



Delhi Public School, Howrah

PERIODIC TEST III (2024-2025)

Class-XII

Care must be taken not to write anything on the question paper. All the questions must be attempted in the correct sequence.

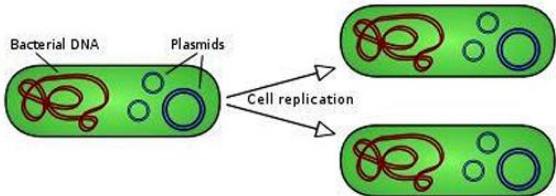

Subject: - Biology (Code No. 044)

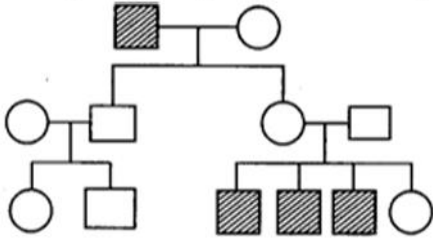
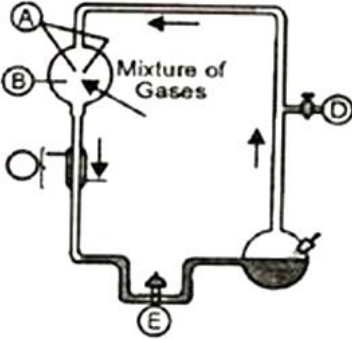
Time: -3 Hours

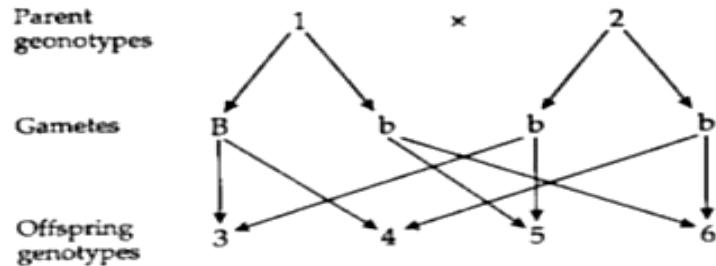
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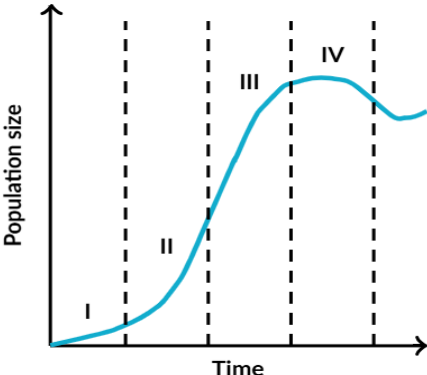
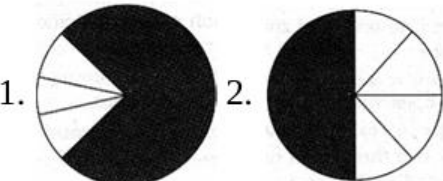
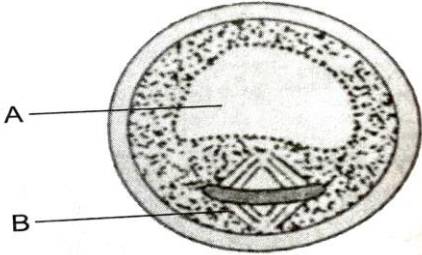
General Instructions:

- i. All questions are compulsory.
- ii. The question paper has five sections and 33 questions. All questions are compulsory.
- iii. Section–A has 16 questions of 1 mark each; Section–B has 5 questions of 2 marks each; Section– C has 7 questions of 3 marks each; Section– D has 2 case-based questions of 4 marks each; and Section–E has 3 questions of 5 marks each.
- iv. There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.
- v. Wherever necessary, neat and properly labeled diagrams should be drawn.

Q. No.	SECTION A Q. No. 1 to 12 are multiple choice questions. Only one of the choices is correct. Select and write the correct choice as well as the answer to these questions.	Marks
1.	<p>Which of the following is true for a Plasmid –</p>  <p>a. It can be replicate independently b. It lies together with chromosomes c. It cannot replicate d. It shows independent assortment</p>	1
2.	<p>The following two images represent which of the cause of biodiversity loss?</p>  <p>a. Habitat loss and fragmentation b. Over-exploitations c. Alien species invasions d. Co- extinctions</p>	1

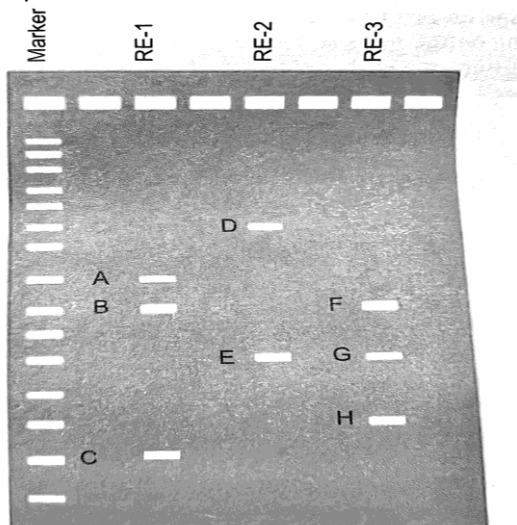
3.	<p>In the given pedigree the shaded figures denote individuals expressing a specific trait. Which of the following is the most probable mode of inheritance of this trait?</p>  <p>a. X-linked recessive transmission b. Codominant relationship of a single pair of alleles c. Simple Mendelian Recessive d. X-linked dominant transmission</p>	1
4.	<p>What would NOT be a side effect of a drug that hypo-stimulates the Leydig (interstitial) cells on a pubertal human?</p> <p>a. Increased secretion of GnRH (gonadotropin-releasing hormone) by hypothalamus b. Increased secretion of FSH (follicle stimulating hormone) by anterior pituitary c. Decreased secretion of GnRH (gonadotropin-releasing hormone) by hypothalamus d. Increased secretion of LH (luteinizing hormone) by anterior pituitary</p>	1
5.	<p>What was the mixture of gases used in chamber marked A?</p>  <p>a. Oxygen O₂, ammonia (NH₃), hydrogen H₂, and water H₂O b. Oxygen O₂, ozone O₃, hydrogen H₂, and water H₂O c. Methane (CH₄), ammonia (NH₃), hydrogen H₂ and water H₂O d. Oxygen O₂, ozone O₃, hydrogen H₂</p>	1
6.	<p>Amit and Mahi are unable to conceive, though they are producing gametes normally. Their doctor suspects that somehow Mahi's reproductive tract can't provide the right conditions for fertilization. Which of the following methods would help them have a child?</p> <p>a. Zygote intrafallopian transfer b. Artificial insemination c. Intra cytoplasmic sperm transfer d. Gamete intrafallopian transfer</p>	1
7.	<p>A man who is blood type AB marries a woman who is blood type heterozygous B. What will be the possible phenotypes of the blood group of their four children?</p> <p>a. AB, AB, A, B b. AB, B, B, A c. AB, O, B, A d. AB, A, A, O</p>	1
8.	<p>If $b = 65$ and $d = 45$, $N = 100$ then find out dN/dt. [Note: b = Birth rate; d = Death rate]</p> <p>a. 100 b. 1000 c. 200 d. 2000</p>	1

9.	<p>Identify the blank spaces A, B, C and D given in the following table.</p> <table border="1" data-bbox="151 132 1437 325"> <thead> <tr> <th>Type of Microbe</th> <th>Scientific Name</th> <th>Commercial Product</th> </tr> </thead> <tbody> <tr> <td>Bacterium</td> <td>A</td> <td>Clot buster enzyme</td> </tr> <tr> <td>B</td> <td>Aspergillus niger</td> <td>Citric acid</td> </tr> <tr> <td>Fungi</td> <td>Trichoderma polysporum</td> <td>C</td> </tr> <tr> <td>Bacterium</td> <td>D</td> <td>Butyric acid</td> </tr> </tbody> </table> <p>a. A - <i>Streptococcus</i>, B - Fungus, C - Cyclosporin-A, D- <i>Clostridium butylicum</i>. b. A- <i>Clostridium butylicum</i>, Q-<i>Streptococcus</i>, C - Fungus, D - Cyclosporin-A c. A- Cyclosporin-A, B - <i>Clostridium butylicum</i>, C - <i>Streptococcus</i>, D – Fungus d. A - Fungus, B - Cyclosporin-A, C - <i>Clostridium butylicum</i>, D - <i>Streptococcus</i></p>	Type of Microbe	Scientific Name	Commercial Product	Bacterium	A	Clot buster enzyme	B	Aspergillus niger	Citric acid	Fungi	Trichoderma polysporum	C	Bacterium	D	Butyric acid	1
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10.	<p>A circular double-stranded DNA molecule of 45kb size has two restriction sites for EcoR I and one for HindIII. All of them are equidistant from each other. Upon incubation with both the restriction enzymes how many band(s) will appear in the gel electrophoresis?</p> <p>a. 3 b. 4 c. 1 d. Insufficient data</p>	1															
11.	<p>Golden rice is</p> <p>a. A variety of rice grown along the yellow river in China b. A transgenic rice having gene for b-carotene c. Long stored rice having yellow colour tint. d. Wild variety of rice with yellow coloured grains.</p>	1															
12.	<p>The genetic diagram shows a monohybrid cross. B is the dominant allele and b is the recessive allele:</p>  <p>Which of the parents and offspring are heterozygous?</p> <p>a. 1, 3 and 4 b. 1, 5 and 6 c. 2, 3 and 4 d. 2, 5 and 6</p>	1															
<p>Question No. 13 to 16 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:</p> <p>a. Both A and R are true and R is the correct explanation of A. b. Both A and R are true and R is not the correct explanation of A. c. A is true but R is false. d. A is False but R is true.</p>																	
13.	<p>Assertion (A): Central cell of embryo sac has two haploid polar nuclei. Reason (R): Antipodal cells are three in number in female gametophyte or embryo sac.</p>	1															
14.	<p>Assertion (A): Self-incompatibility is a genetic mechanism which prevents self-pollination and thereby fertilisation by inhibiting either pollen germination or pollen tube growth in the pistil. Reason (R): In gametophytic self-incompatibility, the incompatibility reaction is determined by the genotype of the sporophytic tissue of the plant from which the pollen is derived.</p>	1															
15.	<p>Assertion (A): DNA fingerprinting is a very quick way to distinguish any two individuals. Reason (R): Any two individuals in the world except identical twins have not similar VNTR.</p>	1															

16.	<p>Assertion (A): 'Cry' proteins are named so because they are crystal proteins. Reason (R): 'Cry' proteins are solubilised in acidic environment of insect midgut and then release toxic core fragments after proteolytic action.</p>	1
SECTION B		
17.	<p>a. A group of researchers tracked the size of a mockingbird population over time. Their results are shown in the graph below.</p>  <p>Which part of the graph represents the point where fecundity (high fertility) sharply increases, and mortality is low?</p> <p>b. A biologist studied the population of rats in a barn. He found that in a year the number of rats increases to 250 from an initial population of 200. What is the birth rate for the given population?</p>	2
18.	<p><u>Attempt either option a or b.</u></p> <p>a. Draw a well labelled diagram of the structure of a sperm.</p> <p style="text-align: center;">OR</p> <p>b. Draw a schematic representation to show the process of spermatogenesis.</p>	2
19.	<p>In the pie chart (1) and (2) drawn below to show the global animal diversity, which group of animals would you name on the areas shaded back in (1) and (2)? In which kind of habitat would you find these groups of animals?</p> 	2
20.	<p>The figure given below shows one stage in the development of microspore. Study the figure and answer the following questions.</p>  <p>a. Identify the label A and B. b. Draw and label the next stage of development that follows.</p>	2
21.	<p><u>Attempt either option a or b.</u></p> <p>a. Mention any four objectives of RCHC.</p> <p style="text-align: center;">OR</p> <p>b. How are non-medicated IUDS different from hormone-releasing IUDS? Give examples.</p>	2

SECTION C

22. Three circular DNA molecules were incubated independently with three different restriction enzymes, RE-1, RE-2 and RE-3 and gel electrophoresis was carried out to separate the DNA fragments formed by restriction digestion. Observe the gel showing the migration of DNA fragments cut with the restriction endonucleases and answer the questions that follows:

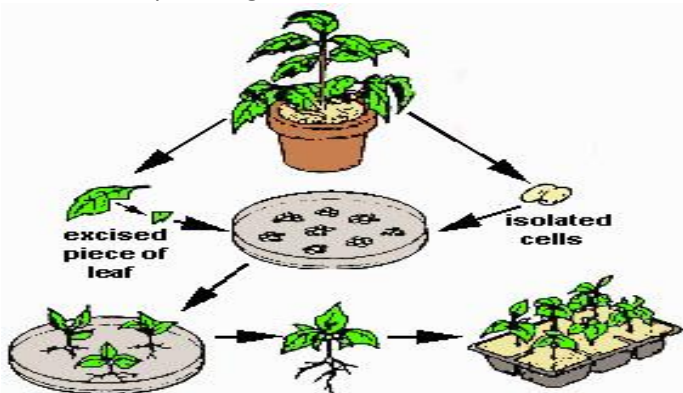


- Write the principle responsible for the migration of DNA fragments to such different positions in the gel.
- How many recognition sites for each of these restriction enzymes were present in the DNA cut with these enzymes? Justify your answer.
- How can one visualize the separated DNA fragments and extract them from the gel?

23. Name the techniques which are employed in following cases:

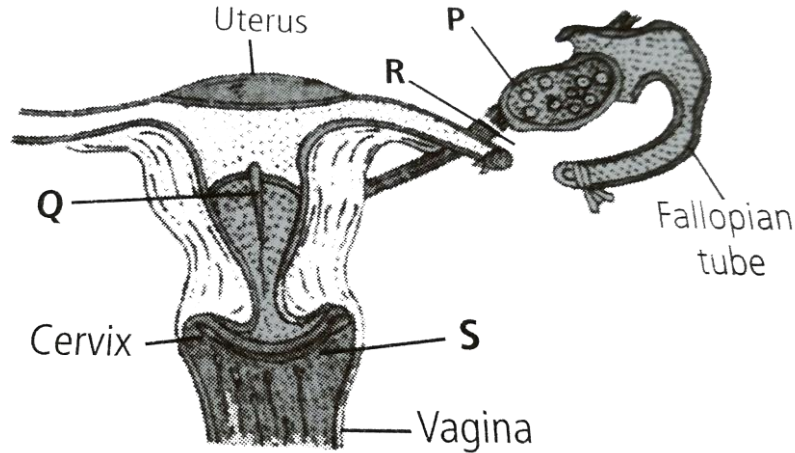
- Transfer of an ovum collected from a donor into the fallopian tube of another female who cannot produce ova but can provide suitable environment for fertilisation and development.
- Embryo is formed in laboratory in which sperm is directly injected into ovum.
- Semen collected either from husband or a healthy donor is artificially introduced either into vagina or uterus.

24. Observe the picture given below and answer the following questions:



- Identify the process shown in the given picture.
- Define the following terms based on the process shown above-
 - Explants
 - Totipotency
 - Micro- propagation
 - Somaclones

25. a. The given figure represents locations (P,Q,R,S) in human female reproductive system that are affected by different birth control measures. Identify the birth control measures the use of which can affect the location P, Q, R and S as shown in the given diagram.



- b. Name the sexually transmitted disease which does not specifically affect the sex organs. Also mention the cause of the disease.

26. Explain the polymerase chain reaction along with the diagram.

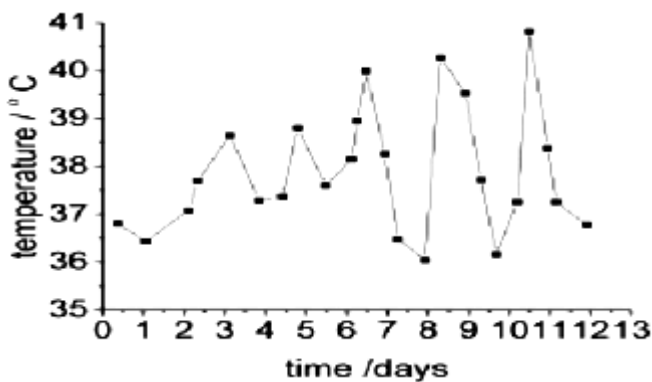
27. How would you find genotype of a tall pea plant bearing white flowers? Explain with the help of a cross. Name the type of cross you would use.

28. A patient complains of suffering from constipation, stomach ache, stool with blood clots and excess mucous. The physician diagnosed it as amoebiasis, after stool test.

- Write the scientific name of the microbe identified in the stool sample.
- How do you think, the patient must have contracted it?
- Write your suggestions to the patient to avoid infection in future.

SECTION D

29. Given below is the pattern of temperature in a person suffering from a non-viral disease transmitted by mosquitoes. Study the graph and answer the questions that follow:



- Explain the factor(s) responsible for this pattern of temperature.
- How does this pathogen multiply in the human body?

Attempt either subpart c or d

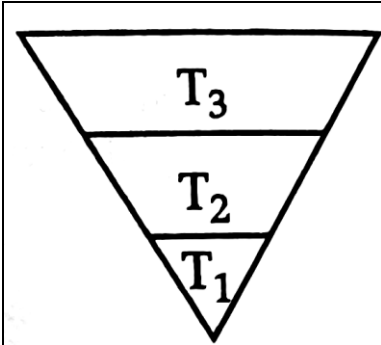
- How is this infection transmitted to humans?

OR

- Which stages of the life cycle of this pathogen are completed in the mosquito's gut?

30. Diagrammatic representation of qualitative data of different trophic levels of an ecosystem forms the ecological pyramids. They are of three types- i. Number of individuals/ unit area ii. Biomass value and iii.

Energy content. The pyramids of number or biomass may be upright or inverted depending upon the nature of trophic levels. Look at the picture given below and answer the questions:



- a. The given pyramid depicts which ecosystem? Give reasons.
- b. Plants-----→ autotrophs, Animals-----→ heterotrophs, Microbes-----→ ?
State how microbes accomplish their energy requirements.

Attempt either subpart c or d

- c. Why is the number of trophic levels in an ecosystem limited?

OR

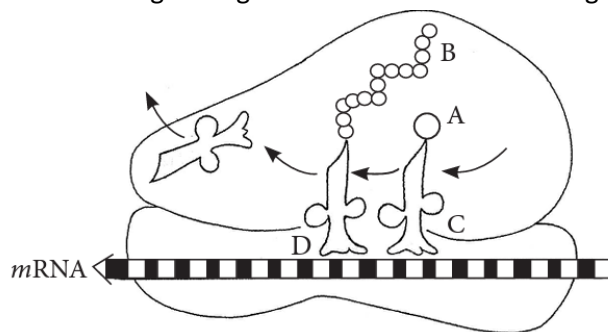
- a. Name any two things which ecological pyramids show.

SECTION E

31. **Attempt either option a or b**

5

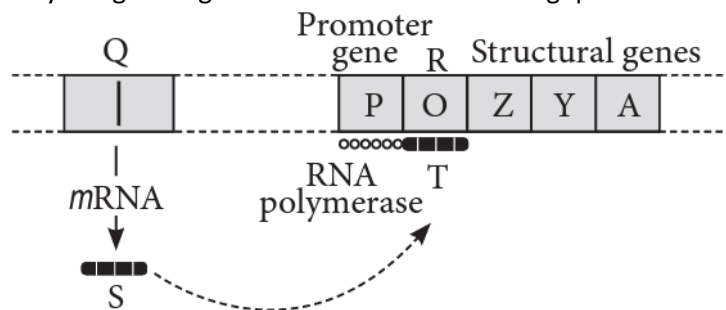
- a. Observe the given figure and answer the following questions.



- i. Identify A, B, C and D in the given figure.
- ii. State the function of C and D.
- iii. How does elongation of B occur?

OR

- b. Study the given figure and answer the following questions.



- i. Identify the figure and Q, R, S and T.
- ii. Explain the function of S.
- iii. State the function of Z, Y and A in presence of lactose in the medium.

32.	<p><u>Attempt either option a or b.</u></p> <p>a. Describe the process of waste water treatment under the following heads:</p> <ol style="list-style-type: none"> i. Primary treatment ii. Secondary treatment. <p style="text-align: center;">OR</p> <p>b. i. How does <i>Bacillus thuringiensis</i> act as a biocontrol agent for protecting Brassica and fruit trees? Explain. ii. List the components of biogas. What makes methanogens a suitable source of biogas production?</p>	5
33.	<p><u>Attempt either option a or b.</u></p> <p>a. i. Write about the ancestry and evolution of bat, horse and human on the basis of a comparative study of their forelimbs. What are these limbs categorized as? ii. There are 100 students in a class. Ninety-six did well in the course whereas four blew it totally and received a grade of F. In the highly unlikely event that these traits are genetic rather than environmental, if these traits involve dominant and recessive alleles, and if the four (4%) represent the frequency of the homozygous recessive condition, calculate the following:</p> <ol style="list-style-type: none"> A. The frequency of the recessive allele. B. The frequency of the dominant allele. C. The frequency of heterozygous individuals. <p>iii. What is 'fitness of an individual' according to Darwin?</p> <p style="text-align: center;">OR</p> <p>b. i. How do paleontological evidences support evolution of organisms on earth? ii. Within a population of butterflies, the color brown (B) is dominant over the color white (b). And, 40% of all butterflies are white. With the given information, calculate the following:</p> <ol style="list-style-type: none"> A. The percentage of butterflies in the population that are heterozygous. B. The frequency of homozygous dominant individuals. <p>iii. Write the names of the following:</p> <ol style="list-style-type: none"> A. A 15 mya primate that was ape-like B. A 2 mya primate that lived in East African grasslands. 	5