	Function
(i)	<u>    A    </u>	<u>    B    </u>	Prevent microbial growth
(ii)	<u>    C    </u>	Polymorpho nuclear leucocytes	<u>    D    </u>
(iii)	Cytokine	<u>    E    </u>	<u>    F    </u>



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8. Explain how and why controlled breeding experiment is carried out in cattle.



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9. (i) Why was a bacterium used in the first instance of the construction of an artificial recombinant DNA molecule ?

(ii) Name the scientists who accomplished this and how ?



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**10.** How has the study of biotechnology helped in developing pest resistant cotton crop ? Explain.



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**11.** Why is molecular diagnosis preferred over conventional methods ? Name any two techniques giving one use of each.



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**12.** Explain by taking three different examples how do certain organisms pull through the adverse conditions when unable to migrate under stressful period.



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**13.** In a botanical garden of a city there is a huge banyan tree growing on which hundreds of birds and thousands of insects live. Draw the pyramids of numbers and also biomass represented by this community. Comment giving reasons on the two different pyramids drawn.



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## Set I Comptt Section D

1. The government has hailed the practice of yoga and promoted it internationally.

(a) When is 'Yoga day' celebrated ?

(b) Why is the need for practicing yoga felt ? Give one reason.

(c) Write any four benefits of the practicing yoga.



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## Set I Comptt Section E

1. (a) Explain the process of spermatogenesis in humans.

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2. Schematically represent and explain the events of spermatogenesis in humans.

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3. Arrange the terms given below in their orthir order of occurrence describing their ructure and function in the earloy development of the humn embryo:

Implantation, cleavage, inner cell mass, trophoblast, blastomeres, endometrium, morula, blastocyst,



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4. How does replication of long DNA molecules occur ?

Explain the process.



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5. (i) List any four evidences of evolution,

(ii) The four evidences of evolution are as follows :



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6. Write the importance of species diversity to the Exosystem. Support your answer with the finding of Tilman.



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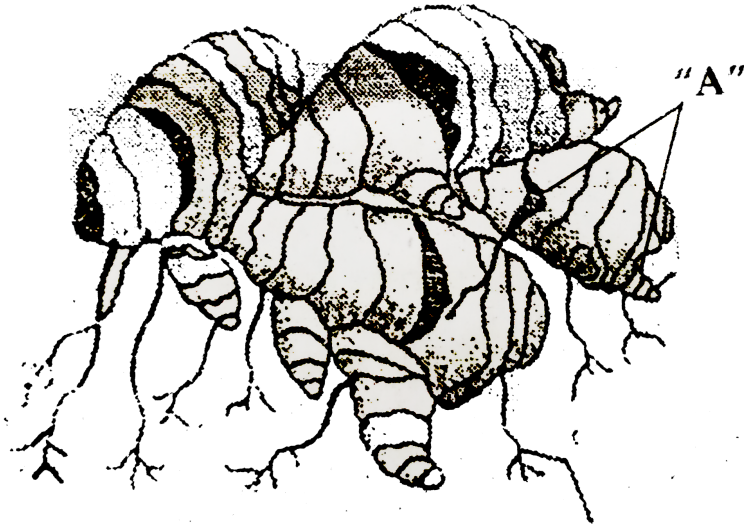
## Delhi Board Set II Section A

1. Give an example of a sex-linked recessive disorder in humans.



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2. Identify 'A' in the given diagram and state its function.



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Delhi Board Set II Section B

1. What is a 'green house' effect ? How is this phenomenon used for growing plants especially in winter ?



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2. Describe a palindrome with the help of an example.



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3. State the three characteristics of Acquired Immunity.  
List the different ways by which it can be attained by humans.





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4. How can evolution by natural selection be explained by melanised moths before and after industrialisation in England ?



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5. Explain any three contraceptive devices that can be used by women for their family planning.



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1. (a) Explain with the help of Griffith's experiment how the search for genetic material was conducted and what was the conclusion drawn ?

(b) How did Macleod, Mc Carty and Avery establish the Bio-Chemical nature of the so called "genetic material" identified by Griffith in his experiment.



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2. (a) How does the study of fossils help to understand evolution.



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3. How did S.L. Miller provide an experimental evidence in favour of Oparin and Haldane's hypothesis ? Explain.



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## Delhi Board Set Iii Section A

1. Give an example of a polygenic trait in humans.



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2. Identify 'A' in the diagram and mention its function.



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## Delhi Board Set Iii Section B

1. Why are the environmentalists worried about the considerable increase in the level of green house gases ? List the different green house gases other than carbon dioxide.



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1. Explain the mode of action of Eco RI.

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2. Explain the laws that Mendel derived from his monohybrid crosses.

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3. Explain brood parasitism with an example.

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4. Name and explain the two types of immune responses in humans.

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## Delhi Board Set Iii Section E

1. (a) Explain the role of regulatory gene, operator and structural genes in lac operon when E. Coli is growing in a culture medium with the sources of energy as lactose.

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2. (b) Mention what would happen if lactose is withdrawn from the culture medium.

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3. How did Darwin explain adaptive radiation ? Give another example of animals exhibiting adaptive radiation.

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1. Identify 'A' in the figure showing a stage of embryo development in a dicot plant and mention its function.







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2. In a dihybrid cross carried by T.H. Morgan in *Drosophila* the  $F_2$  ratio deviated from that of Mendel's dihybrid  $F_2$  ratio. Give a reason.



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3. Write the chromosomal basis of sex determination in birds.



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4. Mention the use of gel electrophoresis in biotechnology experiments.



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5. Why are mango trees unable to grow in temperate climate ?



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**Biology Theory Set I Comptt Section B**

1. Name the type of fruit apple is categorised under and why ? Mention two other examples which belong to the same category as apple.



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2. Is haemophilia in humans a sex linked or autosomal disorder ? Work out a cross in support of your answer.



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3. Name any two secondary lymphoid organs in a human body and state the function of any of them.



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4. How are oncogenic viruses different from proto-oncogenes ?



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5. Why are adolescents especially advised not to smoke ? How does smoking affect the functioning of the body ?



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6. Heat loss or heat gain depends upon the surface area of the organism's body. Explain with the help of a suitable example.



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## Biology Theory Set I Comptt Section C

1. (i) How many primary follicles are left in each ovary in a human female at puberty ?

(ii) Draw a sectional view of the ovary showing the different follicular stages of a human female in her preovulatory phase of menstrual cycle.



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2. Draw a labelled diagram of a section of an enlarged view of microsporangium of an angiosperm.

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3. Name the cells and the events they undergo to produce pollen grains.

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4. Describe any three steps taken up by our government to check population growth rate.

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5. Work out the monohybrid cross upto  $F_1$  by taking a suitable example so as to show the following phenotypes.

(i)  $F_1$  represents only one of the parents.

(ii)  $F_1$  with both the parental characteristics.

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6. In a typical nucleus, some regions of chromatin are stained light and others dark. Explain why is it so and what is its significance ?



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7. Write any three goals of Human Genome Project.



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8. (i) Which organ of the human body is initially affected when bitten by an infected female Anopheles ?  
Name the stage of the parasite that infects this organ.



(ii) Explain the events that are responsible for chill and high fever in the patient.



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9. (a) Why is mother's milk considered very essential for the healthy growth of infants.

(b) What is the milk called that is produced in the initial days of lactation ?



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**10.** How does *Agrobacterium tumifaciens* act as a suitable vector in the biotechnological experiments ?  
Site an example where it has been successfully used as a vector.

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**11.** People are quite apprehensive to use GM crops. Give three arguments in support of GM crops so as to convince the people in favour of such crops.

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**12.** Explain how Eli Lilly, an American company produced insulin by recombinant DNA technology.

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**13.** State Gause's Competitive Exclusion Principle.

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**14.** (a) " Organisms may be conformers or regulators . "

Explain this statement and give one example of each.

(b) Why are there more conformers than regulators in the animals world ?



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## Biology Theory Set I Comptt Section D

1. Modern life style in big cities and towns is surely making the life more easy and comfortable for people.

On the contrary many more health issues and problems are on the rise and one of them is allergic reactions.

(a) Write four steps you would suggest to minimise the cause of the above allergic responses.

(b) List any two allergen. How does the human body respond to them ? Explain.



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## Biology Theory Set I Comptt Section E

1. (a) Draw the longitudinal section of a flower showing growth of pollen tube upto the embryo sac. Label the

following parts :

(i) Stigma

(ii) Pollen tube

(iii) Integument

(iv) Chalazal end

(v) Nucellus

(vi) Synergids

(b) What is double fertilisation in Angiosperms? Why is it so called ?



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2. Draw the microscopic structure of human sperm and relate its different parts with their functions.



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3. (a) Write any two different levels at which regulation of Gene Expression could be exerted in Eukaryotes.



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4. Give a labelled schematic representation of "lac operon" in its "Switched off" position.



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5. (a) Explain the observations and the conclusion Darwin by during his visit to Galapagos Islands.

(b) Write the two key concepts of Darwin's theory of natural selection.



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6. (i) What is population density ? Why are ecologists interested in measuring it ?

(ii) Write the different ways of measuring population density. Explain any two with the help of specific examples.



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7. (i) Name the specific cellular components where phosphorus is in abundance in living organisms.

(ii) Name the natural reservoir of phosphorus.

(iii) Explain the phosphorus cycle.



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## Outside Delhi Set II Section A

1. Give an example of an organism that exhibits haplodiploid sex-determination system.

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2. Given below is a section of a Maize grain. Identify 'A' and state its function.

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## Outside Delhi Set Ii Section B

1. Name two drugs obtained from poppy plant. "These Drugs are medically useful but are often abused". Taking the mentioned examples justify by giving reasons.



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## Outside Delhi Set Ii Section C

1. Why should Biodiversity be conserved ? Explain giving three reasons.

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2. (i) Why is inbreeding necessary ? Give two reasons.

(ii) What does continued inbreeding lead to ?

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3. What is mutation ? Explain with the help of an example how does a kpoint mutation affect the genetic code.Name another type of mutation.

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4. (i) Expand MTP.

(ii) Give two situations when MTP is advised.

(iii) Write when amniocentesis and MTP can be misured.



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## Outside Delhi Set II Section E

1. Explain sequentially the process of 'Translation' in a prokaryote. Name the cellular factor where this process occurs.



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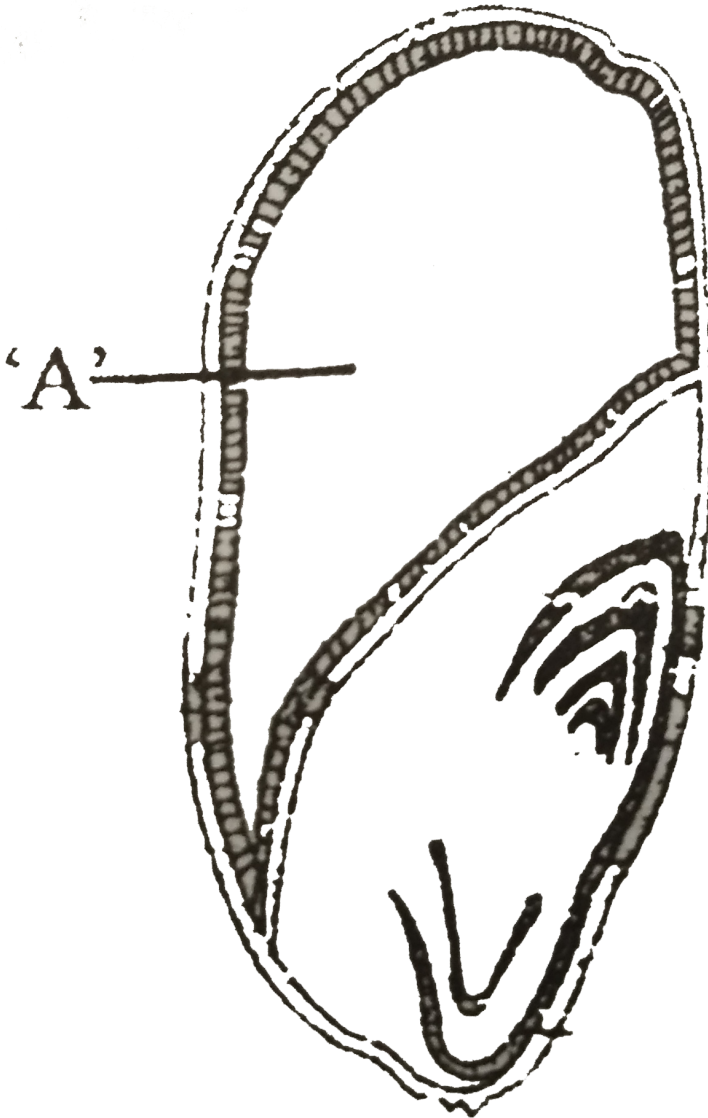
2. How is DNA fingerprinting done ? Name any two types of human samples which can be used for DNA fingerprinting. Explain the process sequentially.

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3. Mention any two situations when the DNA fingerprinting technique is useful.

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1. Given below is a section of maize grain. Identify 'A' and state its function.



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2. Give one example of organism exhibiting female heterogamety.

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## Outside Delhi Set Iii Section B

1. What happens to an individual when regular dose of drugs/alcohol is abruptly discontinued ? What characteristics manifest in the individual under such a situation ?



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## Outside Delhi Set Iii Section C

1. (a) HIV and Hepatitis-B are STDs. Mention the two other ways by which they can be transmitted to a healthy person.

(b) Why is early detection of STD essential? What can it lead to otherwise? Explain.



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2. Write the functions of the following in biotechnology

:

(a) polymerase chain reaction technique

(b) Restriction endonucleases.

(c) *Bacterium thermus aquaticus*.



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3. Make a list of three household products along with the names of the micro-organisms producing them.



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4. Explain the levels of biodiversity at genetic, specific and ecological levels with the help of one example each.



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## C B S E Class Xii

1. write the dual purpose served by deoxyribonucleoside triphosphates in polymerisation



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2. Name two diseases whose spread can be controlled by the eradication of *Aedes* mosquitoes



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3. How do cytokine barriers provide innate immunity in humans?



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4. Write the names of the following

(a) A 15 mya primate that was ape like,

(b) A 2 mya primate that lived in east African grasslands



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5. Mention the chemical change that proinsulin undergoes to be able to act as mature insulin



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6. Your advice is sought to improve the nitrogen content of the soil to be used for cultivation of a non leguminous terrestrial crop

(a) Recommend two microbes that enrich the soil with nitrogen

(b) Why do leguminous crops not require such enrichment of the soil ?

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7. With the help of an algebraic equation how did Hardy Weinberg explain that in a given population the frequency of occurrence of alleles of a gene is supposed to remain the same through generations?

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8. Although a prokaryotic cell has no defined nucleus yet DNA is not scattered throughout the cell. Explain.



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9. How did a citizen group called friends of Arcata marsh, Arcata California USA help to improve water quality of the marshland using integrated waste water treatment ? Explain in four steps.



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**10.** You have obtained high yielding variety of tomato.

Name and explain the procedure that ensure retention of the desired characteristics repeatedly in large population of future generations of the tomato crop.



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**11. (a)** Name the source plant of heroine drug. How is it obtained form the plant?

**(b)** Write the effect of heroin on the human body.



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**12.** Draw a diagram of mature human sperm . Label any three parts and write their function .



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**13.** (a) Expand VNTRs and describe its role in DNA fingerprinting

(b) List any two applications of DNA finger printing techniques



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14. Differentiate between parthenocarpy and parthenogenesis giving example of each



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15. Medically it is advised to all young mothers that breastfeeding is the best for their newborn babies .Do you agree? Give reasons in support of your answer



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16. Explain the mechanism of sex determination in birds .How does it differ from that of human beings?



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17. (a) How has the development of bioreactor helped in biotechnology?

(b) Name the most commonly used bioreactor and describe its working



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18. Explain the roles of the following with the help of an example each in recombinant DNA technology?

(a) Restriction Enzymes (b) Plasmids



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19. Explain out breeding out crossing and cross breeding practices in animal husbandry.



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20. (a) Organic farmers prefer biological control of diseases and pests to the use of chemicals for the purpose justify

(b) Give example of a bacterium a fungus and an insect that are used as biocontrol agents



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21. (a) Different between analogous and homologous structures

(b) Select and write analogous structures from the list given below :

(i) wings of butterfly and birds

(ii) vertebrate hearts

(iii) Tendrils of bougainvillea and cucurbita

(iv) Tubers of sweet potato and potato.



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22. (a) India has greater ecosystem diversity than Norway. Do you agree with the statement? Given

reasons in support of your answer

(b) Write the difference between genetic biodiversity and species biodiversity that exists at all the levels of biological organisation

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**23.** Explain the effect on the characteristics of a river when urban sewage is discharged in to it.

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24. How has the use of agrobacterium as vectors helped in controlling meloidogyne incognita infestation in tobacco plants ? Explain in correct sequence



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25. Looking at deteriorating air quality because of air pollution in many cities of the country the citizen are very much worried and concerned about their health. The doctors have declared health emergency in the cities where the air quality is very severely poor.

(a) Mention any two major causes of air pollution

(b) Write any two harmful effect of air pollution to plants and humans.



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26. (a) Describe any two devices in a flowerings plant which prevent both autogamy and geitonogamy

(b) Explain the events up to double fertialisation after the pollen tube enters one of the synergids in an ovule of an angisperm.



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**27. (a)** Explain menstrual cycle in human females

(b) How can the scientific understanding of the menstrual cycle of human females help as a contraceptive measure ?



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**28. (a)** Write the scientific name of the organism

Thomas hunt morgan and his colleagues worked with for their experiments .Explain the correction between linkage and recombination with respect to genes as studied by them



(b) How did sturtevant explain gene mapping while working with morgan?



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29. (a) state the central dogma as proposed by francis crick are there any exceptions to it ? Support your answer with a reason and an example

(b) Explain how the biochemical characterisation (nature) of Transforming principle was determined which was not defined from Griffith 's experiments



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**30.** (a) Following are the responses of different animals to various abiotic factors .Describe each one with the help of an example: (i) Regulate ,(ii) Conform ,(iii) Migrate ,(iv) Suspend

(b) If 8 individuals in a population of 80 butterflies die in a week calculate the death rate of population of butterflies during that period



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**31.** (a) What is a trophic level in an ecosystem? What is standing crop with reference to it ?

(b) Explain the role of the first trophic level in an ecosystem .

(c ) How is the detritus food chain connected with the grazing food chain in a natural ecosystem?



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Set I

1. A geneticist interested in studying variations and patterns of inheritance in living beings prefers to choose organisms for experiments with shorter life cycles. Provide a reason.



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2. Name the transcriptionally active region of chromatin in a nucleus.



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3. State a reason for the increased population of dark coloured moths coinciding with the loss of lichens (on tree barks) during industrialization period in England.



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4. Indiscriminate diagnostic practices using X- rays etc, should be avoided . Give one reason.

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5. What is biopiracy?

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6. After a brief medical examination a healthy couple came to know that both of them are unable to produce functional gametes and should look for an 'ART' (Assisted Re-productive Technique). Name the 'ART' and the procedure involved that you can suggest to them to help them bar a child.

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7. Differentiate between male and female heterogamety.

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8. How has mutation breeding helped in improving the production of mung bean crop?

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9. Mention a product of human welfare obtained with the help of each one of the following microbes :

(a) LAB

(b) *Sacchromyces cerevisiae*

(c) *Propionibacterium shermanii*

(d) *Aspergillus niger*



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10. Many fresh water. animals can not survive in a marine environment. Explain.



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**11.** How are productivity, gross productivity, net primary productivity, and secondary productivity interrelated?



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**12.** Double fertilization is reported in plants of both, castor and groundnut. However, the mature seeds of groundnut are non-albuminous and castor are albuminous. Explain the post-fertilization events that are responsible for it.



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**13.** Describe the process of Parturition in humans.



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**14.** A teacher wants his/her students to find the genotype of pea plants bearing purple coloured flowers in their school garden. Name and explain the cross that will make it possible.



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**15.** (a) A DNA segment has a total of 1000 nucleotides, out of which 240 of them are adenine containing

nucleotides. How many pyrimidine bases this DNA segment possesses?

(b) Draw a diagrammatic sketch of a portion of DNA segment to support your answer.

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**16.** Explain polygenic inheritance with the help of a suitable example.

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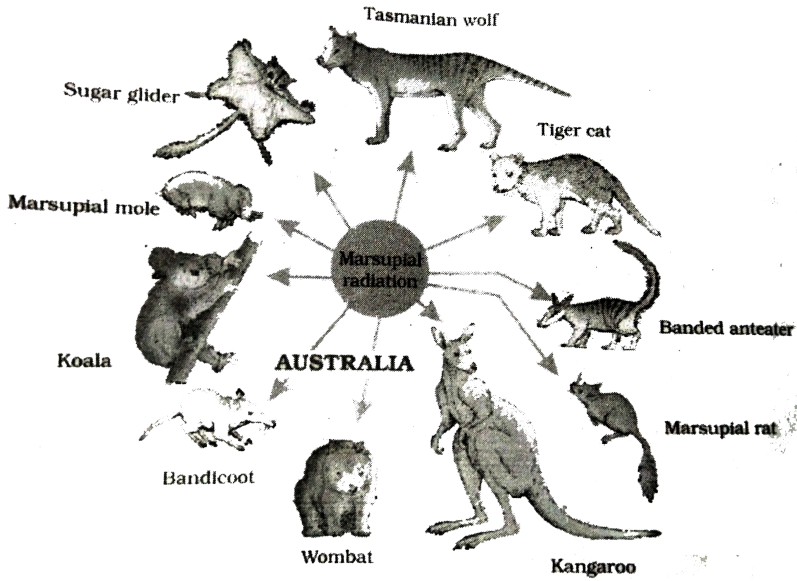
**17.** Enlist the steps involved in the inbreeding of cattle.

Suggest two disadvantages of this practice .



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**18.** A team of students are preparing to participate in the inter school sports meet. During a practice session you find some vials with labels of certain cannabionoids .



(a) Will you report to the authorities ? Why ?

( b) Name a plant from which such chemicals are obtained .

( c) Write the effect of there chemicals on human body .

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**19.** Choose any three microbes, from the following which are suited for organic farming which is in great demand these days for various reasons. Mention one application of each one chosen.

Mycorrhiza, Monascus, Anabaena, Rhizobium, Methanobacterium, Trichoderma



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**20.** Recombinant DNA-technology is of great important in the field of medicine. With the help of a flow chart , show how this techonology has been used in preparing genetically engineered human insulins

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**21.** Following the collision of two trains a large number of passengers are killed. A majority of them are beyond recognition. Authorities want to hand over the dead to their relatives. Name a modern scientific method and write the procedure that would help in the identification of kinship.

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**22.** Many plant and animal species are on the verge of their extinction because of loss of forest land by

indiscriminate use by the humans .As a biology student what method would you suggest along with its advantages that can protect such threatened species from getting extinct ?

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23. "Determination of Biological oxygen demand (BOD) can help in suggesting the quality of a water body. " Explain

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24. Draw a labelled sketch of sparged -stirred -tank bioreactor. Write its application.



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25. Since October 02, 2014 "Swachh Bharat Abhiyan" has been launched in our country.

(a) Write your views on this initiative giving justification.

(b) As a biologist name two problems that you may face while impementing the programme in your locality

.



( c ) Suggest two remedial methods to overcome these problems.



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**26.** A flower of tomato plant following the process of sexual reproduction produces 240 viable seeds.

Answer the following questions giving reasons :

(a) What is the minimum number of pollen grains that must have been involved in the pollination of its pistil ?

(b) What would have been the minimum number of ovules present in the ovary ?

(c) How many megaspore mother cells were involved ?

(d) What is the minimum number of microspore

mother cells involved in the above case ?

(e) How many male gametes were involved in this case ?



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27. During the reproductive cycle of a human female, when, where and how does a Placenta develop ? What is the function of placenta during pregnancy and embryo development?



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**28.** Explain the genetic basis of blood grouping in human populations.

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**29.** "Analysis of age-pyramids for human population can provide important inputs for long-term planning strategies." Explain.

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**30.** Write advantages of bee keeping.

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**31.** Excessive nutrients in a fresh water body cause fish mortality give two reasons .

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**32.** State a difference between a gene and an allele.

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**33.** Suggest a technique to a researcher who needs to separate fragments of DNA.

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**34.** Explain the significance of meiocytes in a diploid organism .

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**35.** Mention the kind of biodiversity of more than a thousand varieties of mangoes in India represent . How is possible ?

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**36.** List the events that reduce the biological oxygen demand (Bod) of a primary effluent during sewage treatment .



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**37.** Mention the name of the causal organism, symptoms and the mode of transmission of the disease Amoebiasis.



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38. Identify 'A','B','C' and 'D' in the given table .

Crop	variety	Resistance to disease
A	Himgiri	Leaf rust
Cauliflower	Pusa shubhra	<i>b</i>
Brassica	Pusa Swarnim	<i>C</i>
Cowpea	D	Bacterial blight



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39. Why doctors recommend breast feeding during initial period of infant growth?



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40. Describe the experiment that helped Louis Pasteur to dismiss the theory of spontaneous generation of life.

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41. Discuss the advantages of GMO.

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42. "In a food chain, a trophic level represents a functional level, not a species." Explain.

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**43.** (A) Name any two places where it is essential to install electrostatic precipitators. Why is it required to do so?

(b) Mention one limitation of the electrostatic precipitator.



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**44.** prior to a sports event blood and urine samples of sportspersons are collected for drug tests.

(a) why is there a need to conduct such tests?

(b) name the drugs the authorities usually look for

( C ) write the generic names of two plants from which these drugs are obtained.



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**45.** Given below is a list of six micro-organisms . State their usefulness to humans.

- (a) Nucleopolyedrovirus
- ( b) Sachharomyces cerevisiae
- ( c) Monascus purpureus
- ( d) Trichoderma polysporum
- ( E) Penicillium notatum
- ( F) Propionibacterium sharmanii



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**46.** Reproductive and child Healthcare (RCH) programmes are currently in operation . One of the major tasks of these programmes is to create awareness amongst people about the wide range of reproduction related aspects As. This is important and essential for building a reproductively healthy society .

(a) " Providing sex education in schools in one of the ways to meet this goal." give four points in support of your opinoin regarding this statement.

(b) list any two 'indicators' that indicate a reproductively healthy society .

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**47.** List the different types of pollination depending upon the source of pollen grain .

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**48.** How are the following formed and involved in DNA packaging in a nucleus of a cell?

(i) Histone octomer

(ii) Nucleosome

(iii) chromatin

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**49. DIFFERENCE BETWEEN EUCHROMATIN & HETEROCHROMATIN**



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**50. a) What is an age-pyramid?**

**b) Name three representative kinds of age-pyramids for human population and list the characteristics for each one of them.**



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**51.** Name the embryonic stage that gets implanted in the uterine wall of a human female.

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**52.** State the importance of bio-fortification.

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**53.** How do algal blooms affect the life in water bodies

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54. Name the common ancestor of the great apes man.

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55. Write a difference between net primary productivity and gross productivity

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56. Mention the contribution of genetic maps in human genome project.

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**57.** Name the phase all organisms have to pass through before they can reproduce sexually.

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**58.** Name the enzyme produced by Streptococcus bacterium. Explain its importance In medical sciences.

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**59.** How is Rosie considered differen from normal cow ?  
Explain

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**60.** State the use of Biodiversity in modern agriculture.



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**61.** Write the full form of VNTR. How is VNTR different from Probe



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**62.** Differentiate between benign and malignant tumours.

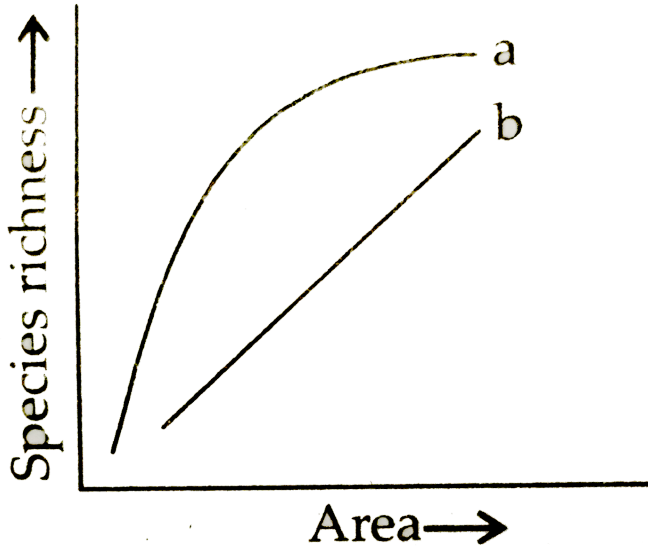


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**63.** Differentiate between in situ and ex situ approaches of conservation of biodiversity.

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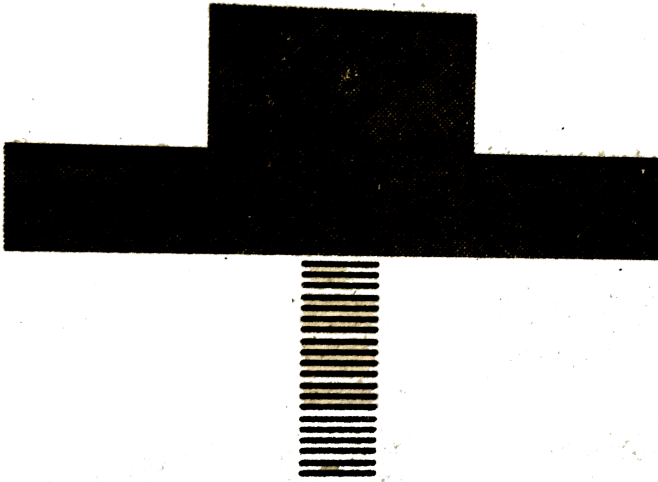
**64.** The above graph show Species-Area relationship. Write the equation of the curve a and explain.



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65. The cell division involved' in gamete formation is not of the same type in different organisms. Justify.

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66.

Identify the type of the given ecological pyramid and give one example each of pyramid of number and pyramid of biomass in such cases.



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67. What' is genetic engineering List the steps in rDNA technology.

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68. Scientists have succeeded in recovering healthy plants from a diseased one.

(a) Name the part of the plant used as explant by the scientists.

(b) Describe the procedure the scientists followed to recover the healthy plants.

(c) Name this technology used for crop improvement

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**69.** (i) Write the scientific names of the two species of filarial worms causing filariasis. (ii) How do they affect the body of infected persons(s)? (iii) How does the disease spread?



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**70.** Unambiguous, universal and degenerate are some of the terms used for the genetic code. Explain the salient features of each one of them.



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**71.** Water is very essential for life. Write any three features both for plants and animals which enable them to survive in water scarce environment.

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**72.** How do organisms cope with stressful external environmental conditions which are localised or of short duration ?

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73. (i ) State the consequence if the electrostatic precipitator of a thermal plant fails to function.

(ii) Mention any four methods by which the vehicular air pollution can be controlled.



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74. Give reasons why : (i) most zygotes in angiosperms divide only after certain amount of endosperm is formed.

(ii) ground nut seeds are exalbuminous and castor seeds are albuminous.

(iii) Micropyle remains as a small pore in the seed coat



of a seed. (iv) integuments of an ovule harden and the water content is highly reduced, as the seed matures. apple and cashew are not called true fruits.

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**75.** Draw a labelled diagram of LS. of an embryo of grass (any six labels). (b) Give reason for each of the following: (i) Anthers of angiosperm flowers and described as ditheous. (ii) Hybrid seeds have to be produced year after year.

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**76.** Describe the mechanism of pattern of inheritance of ABO blood groups in humans.

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**77.** Why is haemophilia generally observed in human males ? Explain the conditions under which a human female can be haemophilic. (b) Draw the male Reproductive system.

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**78.** (i) Describe the characteristics a cloning vector must possess. (ii) Why DNA cannot pass through the cell membrane ? Explain. How is a bacterial cell made competent to take up recombinant DNA from the medium?



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**79.** If a desired gene is identified in an organism for some experiments, explain the process of the following :

(i) Cutting this desired gene at specific location

(ii) Synthesis of multiple copies of this desired gene

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**80.** Why hnRNA is required to undergo splicing?

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**81.** The microscopic grains of the past are obtained as fossils. Mention the characteristic of the pollen grains that makes it happen.

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**82.** How does colostrum provide initial protection against diseases to new born infants? Give one reason

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**83.** Mention the types of evolution that has brought the similarity as seen in potato tuber and sweet potato

 [Watch Video Solution](#)

**84.** Name the group of organisms and the substrate they act on to produce biogas.

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**85.** Mention the pollinating agent of an inflorescence of small dull coloured floweres with well exposed stamens and large feathery stigma. Give any one characteristic of pollen grains produced by such flowers.

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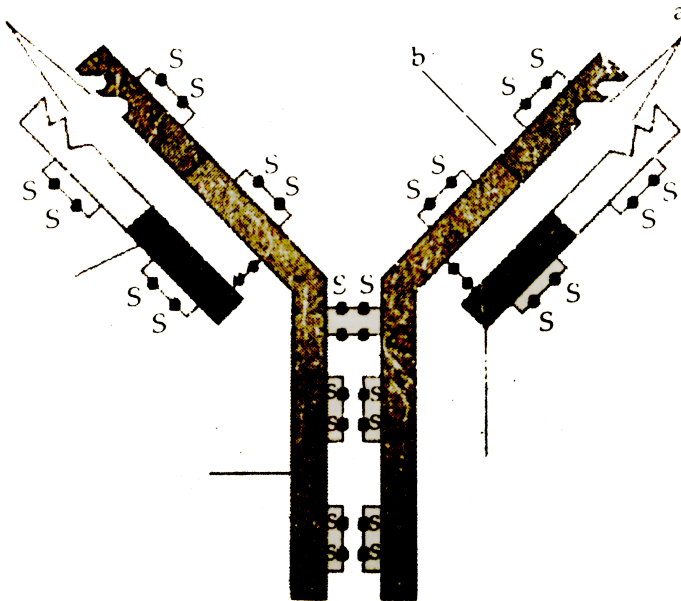
**86.** Name the organism commercially used for the production of single cell protein

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87. What does the above diagram illustrate?

Name the parts labelled 'a' and 'b'.

Name the types of cells that produce this molecule.



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**88.** Banana is a parthenocarpic fruit where oranges show polyembryony. How are they different from each other with respect to seeds?



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**89.** Where are fimbriae present in a human female reproductive system? Give their function.



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**90.** How is the translation of mRNA terminated? Explain.





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**91.** Explain accelerated eutrophication. Mention any two consequences of this phenomenon



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**92.** List the specific symptoms of amoebiasis. Name the causative organism



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**93.** A crane had DDT level as 5 ppm in its body. What would happen population of such birds ? Explain giving reasons



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**94.** Describe the responsibility of GEAC set up by the Indian Government.



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**95.** During the secondary treatment of the primary effluent how does the significant decrease in BOD occur



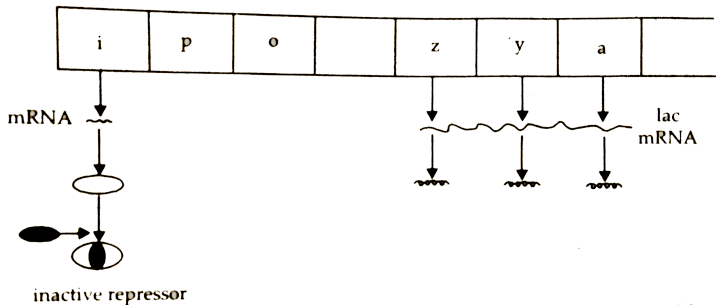
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96. Study the figure given below and answer the questions .

How does the repressor molecule get inactivated?

When does the transcription of lac mRNA stop?

Name the enzyme transcribed by the gene 'z'.



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**97.** Name the pioneer species on a bare rock. How do they help in establishing the next type of vegetation? Mention the type of climax community that will ultimately get established



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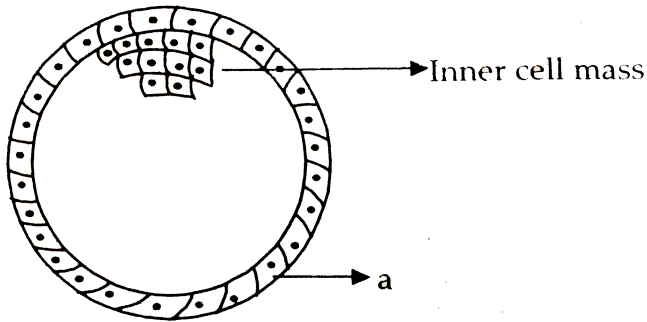
**98.** Study the figure given below and answer the questions that follow :

Name the stage of human embryo the figure represents

Identify 'a' in the figure and mention its function.

Mention the fate of the inner cell mass after implantation in the uterus

Where are the stem cells located in this embryo?



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**99.** Give the scientific name of the parasite that causes malignant malaria in humans. At what stage does this parasite enter the human body? Trace its life cycle in human body.



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**100.** Draw a labelled schematic sketch of replication fork of DNA. Explain the role of the enzymes involved in DNA replication



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**101.** Explain the cause of global warming. Why is it a warning to mankind?

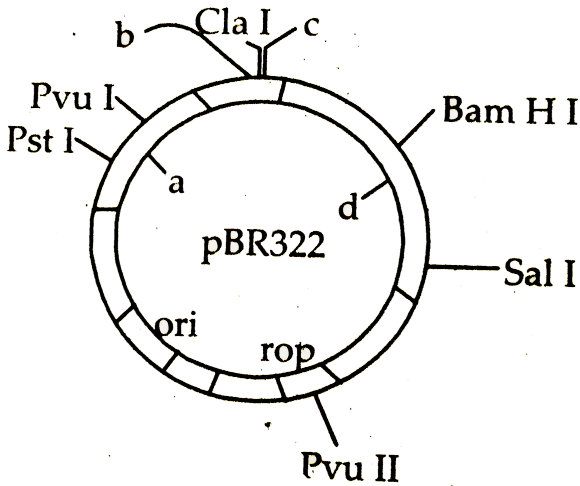


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**102.** Inheritance pattern of ABO blood group in human shows dominance, co-dominance and multiple allelism.

Explain each concept with the help of blood group genotypes

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103.

(a) Identify the selectable markers in the diagram of E. Coli vector shown above .

( b) How is the coding squnce of  $\alpha$ - galactosidase

consider a better markers than the ones identified by you in the diagram ? Explain.



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**104.** Mention the specific geographical region where these organisms are found.

Name and explain the phenomenon that has resulted in the evolution of such diverse species in the region.

Explain giving reason the existence of placental wolf and Tasmania wolf sharing the same habitat.



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**105.** Construct an ideal pyramid of energy when 1,000,000 joules of sunlight is available. Label all its trophic levels.



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**106.** Explain with the help of a diagram the development of a mature embryo sac from a megaspore mother cell in angiosperm



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**107.** Study the following flow chart. Name the hormones involved at each stage. Explain their functions.



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**108.** Two blood samples A and B picked up from the crime scene were handed over to the forensic department for genetic fingerprinting. Describe how the technique of genetic fingerprinting is carried out. How will it be confirmed whether the sample belonged to the same individual or two different individuals?



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**109.** One of the main objective of biotechnology is to minimize the use of insecticides on cultivated crops. Explain with the help of a suitable example how insect resistant crops have been developed using techniques of biotechnology.



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**110.** How is mature insulin different from proinsulin secreted humans pancreas in human?

Explain how was human functional insulin produced using rDNA technology.

Why is the functional insulin thus produced considered better than the ones used earlier by diabetic patients?



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**111.** Name the type of cell division that takes place in the zygote on an organism exhibiting haplontic life cycle



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**112.** Write the scientific name of the microbe used for fermenting malted cereals and fruit juices.



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**113.** Write the unit 'used for measuring ozone thicknes



**Watch Video Solution**

**114.** Name the event during cell divison cycle that results in the gain or loss of chromosome.



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**115.** How can bacterial DNA be released from the bacterial cell for biotechnology experiments ?



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**116.** Write the importance of cryopreservation in conservation of biodiversity. Ans



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**117.** Mention the role of the codons AUG and UGA during protein synthesis.



**Watch Video Solution**

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**118.** Normally one embryo develops in one seed but when an orange seed is squeezed many embryos of different shapes and sizes are seen. Mention how it has happened.

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**119.** How do histones acquire positive charge ?

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**120.** Why is CuT (Copper T) considered a good contraceptive device to space children ?

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**121.** Differentiate between albuminous and non-albuminous seeds, giving one example of each.

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**122.** Explain the process of RNA interference.

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**123.** List the key tools used in recombinant DNA technology

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**124.** Name the two types of immune systems in a human body. Why are cell mediated and humoral immunities so called

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**125.** Write the scientific names of the causal organisms of elephantiasis and ringworm in humans. Mention the

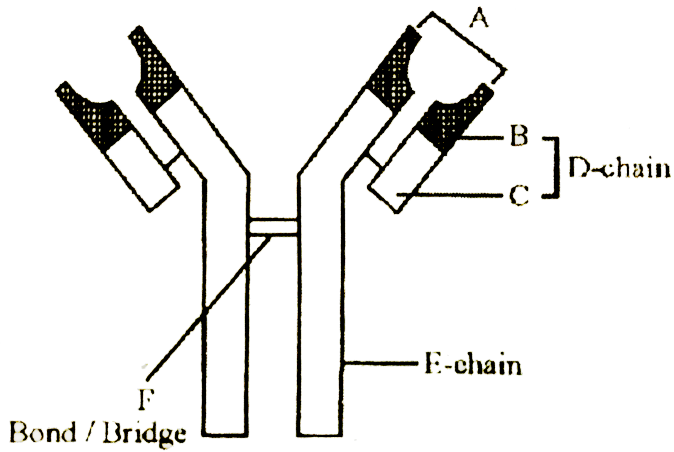
body parts affected by them.

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**126.** Justify with the help of an example where a deliberate attempt by humans has led to the extinction of a particular species.

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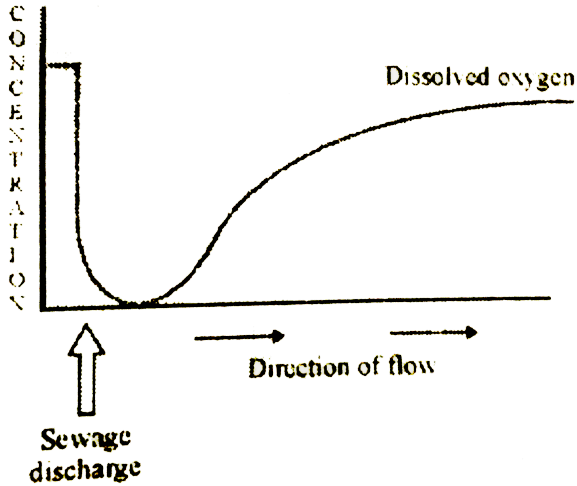
**127.** Identify A, D, E and F in the diagram of an antibody molecule given below :



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**128.** Study the graph given below. Explain how is oxygen concentration affected in the river when sewage is

discharged into it.



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**129.** Explain how a hereditary disease can be corrected.

Give an example of first successful attempt made towards correction of such diseases.



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**130.** Draw a diagram of a male gametophyte of an angiosperm. Label any four parts. Why is sporopollenin considered the most resistant organic material ?

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**131.** How are dominance, codominance and incomplete dominance patterns of inheritance different from each other ?

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**132.** The base sequence in one of the strands of DNA is TAGCATGAT.

(i) Give the base sequence of its complementary strand. (ii) How are these base pairs held together in a DNA molecule ? (iii) Explain the base complementarity rules. Name the scientist Who framed this rule.

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**133.** (a) Sickle cell anaemia in humans is a result of point mutation. Explain.

(b) Write the genotypes of both the parents who have produced a sickle cell anaemic offspring.

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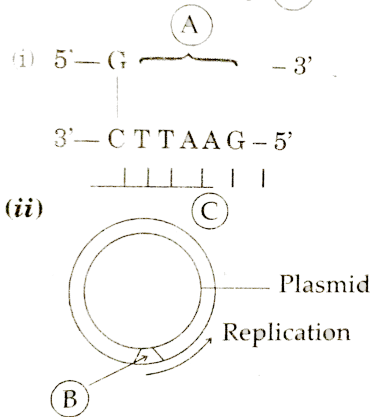
**134.** What is inbreeding depression and how is it caused in organisms ? Write any two advantages of inbreeding.

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135.

Identify

24. (a) Identify (A) and (B) illustration in the following :



(b) Write the term given to (A) and (C) and why ?

(c) Expand PCR. Mention its importance in biotechnology.

and

illustration in the following

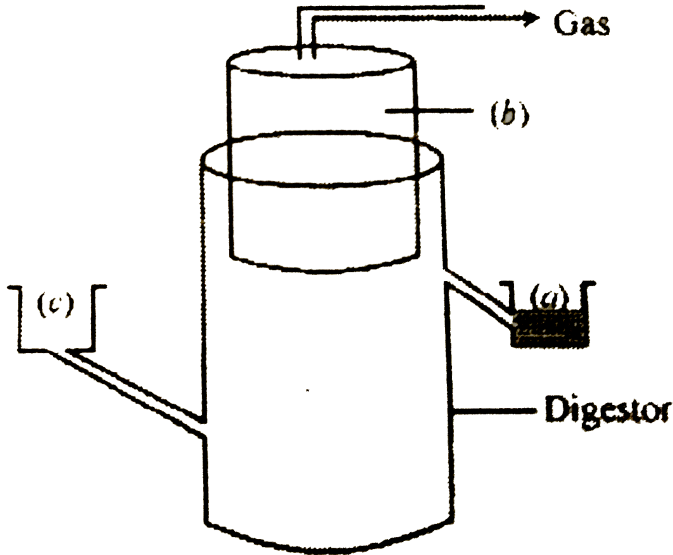
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136. The diagram above is that of a typical biogas plant.

Explain the sequence of events occurring in a biogas



plant. Identify a, b and c.



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**137.** How can crop varieties be made disease resistant to overcome food crisis in India ? Explain. Name one disease resistant variety in India of : (a) Wheat to leaf and stripe rust (b) Brassica to White rust



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**138.** Write the source and the effect on the human body of the following drugs

(i) Morphine

(ii) Cocaine

(iii) Marijuana



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**139.** Name the type of interaction seen in each of the following examples (i) Ascaris worms living in the intestine of human

(ii) Wasp pollinating fig inflorescence.

(iii) Clown fish living among the tentacles of sea-anemone

(iv) Mycorrhizae living on the roots of higher plants

(v) OPCh-id growing on a branch of a mango tree

(vi) Disappearance of smaller barnacles when Balanus dominated in the Coast of Scotland.



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**140.** (a) Draw a labelled diagram of the human female reproductive system.

(b) Enumerate the events in the ovary of a human female during

(i) Follicular phase

(ii) Luteal phase of menstrual cycle.



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**141.** (a) Write the specific location and the functions of the following cells in human males .

(i) Leydig cells

(ii) Sertoli cells

(iii) Primary spermatocyte

(b) Explain the role of any two accessory glands in human male reproductive system.



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**142.** Explain salient features of Hugo de Vries theory of mutation. How is Darwin's theory of natural selection different from it ? Explain.



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**143.** Explain primary productivity the factors that influence it.

Describe how do oxygen and chemical composition of detritus control decomposition.

What is El Nino effect ? Explain how it accounts for biodiversity loss

) Explain any three measures that you as an n

individual would take, to reduce environmental pollution.



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**Set I**

1. Name any two common Indian millet crops. State one characteristic of millets that has been improved as a result of hybrid breeding so as to produce high yielding millet crops.



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2. Explain the mechanism of Sex-determination in birds.

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3. What is adaptive radiation ? When can adaptive radiation be referred to as convergent evolution ? Give an example.

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4. (a) A DNA segment has a total of 1,500 nucleotides, out of which 410 are Guanine containing nucleotides. How many pyrimidine bases this segment possesses ?

(b) Draw a diagrammatic sketch of a portion of DNA segment to support your answer?



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5. Name the stage of human embryo at which it gets implanted. Explain the process of implantation.



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6. A non - biology person is quite shocked to know that apple is a false fruit mango is a true fruit and banana is



a seedles fruit .As a biology student how would you satisfy this person ?



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7. Aflower of brinjal plant following the process of sexual reproduction prroduces viable seeds.

Answer thr following questions giving reasons:

How many ovules are minimaly involved ?

( b) How many megaspore mother cells are involed ?

(c ) What is the minimum number of pollen grains that must land on stigma for pollination ?

( d) How many male gametes in the above cese ?



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8. Explain the importance of syngamy and meiosis in a sexual life cycle of an organism .



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9. why the plants that inhabit a desert are not found in a mangrove ? Give reasons .



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**10.** differentiable between somaclones and somatic hybrids give one example of each .



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**11.** A color-blind child is born to a normal couple. Work out a cross to show how it is possible. Mention the sex of this child.



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**12.** in certain seasons we sweat profusely while in some other season we shiver .



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**13.** List the criteria a molecule that can act as genetic material must fulfill. Which one of the criteria are best fulfilled by DNA or by RNA thus making one of them a better genetic material than can other? Explain.



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**14.** Differentiate between analogy and homology giving one example one each of plant and animal respectively

( B) How are they considered as an evidence in support of example of evolution ?



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15. Why is it essential to have a ' selectable marker' in a cloning vector



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16. Why are some molecules called bioactive molecules ? Give two examples of such molecules.



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**17.** List the two types of immunity a human baby is born with. Explain the differences between the two types.



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**18.** Explain the response of all communities on environment over time.



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**19.** (a) Name the causative agent of typhoid in humans.  
(b) Name the test administered to confirm the disease.

(c) How does the pathogen gain entry into the human body ? Write the diagnostic symptoms and mention the body organ that gets affected in severe cases.



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**20.** (a) Name the scientist who called tRNA an adapter molecule

(b) Draw a clover leaf structure of t-RNA showing the following :

(i) tyrosine attached to its amino acid site (ii) anticodon for this amino acid in its correct site (codon for tyrosine is UCA)

(c) What does the actual structure of t-RNA look like.



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21. Why are the wings of a butterfly and of a bat called analogous?



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22. How are the two following varieties of sugarcane different from each other'!

Saccharum barberi

Saccharum officinarum



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**23.** Name the cell from which the endosperm of coconut develops. Give the characteristic features of endosperm of coconut



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**24.** How does Cu-T acts as an effective contraceptive for human females?



**Watch Video Solution**

**25.** Nematode-specific genes are introduced into the tobacco plant using *Agrobacterium* vectors to develop

resistance in tobacco plants against nematodes.

Explain the events that occur in tobacco plant to develop resistance

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**26.** Egrets are often seen along with grazing cattle .

How do you refer to this interaction? Give a reason for this association.

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**27.** Mention the target cells of luteinising hormone in human males and females. Explain the effect and the changes which the hormone induces in each case.

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**28.** Draw a diagrammatic sectional view of human ovary showing stages of oogenesis along with corpus luteum. Where is morula formed in humans? Explain the process of its development from zygote.

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**29.** How does the pollen mother cell develop into a mature pollen grain? Illustrate the stages with labelled diagrams.



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**30.** How did Hershey and Chase prove that DNA is the hereditary material ? Explain their experiment with suitable diagrams.

Observation and Conclusions



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**31.** Inheritance pattern of flower colour in garden pea plant and snapdragon differs. Why is this difference observed? Explain showing the crosses up to  $F_2$  generation.



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**32.** How does Penicillium reproduce asexually



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**33.** Mention the uses of cloning vector in biotechnology.



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**34.** Mention the function of trophoblast in human embryo.



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**35.** Name the oral pill used as a contraceptive by human females. Explain how does it prevent pregnancy?



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**36.** Explain the advantage of cross breeding of the two species of sugarcane in India.



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**37.** Differentiate between geitonogamy and xenogamy in plants. Which one between the two will lead to inbreeding depression and why



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**38.** A pea plant with purple flowers was crossed with white flowers producing 60 plants with only purple

flowers.

On selfing, these plants produced 482 plants with purple flowers and 162 with white flowers. What gametic mechanism accounts for these results.



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**39.** Mention the property of plant cells that has helped them to grow into a new plant in in-vitro conditions. Explain the advantages of micropropagation.



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**40.** Healthy ecosystems are the base of wide range of (ecosystem) services. Justify.

Explain the differences and the similarities between hydrarch and xerarch successions of plants.

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### Set iii

1. Differentiate between 'ZZ' and 'XY' type of sex-determination mechanism.

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2. Enumerate at least four objectives for improving the nutritional quality of different crops for the health benefits of the human population by the process of "Biofortification".

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3. Explain the interpretation of Charles Darwin when he observed a variety of small black birds on Galapagos Islands.

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4. A DNA segment has a total of 2,000 nucleotides, out of which 520 are adenine containing nucleotides. How many purine bases this DNA segment possesses ?

Drawn a diagrammatic sketch of a portion of DNA segment to support your answer.



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5. A flower of tomato plant following the process of sexual reproduction produces 200 viable seeds.

Answer the following question giving reasons:

(a) What would have been the minimum number of ovules present per-pollinated pistil ?

(b) How many microspore mother cells would minimally be required to produce requisite number of pollen grains ?

(c) How many pollen grains must have minimally pollinated the carpel ?

(d) How many male gametes would have used to produce these 200 viable seeds ?

How many megaspore mother cells were required in this process?

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6. Explain the development of a secondary oocyte ( ovum) in a human female from the embryonic stage

upto its ovulation. Name the hormones involved in this process.



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7. Suggest any two possible treatments that can be given to a patient exhibiting adenosine deaminase deficiency.



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8. A liverwort plant is unable to complete its life- cycle in a dry environment State two reasons .



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9. The  $F_2$  progeny of a monohybrid cross showed phenotypic and genotypic ratio as 1:2:1, unlike that of Mendel's monohybrid  $F_2$  ratio. With the help of a suitable example, work out a cross and explain how it is possible.

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10. Why are some seeds referred to as apomictic seeds? Mention one advantage and one disadvantage to a farmer who uses them.



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11. (a) How are Mendelian inheritance, polygenic inheritance and pleiotropy different from each other ?
- (b) Explain polygenic inheritance pattern with the help of a suitable example.

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12. Distinguish between the roles of flocculation and anaerobic sludge digesters in sewage treatments.

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**13.** plants that inhabit a rain - forest are not found in a wetland ,Explain .



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**14.** What stimulates pituitary to release the hormone responsible to, parturition? Name the hormone.



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**15.** Pollinating species of wasps show mutualism with specific fig plants. Mention the benefits the female

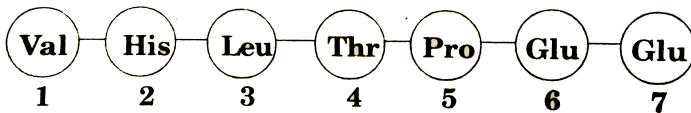


wasps derive from the fig trees from such an interaction



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16. A relevant portion of  $\beta$ -chain of haemoglobin of a normal human is given below :



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17. Biopiracy should be prevented. State why and how



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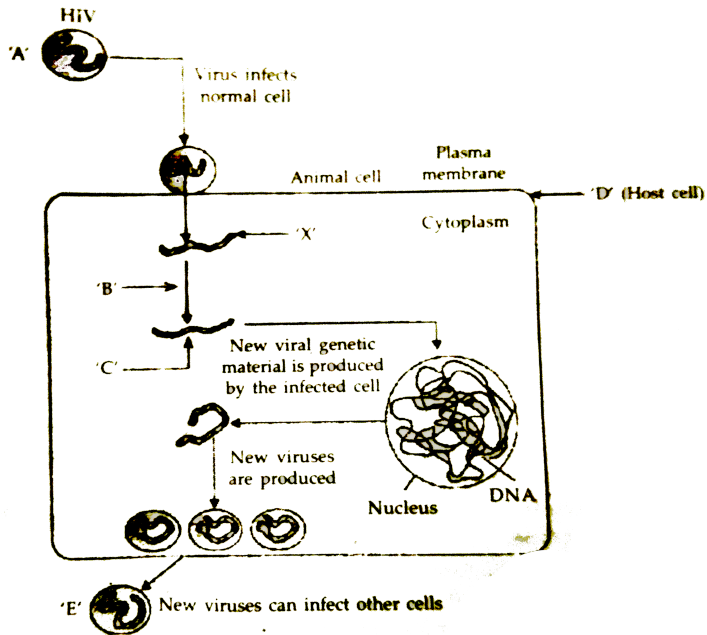
**18.** Why is tobacco smoking associated with rise in blood pressure and emphysema (oxygen deficiency in the body) ? Explain.

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**19.** What is polyblend ? Why did the plastic manufacturers think of producing it ? Write its usefulness.

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SECTION - C



20.

Study the diagram showing replication of HIV in humans and answer the following questions accordingly :

- (i) Write the chemical nature of the coat A .
- (ii) Name the enzyme B acting on X to produce molecule O . Name O .
- (iii) Mention the name of the host cell D the HIV attacks first when it enters into the human body.
- (iv)

Name the two different cells the new viruses E subsequently attack.



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**21.** Answer the following questions based on Meselson and Stahl's experiment: (a) Write the name of the chemical substance used as a source of nitrogen in the experiment by them. (b) Why did the scientists synthesise the light and the heavy DNA molecules in the organism used in the experiment? (c) How did the scientists make it possible to distinguish the heavy DNA molecule from the light DNA molecule? Explain.

((1) Write the conclusion the scientists arrived at after completing the experiment.



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22. A true breeding homozygous pea plant with green pods and axial flowers as dominant characters, crossed with a recessive homozygous pea plant with yellow pods and terminal flowers. Work out the cross upto  $F_2$  generation giving the phenotypic ratios of  $F_1$  and  $F_2$  generation respectively.

(b) State the Mendelian principle which can be derived from such a cross and not from monohybrid cross.



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**23.** Some allergens trigger sneezing and wheezing in human beings. What causes this type of response by the body?

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**24.** Are the thorn of Bougainvillea and tendril of cucurbita homologous or analogous. What type of evolution has brought such a similarity in them?

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**25.** Mention the two addition processing which hnRNA needs to undergo after splicing so as to become functional.



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**26.** Which of the following is a free living bacteria that can fix nitrogen in the soil?

Spirulina, Azospirillum, Sonalika



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27. Name the muscular and the glandular layers of human uterus . Which one of these layers undergoes cyclic changes during menstrual cycle ? Name the hormone essential for the maintenance of this layer



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28. Name the hormonal composition of the oral contraceptive used by human females. Explain how does it acts as a contraceptive.



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29. What is 'r' in the population equation given :  $dN/dt = rN$



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30. How does the increase and the decrease in the value of 'r' affect the population size"



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31. Name the respective forms in which the malaria parasite gains entry into (i) Human body, (ii) Body of female Anopheles.



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**32.** Name the hosts where the sexual and the asexual reproductions of malarial parasites occur respectively.



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**33.** Name the toxin responsible for the appearance of symptoms of malaria in humans. Why do these symptoms occur periodically?



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**34.** What did Meselson and Stahl observe when

They cultured *E. coli* in a medium containing  $^{15}\text{N}\text{H}_4\text{Cl}$

for a few generations and centrifuged the content?

they transferred one such bacterium to the normal

medium of  $\text{NH}_4\text{Cl}$  and cultured for 2 generations ?

What did Meselson and Stahl conclude from this experiment? Explain With the help of diagram

Which is the first genetic material? Give reasons in support of your answer.



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**35.** You are given a red flower-bearing pea plant and a red flower-bearing snapdragon plant. How would you

find the genotypes of these two plants with respect to the colour of the flower? Explain with the help of crosses. Comment upon the pattern of inheritance seen in these two plants.

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**36.** Draw a labelled diagram of a mature embryo sac. Why does a pollen grain possess two male gametes? Explain.

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**37.** Draw a schematic diagram of a human sperm and label the cellular components. Give the functions of any three parts.

Where are the sperm heads found embedded to survive after spermiogenesis?



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**38.** Why green plants are not found a certain depth in the ocean ?



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**39.** State the dual role of deoxyribonucleoside triphosphates during DNA replication.

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**40.** Explain the role of Ti plasmids in biotechnology.

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**41. (a)** Why do farmers prefer biofertilisers to chemical fertilizers these days ? Explain.

**(b)** How do Anabaena and mycorrhiza act as biofertilizers ?



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**42.** (a) Name the stage of plasmodium that gains entry into the human body.

(b) Trace the stages of in the body of female anopheles after its entry.

(c) Explain the cause of periodic recurrence of chill and high fever during malarial attack in humans.



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**43.** Trace the events that occur in human body to cause immunodeficiency when HIV gains entry into the body.



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44. (a) When and Where does spermatogenesis occur in human male ?

(b) Draw a diagram of a mature human male gamete. Label the following parts: acrosome, nucleus, middle piece and tail.

(c) Mention the functions of acrosome and middle piece.



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**45.** (a) Describe the stage of oogenesis in human female.

(b) Draw a labbed diagram of a human ovum released after ovulation



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**46.** (a) When and where does spermatogenesis occur in human male ?

(b) Draw a diagram of a mature human male gamete and label the following parts : acrosome, middle piece and tail

(c) mention the function of acrosome and middle piece

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## Set I

1. How many chromosomes do drones of honeybee possess ? Name the type of cell division involved in the production of sperms by them.

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2. What is a Cistron.?

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3. Retroviruses have no DNA. However, the DNA of the infected host cell does possess viral DNA. How is it possible ?



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4. Why do children cured by enzyme-replacement therapy for adenosine deaminase deficiency need periodic treatment ?



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5. List two advantages of the use of unleaded petrol in automobiles as fuel.

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6. Why do moss plants produce very large number of male gametes ? Provide one reasons. What are these gametes called ?

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7. Select the homologous structures from the combinations given below :

Forelimbs of whales and bats

Tuber of potato and sweet potato

Eyes of octopus and mammals

Thorns of Bougainvillea and tendrils of Cucurbita. (b)

State the kind of evolution they represent.



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**8.** Why are the plants raised through micropropagation

termed somaclones ?

(b) Mention two advantage of this technique .



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9. Explain the different steps involved during primary treatment phase of sewage.



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10. What is mutualism ? Mention any two examples where the organisms involved are commercially exploited in agriculture.



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11. List any four techniques where the principle of ex-situ conservation of biodiversity has been employed.



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12. State what is apomixis. Write its significance. How can it be commercially used ?



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13. During a monohybrid cross involving a tall pea plant with a dwarf pea plant, the offspring populations were tall and dwarf in equal ratio. Work out a cross to show how it is possible.



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**14.** Explain the significance of satellite DNA in DNA fingerprinting technique.



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**15.** A heavily bleeding and bruised road accident victim was brought to a nursing home . The doctor immediately gave him an injection to protect the patient's against a deadly disease.

( a ) Write what did the doctor inject into the patient's body .

( b ) How do you think this injection would protect the patient against the disease ?



( c) Name the disease against which this injection was given and the kind of immunity it provides .



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**16.** Enumerate any six essentials of good ,effective Dairy Farm Management Practices.



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**17.** State the medicinal value and the bioactive molecule produced by streptococcus ,Monascus and Trichoderma



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**18.** What are methanogens ? How do they help to generate biogas ?



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**19.** Rearrange the following in the correct sequence to accomplish an important biotechnological reaction:

- ( a ) In vitro synthesis of copies of DNA of interest
- ( b ) Chemically synthesized oligo - nucleotides
- ( c ) Enzyme DNA - polymerase
- ( d ) Complementary region of DNA
- ( e ) Genomic DNA template

(f) Nucleotides provided

(g) Primes

(h) Thermostable DNA polymerase (from *Thermus aquaticus*)

(i) Denaturation of ds-DNA



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20. Describe any three potential applications of genetically modified plants.



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**21.** How do snails, seeds, bears, zooplanktons, fungi and bacteria adapt to conditions unfavourable for their survival ?

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**22.** Explain the function of each of the following :

(a) Coleorhiza , ( b) Umbilical cord ,( c) Germ pores

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**23.** Your school has been selected by the Department of Education to organize and host an inter school

seminar on "Reproductive Health - problems and practices " However ,many parents are reluctant to permit their wards to attend it . Their argument is that topic is " too embarrassing "

Put forth four arguments with appropriate reasons and explanation to justify the topic to be very essential and timely.



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**24.** Plan an experiment and prepare a flow chart of the steps that you would follow to ensure that the seeds are formed only from the desired sets of pollen grains. Name the type of experiment that you carried

out .

( b) Write the importance of such experimets.



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**25.** Why are thalassemia and hemophilia categorized as Mendelian disorders ?

(a) Write the symptoms of these diseases. Explain their pattern of inheritance in humans.

( b) Write the genotypes of the normal parents producing a hemophilic son.



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**26.** How do m-RNA, t-RNA and ribosomes help in the process of translation ?



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**27. (a)** List the different attributes that a population has and not an individual organism.

**(b)** What is population density? Explain any three different ways the population density can be measured with the help of an example each.



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**28.** It is often said that the pyramid of energy is always upright. On the other hand, the pyramid of biomass can be both upright and inverted." Explain with the help of example and sketches .



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**29.** AMOSS Plant is unable to complete its life-cycle in a dry environment. State two reasons.



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**30.** Explain co-evolution with reference to parasites and their hosts. Mention any four special adaptive features evolved in parasites for their parasitic mode of life.



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**31.** With the help of a flow - chart exhibit the events of eutrophication .



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**32.** Explain the process to transcription in prokaryotes .How is the process different in eukaryotes ?



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## Others

1. An anther with malfunctioning tapetum often fails of produce viable male gametophytes. Give one reason.



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2. Why sharing of injection needles between two individuals is not recommended?



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3. Name the enzyme and state its property that is responsible for continuous and discontinuous replication of the two strands of a DNA molecule.



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4. Identify the examples of convergent evolution from the following :

- (i) Flippers of penguins and dolphins
- (ii) Eyes of octopus and mammals
- (iii) Vertebrate brains



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5. Write the importance of MOET.



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6. Why is the enzyme cellulase needed for isolating genetic material from plant cells and not from the animal cells?



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7. Name the type of biodiversity represented by the following:

(i) 50,000 different strains of rice in India

(ii) Estuaries and alpine meadows in India.



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**8.** Write the equation that helps in deriving the net primary productivity of an ecosystem.



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**9.** Write the function of adenosine deaminase enzyme. State the cause of ADA deficiency in humans. Mention a possible permanent cure for a ADA deficiency patient.



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**10.** Expand the following and mention one application of each : (i) PCR (ii) ELISA



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**11. (a)** Mention the difference in the mode of action of exonuclease and endonuclease.

**(b)** How does restriction endonuclease function?

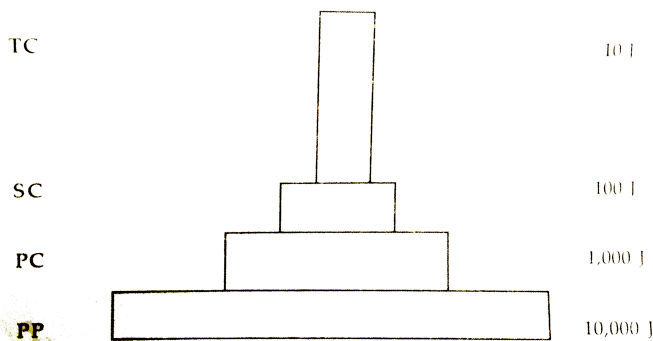


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12. Name any two source of e-wastes and write two different ways for their disposal.

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13. Why the pyramid of energy is always upright?  
Explain.



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**14.** Explain why very small animals are rarely found in polar region.



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**15.** With the help of any two suitable examples explain the effect of anthropogenic actions on organic evolution



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**16.** The movement of a gene from one linkage group to another is called





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17. Describe the structure of a RNA polynucleotide chain having four different types of nucleotides.



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18. (a) Why are the fruit juices brought from market clearer as compared to those made at home?

(b) Name the bioactive molecule produced by *Trichoderma polysporum*.



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**19.** Differentiate between inbreeding and outbreeding in cattle. State one advantage and one disadvantage for each one of them.



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**20.** (a) why are transgenic animals so called?

(b) Explain the role of transgenic animals in (i) vaccine safety and (ii) biological products with the help of an example each



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**21.** How have human activities caused desertification ?

Explain.

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**22.** Explain mutualism with the help of any two examples. How is it different from commensalism?

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**23.** (a) Draw a diagrammatic sectional view of the female reproductive system of human and label the parts

(i) where the secondary oocytes develop

(ii) which helps in collection of ovum after ovulation

(iii) where fertilization occurs

(iv) where implantation of embryo occurs.

(b) Explain the role of pituitary and the ovarian hormones in menstrual cycle in human females.



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**24.** (a) What is plant breeding? List the two steps the classical plant breeding involves.

(b) How has the mutation breeding helped in improving crop varieties? Give one example where this technique has helped.

(c) How has the breeding programme helped in improving the public nutritional health? State two examples in support of your answer.



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**25.** A child suffering from Thalassemia is born to a normal couple. But the mother is being blamed by the family for delivering a sick baby.

(a) What is Thalassemia ?

(b) How would you counsel the family not to blame the mother for delivering a child suffering from this disease ? Explain...

(c) List the values your counselling can propagate in the families.



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**26.** Identify the examples of homologous structures from the following-

(i) Vertebrate hearts

(ii) Thorns in Bougainvillea and tendrils of Cucurbita.

(iii) Food storage-organs in sweet potato and potato.



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27. A young boy when brought a pet dog home started to complain of watery eyes and running nose. The symptoms disappeared when the boy was kept away from the pet.

(a) Name the type of antibody and the chemicals responsible for such a response in the boy.

(b) Mention the name of any one drug that could be given to the boy for immediate relief from such a response.



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**28.** (a) Explain how to find whether an E. coli bacterium has transformed or not when a recombinant DNA bearing ampicillin resistant gene is transferred into it.

(b) What does the ampicillin resistant gene act as in the above case?



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**29.** (a) Draw a diagram of the structure of a human ovum surrounded by corona radiata. Label the following parts :

(i) Ovum, (ii) Plasma Membrane, (iii) Zona Pellucida

(b) State the function of Zona Pellucida.



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**30.** (a) Describe the events of spermatogenesis with the help of a schematic representation.

(b) Write two differences between spermatogenesis and oogenesis.

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**31.** Explain the steps that ensure cross pollination in an autogamous flower.

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**32.** Why and how bacteria can be made 'competent' ?



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**33.** (a) Name the deficiency for which first clinical gene therapy was given.

(b) Mention the cause of and one cure for this deficiency.



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**34.** (a) Draw a diagram of a mature embryo sac of an angiosperm and label the following parts in it :

(i) Filiform apparatus (ii) Synergids

(iii) Central cell (iv) Egg cell

(v) Polar nuclei (vi) Antipodals

(b) Write the fate of egg cell and polar nuclei after fertilization.



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**148.** Name the genes responsible for making Bt cotton plants resistant to bollworm attack. How do such plants attain resistance against bollworm attacks? Explain.

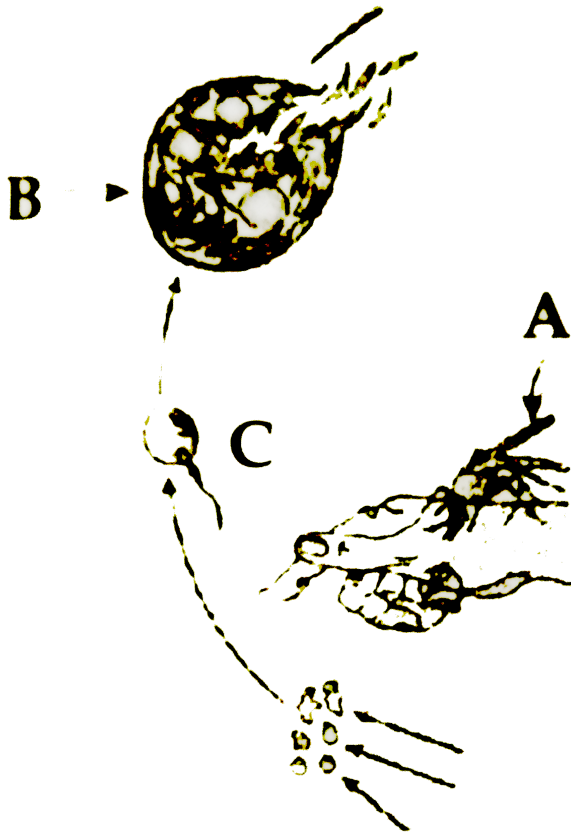


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**149.** Study a part of the life cycle of malarial parasite given below. Answer the questions that follows: (a) Mention the roles of 'A' in the life cycle of the malarial parasite.

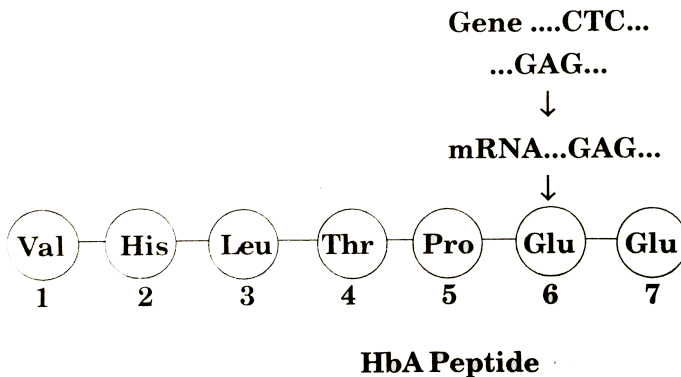
(b) Name the event 'C' and the organ where this event occurs .

(c) Identify the organ 'B' and name the cells being released from it.



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**150.** Given below is the representation of amino acid composition of the relevant translated portion of  $\beta$ -chain of haemoglobin, related to the shape of human red blood cells.



(a) Is this representation indicating a normal human or a sufferer from certain related genetic disease? Give reason in support of your answer.

(b) What difference would be noticed in the phenotype of the normal and the sufferer related to this gene?

(c) Who are likely to suffer more from the defect related to the gene represented the males, the females or both males and females equally? And why?



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(i) Identify the figure that illustrates ovulation and mention the stage of oogenesis it represents.

(ii) Name the ovarian hormone and the pituitary hormone that have caused the above mentioned event.

(iii) Explain the changes that occur in the uterus simultaneously in anticipation.

(iv) Write the difference between 'c' and 'h'

(v) Draw a labelled sketch of the structure of a human ovum prior to fertilization.



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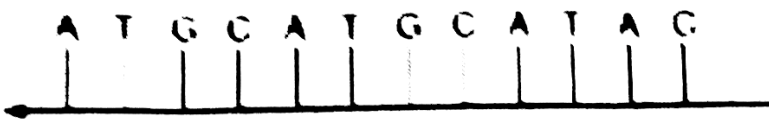
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**174.** (a) Construct a complete transcription unit with promoter and terminator on the basis of the hypothetical template strand given below :



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