

**Strictly Confidential: (For Internal and Restricted use only)**

**Senior Secondary School Term II Examination, 2022**

**Marking Scheme – BIOLOGY (SUBJECT CODE — 044)**

**(PAPER CODE — 57/1/2)**

**General Instructions: -**

1. You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested that before starting evaluation, you must read and understand the spot evaluation guidelines carefully.
2. **“Evaluation policy is a confidential policy as it is related to the confidentiality of the examinations conducted, Evaluation done and several other aspects. Its’ leakage to public in any manner could lead to derailment of the examination system and affect the life and future of millions of candidates. Sharing this policy/document to anyone, publishing in any magazine and printing in News Paper/Website etc may invite action under IPC.”**
3. Evaluation is to be done as per instructions provided in the Marking Scheme. It should not be done according to one’s own interpretation or any other consideration. Marking Scheme should be strictly adhered to and religiously followed. **However, while evaluating, answers which are based on latest information or knowledge and/or are innovative, they may be assessed for their correctness otherwise and marks be awarded to them. In class-X, while evaluating two competency based questions, please try to understand given answer and even if reply is not from marking scheme but correct competency is enumerated by the candidate, marks should be awarded.**
4. The Head-Examiner must go through the first five answer books evaluated by each evaluator on the first day, to ensure that evaluation has been carried out as per the instructions given in the Marking Scheme. The remaining answer books meant for evaluation shall be given only after ensuring that there is no significant variation in the marking of individual evaluators.
5. Evaluators will mark(  $\checkmark$  ) wherever answer is correct. For wrong answer ‘X’ be marked. Evaluators will not put right kind of mark while evaluating which gives an impression that answer is correct and no marks are awarded. **This is most common mistake which evaluators are committing.**
6. If a question has parts, please award marks on the right-hand side for each part. Marks awarded for different parts of the question should then be totaled up and written in the left-hand margin and encircled. This may be followed strictly.
7. If a question does not have any parts, marks must be awarded in the left-hand margin and encircled. This may also be followed strictly.
8. If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out.
9. No marks to be deducted for the cumulative effect of an error. It should be penalized only once.

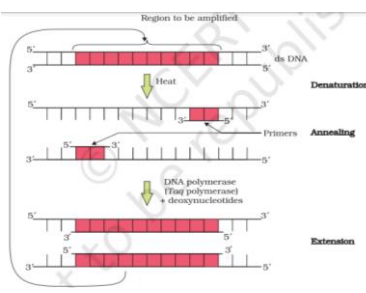
10. A full scale of marks 0-35 has to be used. Please do not hesitate to award full marks if the answer deserves it.
11. Every examiner has to necessarily do evaluation work for full working hours i.e. 8 hours every day and evaluate 30 answer books per day in main subjects and 35 answer books per day in other subjects (Details are given in Spot Guidelines). This is in view of the reduced syllabus and number of questions in question paper.
12. Ensure that you do not make the following common types of errors committed by the Examiner in the past:-
  - Leaving answer or part thereof unassessed in an answer book.
  - Giving more marks for an answer than assigned to it.
  - Wrong totaling of marks awarded on a reply.
  - Wrong transfer of marks from the inside pages of the answer book to the title page.
  - Wrong question wise totaling on the title page.
  - Wrong totaling of marks of the two columns on the title page.
  - Wrong grand total.
  - Marks in words and figures not tallying.
  - Wrong transfer of marks from the answer book to online award list.
  - Answers marked as correct, but marks not awarded. (Ensure that the right tick mark is correctly and clearly indicated. It should merely be a line. Same is with the X for incorrect answer.)
  - Half or a part of answer marked correct and the rest as wrong, but no marks awarded.
13. While evaluating the answer books if the answer is found to be totally incorrect, it should be marked as cross (X) and awarded zero (0) Marks.
14. Any unassessed portion, non-carrying over of marks to the title page, or totaling error detected by the candidate shall damage the prestige of all the personnel engaged in the evaluation work as also of the Board. Hence, in order to uphold the prestige of all concerned, it is again reiterated that the instructions be followed meticulously and judiciously.
15. The Examiners should acquaint themselves with the guidelines given in the Guidelines for spot Evaluation before starting the actual evaluation.
16. Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totaled and written in figures and words.
17. The Board permits candidates to obtain photocopy of the Answer Book on request in an RTI application and also separately as a part of the re-evaluation process on payment of the processing charges.

**MARKING SCHEME**  
**Senior Secondary School Examination TERM–II, 2022**  
**BIOLOGY (Subject Code — 044)**  
**[ Paper Code — 57/1/2 ]**

**Maximum Marks : 35**

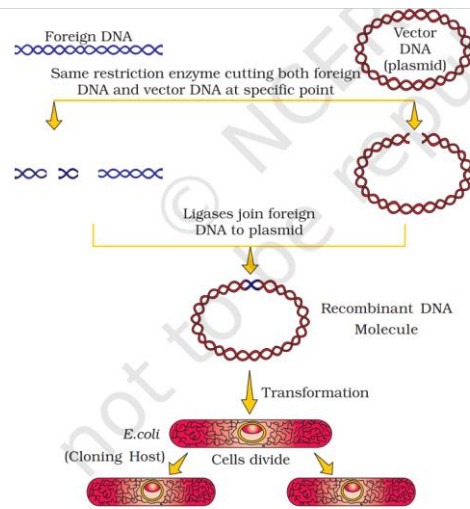
Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks
<b>SECTION – ‘A’</b>		
<b>1.</b>	Allows vigorous growth of microbes, formation of flocs to form mesh like structures, microbes consume major part of organic waste in the sewage, reduces BOD of the affluent / reduces polluting potential	1/2×4
<b>OR</b>		
(a)	<ul style="list-style-type: none"> <li>• Biogas / Gobar gas</li> <li>• Methane, CO<sub>2</sub> / H<sub>2</sub> / H<sub>2</sub>S</li> </ul> <p><b>Note: any one component along with methane to be awarded one mark.</b></p>	1/2 1/2+1/2
(b)	Anaerobic digestion of cellulose	1/2
		2
<b>2.</b>	<ul style="list-style-type: none"> <li>• Humoral immune response, antibody mediated</li> <li>• cell mediated immune response, rejects the graft (in organ transplant) by identifying as non-self / T-Cells interact with antigens</li> </ul> <p style="text-align: center;">//</p> <ul style="list-style-type: none"> <li>• Primary immune response, of low intensity / slow response</li> <li>• Secondary immune response, of high intensity / faster response</li> </ul>	1/2×4  1/2×4
		2
<b>3.</b>	(a) Shark harvest increases over the years from 1992 to 2003. (b) Biodiversity decreases due to over exploitation / excessive harvesting.	1+1
<b>OR</b>		
Tilman conducted experiments in out door plots, plots with more species shows less year to year variation in biomass (more stability).		1+1
		2
<b>4.</b>	<i>Monascus purpureus</i> Blood-cholesterol lowering agent, inhibits enzyme responsible for synthesis of cholesterol	1  1/2+1/2
		2
<b>5.</b>	(a) Baculoviruses / Nucleopolyhedrovirus (b) Species specific, narrow spectrum insecticidal application, no negative impact on plants / mammals / birds / fish / non-target insects, desirable for integrated pest management (any two)	1  1/2+1/2

		2
6.	(a) Carrying capacity is the maximum possible number of organisms (beyond which no further growth is possible) in a habitat.	1
	(b) Limited resources lead to competition, fittest survives and reproduces.	1/2+1/2
		2
<b>SECTION – ‘B’</b>		
7.	(a) It indicates exponential / geometric growth	1
	(b) Assesses impact of biotic and abiotic factors on population growth, indicates intrinsic rate of natural increase	1+1
		3
8.	(i) Helps in identifying non-transformants from transformants / recombinants from non recombinants	1
	(ii) Genes encoding resistance to antibiotics such as ampicillin / tetracycline / kanamycin / chloramphenicol / amp <sup>R</sup> / tet <sup>R</sup>	1
	(iii) (The normal E. coli cells do not carry resistance against any of these antibiotics.) It helps to identify and select transformants / identification of recombinants.	1
	<b>OR</b>	
	• Plasmids are extra chromosomal self-replicating (double stranded) circular DNA molecules (generally found in bacterial cell)	1
	• Plasmid is circular extra chromosomal DNA of bacterial cells whereas cloning vector is a vehicle that carries foreign DNA into another cell.	1
	• Bacteriophage, pBR322	1/2+1/2
		3
9.	Do not eradicate pests but keep them at manageable level by various checks and balances, pests may be food for otherwise beneficiary predators and parasites who would suffer and not survive, more varieties in a landscape more sustainable it is (or any other correct reason)	1×3
		3
10.	(a)	• Five extinctions have already occurred
		• sixth is in progress
	(b)	• Sixth extinction is much faster / sixth extinction is 100 to 1000 times faster
		• Human activities like industrialisation, loss of habitat, over exploitation, land reforms. (Any two)
		1/2+1/2
		1
		1/2+1/2
		3
11.	(i) Recombinant DNA technology, Polymerase Chain Reaction, ELISA	1/2×3

	(ii) Effective treatment of diseases, Early diagnosis, understanding path physiology of disease, identification of genetic disorders (any three)	$\frac{1}{2} \times 3$
		3
12.	Bacteria— <i>Rhizobium</i> / <i>Azospirillum</i> / <i>Azotobacter</i> Fungi— <i>Mycorrhiza</i> / <i>Glomus</i> Cyanobacteria— <i>Anabaena</i> / <i>Nostoc</i> / <i>Oscillatoria</i>	$\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$
		3
<b>SECTION – ‘C’</b>		
13.	(i) <ul style="list-style-type: none"> <li>• Species A</li> <li>• The leaf area damaged by species - A in Bt-corn is the least</li> </ul> (ii) Species-B (iii) Not to grow Bt variety as seeds are expensive and of not much benefit (productivity wise) / advise to grow Bt corn with its proper justification (iv) Cry IAb. (No marks if only cry gene is written)	1+1 1 1 1
<b>OR</b>		
(i)	<ul style="list-style-type: none"> <li>• (Isolation of genetic material) Fungal cell treated with chitinase, RNA to be removed by treating with RNAase, protein removed by treating with protease, and then addition of chilled ethanol.</li> <li>• Cutting of DNA at specific location by restriction enzymes.</li> <li>• Fragments are separated by gel electrophoresis</li> </ul>	$\frac{1}{2} \times 4$ $\frac{1}{2}$ $\frac{1}{2}$
(ii)	Multiple copies of separated genes of interest is synthesized by following steps of the method given below: PCR (polymerase chain reaction) - Denaturation, Annealing, Extension ( followed by amplification)	$\frac{1}{2} \times 4$
	//	
(ii)	Polymerase chain reaction/PCR	$\frac{1}{2}$
		$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
	//	
(ii)	Multiple copies of separated genes of interest are synthesized by following the given below method: rDNA technology, same restriction enzyme cutting both foreign DNA and vector DNA at specific point, ligases join foreign DNA to Plasmid, transformation (cell divides and helps in multiplication of genes)	$\frac{1}{2} \times 4$
	//	

(ii)

### rDNA technology



1/2

1/2

1/2

1/2

5

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