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Senior Secondary School Term II Examination, 2022

Marking Scheme – BIOLOGY (SUBJECT CODE – 044)

(PAPER CODE – 57/4/1)

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 (✓) 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 : 57/4/1]

Maximum Marks : 35

Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks
SECTION—A		
1.	Immune response by vaccine	Immune response by antitoxin
	Immune response is generated by antibodies produced in response to weakened antigen introduced in the body	Immune response is generated by pre-formed antibodies or antitoxin is injected
	Response takes sometime	Quick immune response
	Memory cells are generated / long lasting	One time response
	Vaccine provides active immunity	Antitoxin provides passive immunity
(Any two differences)		1+1
		2
2.	(a) ● <i>Methanobacterium/Methanogen</i> ● It helps in production of biogas/gobar gas	1 1
	OR	
	(b) ● <i>Baculoviruses / Nucleopolyhedrovirus</i> ● Species specific, narrow spectrum insecticidal application, no negative impact on plants / vertebrates / non-target insects, help to conserve beneficial insects, useful in IPM, useful in ecologically sensitive area	1 $\frac{1}{2} \times 2$
(Any two)		2
3.	● Bacteria / Cyanobacteria / Blue Green Algae	1
	● <i>Rhizobium / Azospirillum / Azotobacter / Nostoc / Anabaena / Oscillatoria</i> / or any other correct example	$\frac{1}{2}$
	● Fixes atmospheric Nitrogen into organic form / Enrich Nitrogen content of soil / Increases soil fertility	$\frac{1}{2}$
		2
4.	<i>Trichoderma</i> act as biocontrol agent for several plant pathogens, <i>Trichoderma</i> produces Immunosuppressive agent/Cyclosporin A/ Immunosuppressant useful for humans	1+1
		2

5.	<ul style="list-style-type: none"> Both the species (Species A and B) show better growth when grown together. Both are benefitted from each other / They show mutualism. 	1
		1
		2
6.	(a) <ul style="list-style-type: none"> Graph A depicts exponential growth/ geometric growth, due to unlimited resources and absence of checks/ environmental resistances Graph B shows extinction, due to lack of resources and environmental resistances. <p style="text-align: center;">OR</p> (b) Possible Reasons for decline in human population : Increased Emigration, Increased Mortality, Decreased Birth Rate / Natality, Use of contraceptives, spread of epidemic or any other relevant reason (any two reasons) <p style="text-align: center;">//</p> Possible reasons for decline in plants, animals / other organisms' population : Deforestation, Decreased food availability, Predation pressure, adverse weather, competition or any other relevant reason (any two reasons)	½ +½
		½ +½
		1 +1
		1+1
		2
SECTION – B		
7.	(a) (i) “Within a region species richness increased with increasing explored area, but only up to a limit.” (ii) Very gradually impact on species diversity will be visible/species diversity will be gradually reduced/ negative impact on species diversity. <p style="text-align: center;">OR</p> (b) Dr. Tilman carried out long-term experiments in outdoor plots, he observed plots with more species showed less year-to-year variation in biomass, he showed increased diversity (species richness) contributed to higher productivity.	1+1
		1
		1+1+1
		3
8.	Decline in flora/fauna, Lower resistance to environmental perturbations such as drought, Increased variability in certain ecosystem process such as plant productivity/ water use/ pest / disease cycle (Any Three)	1×3
		3
9.	<ul style="list-style-type: none"> Spores of <i>Bacillus thuringiensis</i> available as sachets are mixed with water and sprayed on vulnerable plants, insect will die if they eat the plant. Examples: <i>Brassica</i>, fruit trees <p style="text-align: center;">//</p>	1+1
		½ + ½

	<ul style="list-style-type: none"> ● Scientists have introduced Bt toxin gene into plants, Insect will die if they eat the plant. ● Examples: Bt rice, Bt cotton, Bt tomato, Bt potato, Bt soyabean, or any other examples 	1+1 $\frac{1}{2} + \frac{1}{2}$
		3
10.	Preparation of two DNA sequences corresponding to A, and B chains of human insulin (using rDNA technology) ↓ Introduction in plasmids of <i>E. coli</i> ↓ Chain A and B were separately produced ↓ Chain A and B were extracted ↓ Both chains were combined by creating di-sulphide bonds to form human insulin. //	$\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
	Same marking to be followed when explained with the help of Storyboard	3
11.	(a) (i) Origin and /or Proliferation and maturation of lymphocytes / the immature lymphocytes differentiate into antigen sensitive lymphocytes/ provide micro environment for development and maturation of T-lymphocytes. (ii) Traps the microorganisms (antigens) and activate the lymphocytes that then proliferate to become effector cells (cause immune response) / provides site for interaction of lymphocytes with antigens (b) Tonsils are secondary lymphoid organs / trap the antigen (pathogen) which then activate the mature lymphoid organs to become effector cells/ provides site for interaction of lymphocytes with antigens	1 1 1
		3
12.	(a) Real Time-Polymerase Chain Reaction / Reverse Transcriptase- Polymerase Chain Reaction Note: One mark is to be awarded for attempting this question (b) ● <u>Denaturation</u> by heating /DNA strands are separated by heating, <u>Annealing</u> of two primers to complementary region of DNA/ <u>Joining</u> of primer to complementary region of DNA, <u>Extension</u> of primers, using thermostable DNA Polymerase or <i>Taq</i> Polymerase (The process is repeated many times/amplification) (b) //	1 $\frac{1}{2} \times 4$

	<p>The diagram illustrates the PCR process in three stages: <ul style="list-style-type: none"> Denaturation: A double-stranded DNA (ds DNA) molecule is heated to separate into two single strands. The strands are labeled with 5' and 3' ends. Annealing: Primers (short DNA sequences) bind to the single strands. The primers are labeled with 5' and 3' ends. Extension: DNA polymerase (Taq polymerase) and deoxynucleotides extend the primers to form two new double-stranded DNA molecules. The polymerase and deoxynucleotides are labeled with 5' and 3' ends. </p>	<p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p> <hr/> <p>3</p>
SECTION - C		
<p>13.</p>	<p>(a) (i) • Crop productivity is quite high in Bt crop as compared to non-Bt crop.</p> <ul style="list-style-type: none"> • Pesticide use has reduced in Bt crop It saves resources and is environment friendly. • Water is required more for Bt crop as compared to non-Bt crop. <p>(ii) Weighing all the parameters it is concluded that Bt crop will be beneficial to farmers. (Less pesticide, more output)</p> <p>(iii) Usually in Rajasthan there is shortage of water hence farmers would like to cultivate non Bt - cotton crop.</p> <p style="text-align: center;">OR</p> <p>(b)(i) • All are restriction endonucleases</p> <ul style="list-style-type: none"> • act as a molecular scissors / cut at a specific site within DNA <p>(ii) amp^R / tet^R, help in identification and selection of transformants from non-transformants / identification of recombinant from non recombinant</p> <p>(iii) Have the ability to replicate within bacterial cells independent of the control of chromosomal DNA / Autonomously replicating / bacteriophages and some bacteria have high copy number per cell, can replicate the desirable gene into large number of copies, presence of selectable marker, presence of cloning sites, presence of ori.</p> <p style="text-align: right;">(Any one)</p> <p>(iii) It is the sequence where replication begins / It controls copy number of vector</p> <p>(iv) No, identification and selection of transformants from non-transformants/ identification of recombinant from non recombinant would not be possible</p>	<p>1+1+1</p> <p>1</p> <p>1</p> <p>1/2</p> <p>1/2</p> <p>1/2 + 1/2</p> <p>1</p> <p>1</p> <p>1/2 + 1/2</p> <hr/> <p>5</p>

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