



# TECHNO INDIA GROUP PUBLIC SCHOOL

## MOCK TEST-3 (2025-2026)

### CLASS-XII

Subject Code **043**

Roll No.

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Candidates must write the code on the title page of the answer-book.

## BIOLOGY

Time allowed : 3 hours

Maximum Marks : 70

### General Instruction:

Read the following instructions carefully and follow them :

1. There are 33 questions in this question paper with internal choice.
2. SECTION A consists of 16 multiple-choice questions carrying 1 mark each.
3. SECTION B consists of 5 short answer questions carrying 2 marks each
4. SECTION C consist of 7 short answer questions carrying 3 marks each.
5. SECTION D consists of 2 case-based questions carrying 4 marks each.
6. SECTION E consists of 3 long answer questions carrying 5 marks each.
7. All questions are compulsory.

### SECTION A

**Section A: Question 1 to 16 are multiple choice questions. Only one of the choices is correct. Select and write the correct choice as well as the answer to those questions**

1. If most individuals in a population are young, why is the population likely to grow rapidly in future? (A) Many individuals will begin to reproduce soon (B) Death rates will be low (C) Immigration and emigration can be ignored (D) All of these	[1]
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2.	Primary endosperm nucleus (PEN) is formed by the fusion of (A) 2 polar nuclei + 1 synergid cell nucleus (B) 1 polar nucleus + 1 antipodal cell nucleus + 1 synergid cell nucleus (C) 2 polar nuclei + 1 male gamete nucleus (D) 2 antipodal cell nuclei + 1 male gamete nucleus	[1]																									
3.	Which enzyme helps in removing oil stains from clothes? (A) Streptokinase      (B) Trypsin      (C) Lipase      (D) Amylase	[1]																									
4.	Which of the following is responsible for transmission of HIV? (A) Transfusion of contaminated blood      (B) Sharing infected needles (C) Multiple sexual partners      (D) All of these	[1]																									
5.	Hardy-Weinberg equilibrium is known to be essentially affected by factors like gene flow, genetic drift, mutation, genetic recombination, and (A) Evolution      (B) Limiting factors      (C) Saltation      (D) Natural selection	[1]																									
6.	Plasmid used to construct the first recombinant DNA was isolated from which bacterium species? (A) <i>Thermus aquaticus</i> (B) <i>Salmonella typhimurium</i> (C) <i>Escherichia coli</i> (D) <i>Agrobacterium tumefaciens</i>	[1]																									
7.	If a double stranded DNA has 20% of cytosine, what will be the percentage of adenine in it? (A) 20%      (B) 60%      (C) 40%      (D) 30%	[1]																									
8.	The density of a population in a given habitat during a given period, fluctuates due to changes in certain basic processes. On this basis, fill up boxes A and B in the given flow chart with correct options. <div style="text-align: center;"> <pre> graph LR     A((A)) -- "+" --&gt; N[Population Density (N)]     N -- "-" --&gt; B((B))           </pre> </div> (A) A-Natality, B-Mortality      (B) A-Immigration, B-Emigration (C) A-Natality, C-Immigration      (D) Both (A) and (B)	[1]																									
9.	The given Punnett's square represents the pattern of inheritance in a dihybrid cross where yellow (Y) and round (R) seed condition is dominant over white (y) and wrinkled (r) seed condition. <table border="1" style="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td></td> <td>YR</td> <td>Yr</td> <td>yR</td> <td>yr</td> </tr> <tr> <td>YR</td> <td>F</td> <td>J</td> <td>N</td> <td>R</td> </tr> <tr> <td>Yr</td> <td>G</td> <td>K</td> <td>O</td> <td>S</td> </tr> <tr> <td>yR</td> <td>H</td> <td>L</td> <td>P</td> <td>T</td> </tr> <tr> <td>yr</td> <td>I</td> <td>M</td> <td>Q</td> <td>U</td> </tr> </tbody> </table> A plant of type 'H' will produce seeds with the genotype identical to seeds produced by the plants of (A) type M      (B) type N      (C) type J      (D) type P		YR	Yr	yR	yr	YR	F	J	N	R	Yr	G	K	O	S	yR	H	L	P	T	yr	I	M	Q	U	[1]
	YR	Yr	yR	yr																							
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yR	H	L	P	T																							
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10.	<p>Match column I with column II and select the correct option:</p> <table border="1"> <thead> <tr> <th colspan="2">Column-I</th> <th colspan="2">Column-II</th> </tr> </thead> <tbody> <tr> <td>A.</td> <td>Recombinant DNA technology</td> <td>(i)</td> <td>Chilled ethanol</td> </tr> <tr> <td>B.</td> <td>Precipitation of DNA</td> <td>(ii)</td> <td>DNA staining</td> </tr> <tr> <td>C.</td> <td>PCR</td> <td>(iii)</td> <td>Gene amplification</td> </tr> <tr> <td>D.</td> <td>Ethidium bromide</td> <td>(iv)</td> <td>Genetic engineering</td> </tr> </tbody> </table> <p>           (A) A-(iv), B-(i), C-(iii), D-(ii)                      (B) A-(i), B-(iii), C-(ii), D-(iv)            (C) A-(ii), B-(i), C-(iii), D-(iv)                      (D) A-(iv), B-(ii), C-(i), D-(iii)         </p>	Column-I		Column-II		A.	Recombinant DNA technology	(i)	Chilled ethanol	B.	Precipitation of DNA	(ii)	DNA staining	C.	PCR	(iii)	Gene amplification	D.	Ethidium bromide	(iv)	Genetic engineering	[1]
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11.	<p>What role does the enzyme topoisomerase play in case of DNA replication?</p> <p>           (A) It unwinds the DNA strand            (B) It facilitates the joining of DNA strands together            (C) It catalyses the polymerization of deoxynucleotides            (D) It releases the tension in the DNA strand         </p>	[1]																				
12.	<p>The relationship between many species of fig tree and some wasps is an example of</p> <p>(A) commensalism    (B) parasitism            (C) amensalism            (D) mutualism</p>	[1]																				
<p><b>Assertion and Reason (13-16):</b></p> <p><b>Directions:</b> The following two questions consist of two statements – Assertion and Reason (R). Answer these questions by 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><b>Assertion:</b> If the sequence of bases in one strand of DNA is known, then the sequence of bases in the other strand can be predicted.</p> <p><b>Reason:</b> Both the strands are complementary to each other.</p>	[1]																				
14.	<p><b>Assertion:</b> All endonucleases do not cut DNA at specific sites.</p> <p><b>Reason:</b> Endonucleases are found in viruses.</p>	[1]																				
15.	<p><b>Assertion:</b> Cannabinoids is a class of diverse chemical compounds, which activate cannabinoid receptors present mainly in brain.</p> <p><b>Reason:</b> Cannabinoids are known for their effects on cardiovascular system of the body.</p>	[1]																				
16.	<p><b>Assertion:</b> To cure SCID, the first clinical gene therapy for ADA was given.</p> <p><b>Reason:</b> Using retroviral vector, the normal gene was delivered into the patient's cell.</p>	[1]																				

**SECTION B**

**Question no. 17 to 21 are very short answer questions, carrying 2 marks each**

17.	<p><b>Attempt either option A or B</b></p> <p><b>A.</b> Justify the following statements in terms of ecosystem dynamics:  “Nature tends to increase the gross primary productivity, while man tends to increase the net primary productivity”.</p> <p style="text-align: center;"><b>OR</b></p> <p><b>B.</b> The biodiversity increases when one moves from pioneer to the climax stage. What could be the explanation?</p>	[2]
18.	Comment: “Deoxyribonucleoside triphosphate serve dual purpose.”	[2]
19.	<p>Give one function of each of the following:</p> <p>(a) Fimbriae                      (b) Acrosome</p>	[2]
20.	<p><b>Attempt either option A or B</b></p> <p><b>A.</b> Draw a pyramid of numbers considering a big banyan tree supporting a population of insects, small birds and their predators.</p> <p style="text-align: center;"><b>OR</b></p> <p><b>B.</b> 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.</p>	[2]
21.	Two children, one with blood group ‘AB’ and the other with blood group ‘O’ are born to parents, where the father has a blood group W and the mother had blood group ‘B’. Work out a cross to show how it is possible.	[2]

**SECTION C**

**Question No. 22 to 28 are short answer questions, carrying 3 marks each**

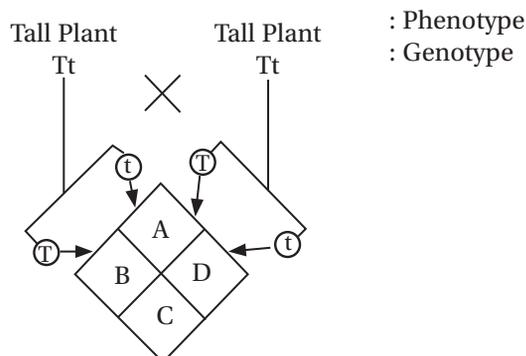
22.	What is foetal ejection reflex? Explain how it leads to parturition.	[3]
23.	Explain the roles of pituitary and ovarian hormones in the menstrual cycle of human females.	[3]
24.	Differentiate between the three types of pollination.	[3]
25.	Explain convergent and divergent evolution with one example of each.	[3]
26.	<p>(i) What is colostrum? Why are breast fed babies generally healthy?</p> <p>(ii) What is humoral immunity?</p>	[3]
27.	<p>(i) Write the palindromic nucleotide sequence for the given DNA segment. 5’-GAATTC-3’</p> <p>(ii) Name the restriction endonuclease that recognises this sequence.</p> <p>(iii) How are ‘sticky ends’ produced? Mention the role of the stricky ends.</p>	[3]
28.	A particular species of wild cat is endangered. To save them from extinction, which would be a better mode of conservation – ex situ or in situ? Justify your answer.	[3]

**SECTION D**

**Question no. 29 and 30 are case based questions carrying 4 marks each**

29. Look at the diagram and answer the following questions:

[4]



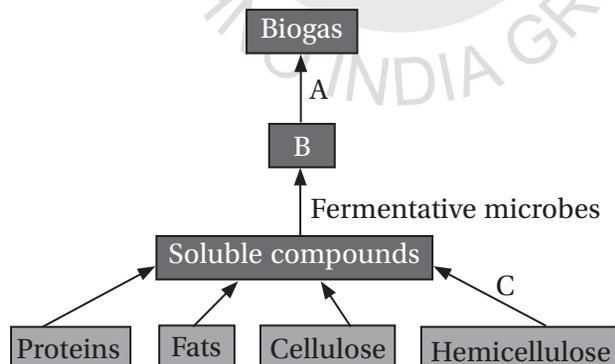
- Write the genotype A, B, C and D
- Write the phenotypes A, B, C and D
- Write the phenotypic and genotypic ratio of the progeny.

**OR**

- Write the conclusions Mendel arrived at on dominance of traits, based on the monohybrid crosses he carried out in pea plants.

30. Study the flow chart for biogas production given below and answer the following questions:

[4]



- Mention the major components of biogas.
- Identify 'B' in the flow chart.
- What does 'A' depict in the given flow chart? Explain.

**OR**

- What are the advantages of biogas?

**SECTION E**

**Question no. 31 to 33 are long answer type question carrying 5 marks each**

31.	<p>(i) Explain how to find whether an <i>E.coli</i> has transformed or not when a recombinant DNA bearing ampicillin resistant gene is transferred into it.</p> <p>(ii) What is the function of the ampicillin resistant gene in the above case.</p>	[5]
32.	<p>(A) (i) Describe the events of oogenesis schematically.</p> <p>(ii) Write 2 differences between oogenesis and spermatogenesis.</p> <p style="text-align: center;"><b>OR</b></p> <p>(B) (i) When a seed of an orange is squeezed, many embryos, instead of one, are observed. Explain how.</p> <p>(ii) Are these embryos genetically similar? Explain your answer.</p>	[5]
33.	<p>(A) (i) Describe the process of synthesis of fully functional mRNA in a eukaryotic cell.</p> <p>(ii) How is the process of mRNA synthesis in eukaryotes different from that in prokaryotes?</p> <p style="text-align: center;"><b>OR</b></p> <p>(B) (i) The given flowchart highlights the steps of DNA fingerprinting technique. Identify a, b, c, d, e and f</p> <div style="text-align: center;"> <p>Isolation of DNA from blood cells</p> <p>↓</p> <p>Cutting of DNA by 'a'</p> <p>↓</p> <p>Separation of DNA fragments by electrophoresis using 'b'</p> <p>↓</p> <p>Transfer (blotting) of fragments to 'c' gel</p> <p>↓</p> <p>DNA splits into single strand</p> <p>↓</p> <p>Introduction of labelled 'd' probe</p> <p>↓</p> <p>'e' of single strands with 'd'</p> <p>↓</p> <p>Detection of hybridized DNA fragments by 'f'.</p> </div> <p>(ii) List any two applications of DNA fingerprinting technique.</p>	[5]