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Senior Secondary School Term II Examination, 2022

Marking Scheme – BIOLOGY (SUBJECT CODE – 044B)

(PAPER CODE – 57/B/5)

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 – 044B)

[Paper Code – 57/B/5]

Maximum Marks : 35

Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks
	SECTION—A	
1.	Red blood cells rupture , haemozoin is released.	1+1
		2
2.	(a) • Due to growth of *Penicillium notatum*	1
	• Discovery of antibiotic/penicillin / chemical for treatment of bacterial infections	1
	OR	
	(b) • *Lactobacillus* Bacteria / Lactic Acid Bacteria / (LAB)	1
	• By increasing vitamin B_{12}	1
		2
3.	• Cocaine/coke/crack/coca alkaloids.	1
	• It interferes with the transport of neuro-transmitter (dopamine) / stimulates central nervous system /sense of euphoria / increased energy / hallucination	1
		2
4.	Once the BOD of sewage is reduced significantly—	
	The effluent is passed into the settling tank where the bacterial 'flocs' are allowed to sediment into 'activated sludge', a small part of the activated sludge is pumped back into the aeration tank to serve as inoculum , the remaining major part of the sludge is pumped into anaerobic sludge digesters where all kinds of anaerobic bacteria digest the bacteria and fungi in the sludge , during this digestion bacteria produce mixture of gases (methane, H_2S, CO_2, etc.).	½×4
		2
5.	• Pre-reproductive, reproductive, post-reproductive.	½ x 3
	• Declining age pyramid—Pre-reproductive and post-reproductive age groups are smaller and reproductive age group biggest.	½
		2

6. (a) • Association between fungi and photosynthesising algae/cyanobacteria, — 1

• fungi help the algae in absorption of moisture / minerals / give protection, algae in turn provides the fungi with energy-yielding carbohydrates through photosynthesis. — ½ +½

OR

(b) • Annual variations in duration of temperature/intensity of temperature / precipitation (rain and snow) (Any two of these) — ½ + ½

• Desert/tropical rain forest/deciduous forest/sea coast (Any two of these) — ½ + ½

2

SECTION—B

7. (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. — 1

(ii)

Primary immune response	*Secondary immune response*
→ The response by our immune system when our body encounters a pathogen for the first time	→ Subsequent encounters with the same pathogen
→ It is of low intensity	→ It is highly intensified/ anamnestic response
→ Slow response	→ Fast response

(Any two differences) — 1+1

OR

(b) Three roles of spleen in human body:

• Has lymphocytes and phagocytes or (fights infections or pathogens)

• Filter of the blood by trapping blood-borne micro organisms

• Large reservoir of erythrocytes

3

8. *(a)* The viruses attack macrophages and helper T-lymphocytes, progressively decreasing their number /decreased Immunity — 1+1

(b) Enzyme Linked Immuno-sorbent Assay / (ELISA) / Polymerase Chain Reaction / (PCR) — 1

3

9.	Isolating antibiotic resistance genes by cutting a piece of DNA from plasmid, linking it with native plasmid of *Salmonella typhimurium*, using DNA ligase	1 x 3 3
10.	• Tropical latitudes have remained relatively undisturbed for millions of years and thus had a long evolutionary time for species diversification. • Tropical environments are less seasonal / relatively more constant / and predictable. • There is more solar energy available in tropics, which contributes to higher productivity.	1 x 3 3
11.	a) Paul – Ehrlich compared Airplane with ecosystem, In an airplane (ecosystem) all parts are joined together using thousands of rivets (species), If every passenger travelling in it starts popping a rivet to take home causing a species to become extinct, it may not affect flight safety (proper functioning of ecosystem) initially, If more and more rivets are removed then the plane becomes dangerously weak over a period of time, loss of rivets on the wings (Key species that drives major ecosystem functions) is a more serious threat to flight	½ x 6 3
12.	• EcoRI (i) 5'—GAATTC—3' 3'—CTTAAG—5' (1/2 Mark for the correct palindromic sequence) (1/2 Mark for the correct polarity) *(ii)* 5' G↓A A T T C 3' C T T A A↑G (Or any other correct example)	1 1 1 3
	SECTION—C	
13.	(a)(i) 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. (Any two)	½+½

	(ii) ● Polymerase Chain Reaction / PCR, ● Taq polymerase, *Thermus aquaticus*, ● Taq polymerase can withstand very high temperature induced denaturation of double-stranded DNA / thermostable. *(iii)* Ori—DNA segment from where replication starts / controls copy number *(iv)* Microinjection , Biolistics /gene gun, disarmed pathogens vector, heat shock method, electroporation *(Any two*) **OR**	1 ½+½ ½ ½ ½+½
	(b) *(i)* ADA deficiency/Adenosine deaminase deficiency *(ii)* It is caused due to deletion of the gene encoding for the enzyme adenosine deaminase *(iii)* - Lymphocytes from the blood of the patient are grown in a culture outside the body. - A functional ADA cDNA (using a retroviral vector) is then introduced into these lymphocytes. - Which are subsequently returned to the patient. - However as these lymphocytes are mortal / not immortal therfore the patient need repeated infusion of such genetically engineered lymphocytes. *(iv)* If gene isolated from marrow cells producing ADA is introduced into cells at early embryonic stages it could be permanent cure.	1 1 ½ ½ ½ ½ 1
		5

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