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Senior Secondary School Term II Examination, 2022

Marking Scheme – BIOLOGY (SUBJECT CODE — 044)

(PAPER CODE — 57/3/3)

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 totalled 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 totalling 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 totalling on the title page.
 - Wrong totalling 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 totalling 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 totalled 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 — 57/3/3]

Maximum Marks : 35

| Q. No. | EXPECTED ANSWER / VALUE POINTS | Marks |
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| SECTION - A | | |
| 1. | (i) Disease — Ascariasis Mode of Transmission — contaminated water /food /vegetables/soil | ½ ½ |
| | (ii) Disease — Elephantiasis / Filariasis Mode of Transmission — bite of female(Culex) mosquito | ½ ½ |
| | OR | |
| | (b) Provide site for interaction of lymphocytes with the antigen, which then proliferate to become effector cells. | 2 |
| 2. | (a) (i) <i>Cannabis sativa</i> | ½ |
| | (ii) Flower tops or inflorescences, leaves, resins (any two) | ½ + ½ |
| | (iii) Influences cardio vascular system | ½ |
| | OR | |
| (b) Provide site for interaction of lymphocytes with the antigen, which then proliferate to become effector cells. | | 1 + 1 |
| | | 2 |
| 3. | <ul style="list-style-type: none"> • Sneezing, watery eyes, running nose, difficulty in breathing and any other symptom (any two) • Body produces IgE antibodies/ give exaggerated response to the antigens/release chemicals like histamine and serotonin from mast cells. | ½ + ½ |
| | | 1 |
| | | |
| 4. | (i) Forms symbiotic association with roots of leguminous plants and helps in Nitrogen fixation | 1 |
| | (ii) Helps in Nitrogen fixation in aquatic or terrestrial environment and serves as biofertilizer / increases organic matter of soil. | 1 |
| | | |
| 5. | (a)(i) A - Mortality/No. of deaths in population B - Natality/No. of births in population | ½ + ½ |
| | (ii) 1 bacteria per bacteria per hour $\left[\text{Growth rate} = \frac{2 \text{ million} - 1 \text{ million}}{1 \text{ million}} \right]$ | 1 |
| | OR | |
| | (b) <ul style="list-style-type: none"> • Expanding, Age pyramid | ½ + ½ |

| | | |
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| | <ul style="list-style-type: none"> The number of individuals in the 'pre-reproductive' age group is more than the 'reproductive' age group. | 1 |
| | | 2 |
| 6. | <p><i>B</i>-lymphocytes — produce antibodies in response to pathogens in our blood/provide humoral immunity</p> <p><i>T</i>-lymphocytes — themselves do not secrete antibodies but help <i>B</i>-lymphocytes to produce them/ provide cell mediated immunity</p> | 1 |
| | | 1 |
| | | 2 |
| SECTION – B | | |
| 7. | <p>When the mosquito bites another human, sporozoites are injected with bite.</p> <p>Parasite (sporozoites) reach the liver through blood</p> <p>The parasite reproduces asexually in liver cells, bursting the cell and releasing into the blood.</p> <p>Human Host</p> <p>Parasites reproduce asexually in red blood cells, bursting the red blood cells and causing cycles of fever and other symptoms. Released parasites infect new red blood cells.</p> <p style="text-align: center;">//</p> <ul style="list-style-type: none"> When mosquito carrying sporozoites bites a human, sporozoites are injected in human body. Sporozoites reach the liver through blood Parasites reproduce asexually in liver cells , burst these cells and get released into blood. Parasite enters RBCs and reproduce asexually, RBCs burst (releases haemozoin) which causes cycles of fever and chill. | <p>1/2</p> <p>1/2</p> <p>1/2 x 2</p> <p>1/2 x 2</p> <p>//</p> <p>1/2</p> <p>1/2</p> <p>1/2 x 2</p> <p>1/2 x 2</p> |
| | | 3 |
| 8. | <p>(a) <ul style="list-style-type: none"> Enzyme-Linked Immunosorbent Assay It is based on the principle of antigen-antibody interaction / HIV infection can be detected by the presence of antigen or by detecting the antibody synthesised against the pathogen. </p> | 1 |
| | | 1 |

| | | |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p style="text-align: center;">//</p> <ul style="list-style-type: none"> ● Polymerase chain reaction ● Early detection and amplification of genetic material of pathogen/virus. <p>(b) RNA</p> | <p style="text-align: center;">//</p> <p style="text-align: center;">1</p> <p style="text-align: center;">1.</p> <p style="text-align: center;">1</p> <p style="text-align: center;">3</p> |
| 9. | <p>(a) (i) S (ii) R (iii) T</p> <p>(b) ● Process of cutting of separated bands of DNA, and extracting from the agarose gel.</p> <p>● Purified DNA is used in rDNA technology / genetic experiments.</p> | <p style="text-align: center;">$\frac{1}{2} \times 3$</p> <p style="text-align: center;">$\frac{1}{2} + \frac{1}{2}$</p> <p style="text-align: center;">$\frac{1}{2}$</p> <p style="text-align: center;">3</p> |
| 10. | <p>(a) ● When a species becomes extinct, the plant and animal species associated with it in an obligatory way also becomes extinct.</p> <p>Examples :</p> <ul style="list-style-type: none"> - When a host (fish) species becomes extinct, the plant and animal species associated with it in an obligatory way also become extinct, - Coevolved plant-pollinator mutualism where extinction of one leads to the extinction of other (any other example) / The coevolved orchid <i>Ophrys</i> and bee pollinator, <p style="text-align: right;">(Any other correct example) (any two)</p> <p style="text-align: center;">OR</p> <p>(b) Source of oxygen in the earth's atmosphere, Pollination (without which plants cannot produce fruits or seeds), is another service provided by forest through different pollinators, Source of aesthetic pleasures (walking through thick woods / watching spring flowers in full bloom / waking up of bulbul's song in the morning), Human derive countless economic benefits from nature-food (cereals, pulses, fruits), Source of firewood / fibre / construction material / industrial products (tannins / lubricants / dyes / resins / perfumes), Contributes to the traditional medicines used by native people around the world, Philosophically or spiritually - we need to realize that every species has an intrinsic value - even if it may not be of current or any economic value to us, This is the ethical argument for conserving forests which relates to what we owe to the millions of plants / animals / microbe species with whom we share this planet.</p> <p>Note: According to Hindi version, all benefits of forest are included (any three)</p> | <p style="text-align: center;">1</p> <p style="text-align: center;">1+1</p> <p style="text-align: center;">1+1+1</p> <p style="text-align: center;">3</p> |

| | | |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|
| 11. | <ul style="list-style-type: none"> ● Toxic insecticidal proteins/ pro-toxin /crystal proteins produced by cry genes of <i>Bacillus thuringiensis</i>. ● e.g., in Bt Cotton / Bt corn/rice / tomato/ soyabean(any other correct example of any crop or any insect) ● Bt toxin protein exists as inactive protoxins, which get activated inside the alkaline pH of the gut of insect, causes perforations / swelling / lysis of midgut ultimately killing the insect. | 1 |
| | | $\frac{1}{2}$ $\frac{1}{2} \times 3$ 3 |
| 12. | <p>(a) ● Yes,</p> <ul style="list-style-type: none"> ● We share the planet with many other organisms like plants / animals / microbes ,every species has an <u>intrinsic</u> value, moral duty to take care of other organism wellbeing, pass on our biological legacy in good order to future generations. <p style="text-align: right;">(Any Two)</p> <p>(b)●Regions showing very high level of species richness, high degree of endemism</p> <ul style="list-style-type: none"> ● Accelerated habitat loss. | $\frac{1}{2}$ |
| | | $\frac{1}{2} + \frac{1}{2}$ |
| | | $\frac{1}{2} + \frac{1}{2}$ |
| | | $\frac{1}{2}$ |
| SECTION - C | | |
| 13. | <p>(a) (i) ● The <i>E.coli</i> DNA polymerase <u>cannot carry out PCR at high temperature</u> (as it becomes inactive).</p> <ul style="list-style-type: none"> ● Whereas Taq polymerase being <u>thermostable</u> remains active even at high temperatures. <p>(ii) ● Primers are small chemically synthesised oligonucleotides that are complementary to the regions of genomic DNA strand</p> <ul style="list-style-type: none"> ● Primers help in extension of complementary DNA strand <p>(iii) Early detection of diseases like cancer / AIDS/ genetic disorder, by amplification of desired genes (when very low concentration of bacteria or virus before setting of the disease symptoms).</p> <p style="text-align: center;">OR</p> <p>(b) (i) Adenosine deaminase (ADA) deficiency.</p> <p>(ii) ● Lymphocytes from the patient's blood are grown in a culture medium outside the body</p> <p>Using retroviral vector, a functional ADA cDNA, is introduced into these lymphocytes.</p> <p>Modified lymphocytes injected back to the patient body.</p> <ul style="list-style-type: none"> ● Lymphocytes are mortal / not immortal, the patient requires repeated/periodic infusion. | 1+1 |
| | | 1 |
| | | 1 |
| | | $\frac{1}{2} + \frac{1}{2}$ |
| | | 1 |
| | | $\frac{1}{2}$ |
| $\frac{1}{2} + \frac{1}{2}$ | | |
| $\frac{1}{2}$ | | |
| $\frac{1}{2} + \frac{1}{2}$ | | |

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|-----------------------------------------------------------------------------------------------------------------------|---|
| (iii) Gene is obtained from bone marrow cells producing ADA is introduced into cells at <u>early embryonic</u> stage. | 1 |
| | 5 |

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