

Marking Scheme
Strictly Confidential
(For Internal and Restricted use only)
Senior School Certificate Examination, 2025
SUBJECT NAME: BIOLOGY (SUBJECT CODE 044) (PAPER CODE 57 (B))

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 various rules of the Board and 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 due marks be awarded to them. In class-XII, 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, due marks should be awarded.
4	The Marking scheme carries only suggested value points for the answers These are in the nature of Guidelines only and do not constitute the complete answer. The students can have their own expression and if the expression is correct, the due marks should be awarded accordingly.
5	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. If there is any variation, the same should be zero after deliberation and discussion. 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.
6	Evaluators will mark(✓) wherever answer is correct. For wrong answer CROSS ‘X’ be marked. Evaluators will not put right (✓)while evaluating which gives an impression that answer is correct and no marks are awarded. This is most common mistake which evaluators are committing.
7	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.
8	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.
9	If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out with a note “Extra Question”.
10	No marks to be deducted for the cumulative effect of an error. It should be penalized only once.

11	A full scale of marks 0-70 has to be used. Please do not hesitate to award full marks if the answer deserves it.
12	Every examiner has to necessarily do evaluation work for full working hours i.e., 8 hours every day and evaluate 20 answer books per day in main subjects and 25 answer books per day in other subjects (Details are given in Spot Guidelines).
13	<p>Ensure that you do not make the following common types of errors committed by the Examiner in the past:-</p> <ul style="list-style-type: none"> ● 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 an answer. ● 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/not same. ● 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.
14	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.
15	Any un assessed 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.
16	The Examiners should acquaint themselves with the guidelines given in the “Guidelines for spot Evaluation” before starting the actual evaluation.
17	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.
18	The candidates are entitled to obtain photocopy of the Answer Book on request on payment of the prescribed processing fee. All Examiners/Additional Head Examiners/Head Examiners are once again reminded that they must ensure that evaluation is carried out strictly as per value points for each answer as given in the Marking Scheme.

MARKING SCHEME

Senior Secondary School Examination, 2025

BIOLOGY (Subject Code-044)

[Paper Code: 57 (B)]

Maximum Marks: 70

Q.No	Expected Answer/ Value Points	Marks	Total Marks
SECTION A			
1.	(A)/ Meiosis of pollen mother cell	1	1
2.	(D) / Erwin Chargaff	1	1
3.	(C) / Multiload 375	1	1
4.	(C) / RNA can act as catalysts	1	1
5.	(B) / Only negative regulation	1	1
6.	(B) / UGA	1	1
7.	(C) / Turner's Syndrome	1	1
8.	(C) / Fungus – Streptokinase, Clot buster	1	1
9.	(C) / Fowl (Birds)	1	1
10.	(A) / Adaptive radiation	1	1
11.	(A) / A small part of activated sludge	1	1
12.	(A) / Extrachromosomal circular DNA	1	1
13.	(C) / Assertion (A) is true, but Reason (R) is false	1	1
14.	(D) / Assertion (A) is false, but Reason (R) is true	1	1
15.	(C) / Assertion (A) is true, but Reason (R) is false	1	1
16.	(D) / Assertion (A) is false, but Reason (R) is true	1	1
SECTION B			
17.	(a) (i) <ul style="list-style-type: none">• Primary spermatocytes-2n / Diploid• Secondary spermatocytes – n / Haploid.	½ ½	

	<p>(ii) In spermatogenesis- the first meiotic division produces two (functional) haploid daughter cells called secondary spermatocytes /produces two haploid daughter cells of equal size whereas in oogenesis the first meiotic division produces two daughter cells but one is a (larger) secondary oocyte and other daughter cell is first (smaller) polar body (non-functional) / produces two haploid daughter cells of unequal size.</p> <p style="text-align: center;">OR</p> <p>(b) (i) Trophoblast layer gets attached to the endometrium to help in implantation / helps in placenta formation / forms chorionic villi (during placenta formation)</p> <p>(ii) A structural and functional unit connecting the developing embryo and maternal body called as placenta.</p>	1	
		1	
		1	2
18.	<p>(a)</p> <p>In Polygenic inheritance three or more genes control a single phenotypic trait (character) but in Mendelian inheritance a single gene controls a single character,</p> <p>In Polygenic inheritance contribution of each allele is additive (quantitative) whereas in Mendelian inheritance it is only one dominant allele that expresses (qualitative).</p> <p style="text-align: center;">(Any one deviation)</p> <p style="text-align: center;">OR</p> <p>(b)</p> <p>- Co-dominance, I^A and I^B when present together they both express their own type of sugars as AB blood group.</p> <p>- Multiple allelism, I gene has 3 alleles (I^A, I^B, i) governing the blood group (though only 2 alleles govern the characters according to Mendelian inheritance).</p>	2	
		$\frac{1}{2} + \frac{1}{2}$	
		$\frac{1}{2} + \frac{1}{2}$	2
19.	<ul style="list-style-type: none"> • To prevent microbial growth • Physiological barrier • Saliva in mouth / acid (HCl) in the stomach (any one example). 	$\frac{1}{2}$	
		1	
		$\frac{1}{2}$	2
20.	<p>-Animal cells</p> <p>Microinjection, rDNA is directly injected into the nucleus of an animal cell / Disarmed Retroviruses, to deliver desirable gene into animal cells</p> <p>- Plant cell</p>	$\frac{1}{2} + \frac{1}{2}$	

	Biolistics / Gene gun, cells are bombarded with high velocity micro-particles of gold or tungsten coated with rDNA / using disarmed Ti plasmid vector or <i>Agrobacterium</i> Mediated Gene Transfer, used to deliver genes of interest into plants.	½+½	2
21.	<p>(a) A population growing in a habitat with limited resources shows initially a lag phase, followed by phases of acceleration and deceleration and finally an asymptote when the population density reaches the carrying capacity 'K' this type of population growth is called as logistic growth curve equation</p> $dN/dt = rN (K-N) / K$ <p>N = population density at time t r = intrinsic rate of natural increase K = carrying capacity</p> <p style="text-align: center;">OR</p> <p>(b) Steps in the process of decomposition are:</p> <ul style="list-style-type: none"> - Detritivores breakdown detritus into smaller particles - By the process of leaching water soluble inorganic nutrients go down into the soil horizon and get precipitated as unavailable salts - Bacterial and fungal enzymes degrade detritus into simpler inorganic substances - Accumulation of dark coloured substance called humus takes place which undergoes decomposition at a very slow rate. 	<p>½+½</p> <p>½</p> <p>½</p> <p>½</p> <p>½</p>	2
	SECTION C		
22.	<p>Pollen grains are light, pollen grains are non-sticky, well exposed stamens, large feathery stigma, single ovule in each ovary, numerous flowers packed into inflorescence, tassels to trap wind borne pollens, compact inflorescence, flowers are colourless, have no fragrance, have no nectar.</p> <p style="text-align: center;">(Any three relevant adaptations)</p>	1x3	3

28.	<ul style="list-style-type: none"> • Predators are animal that hunt and eat other animals for food (or any other relevant explanation) whereas prey are animals that are killed and eaten by other animals. • Predators act as conduits for energy transfer across trophic levels, Predators keep prey population under control, maintains species diversity by reducing the intensity of competition among competing prey species. (Any two roles) 	1 1+1	3
SECTION D			
29.	<p>(a) Hardy-Weinberg equilibrium states that allele frequencies in a population are stable and is constant from generation to generation /the gene pool (total genes and their alleles in a population) remains constant /sum total of all the allelic frequencies is 1 (one).</p> <p>(b) Sometimes the change in allele frequency is so different in the new sample of population that they become a different species, the original drifted population becomes founders and the effect is called as founder effect.</p> <p>(c) (i) When a section of population migrates (gene migration) to another place the gene frequencies in the original as well as in the new population change thus deviating from Hardy-Weinberg equilibrium / New genes or alleles are added to the new population and these are lost from the old population thus deviating from Hardy -Weinberg equilibrium.</p> <p style="text-align: center;">OR</p> <p>(c) (ii) Mutation causes sudden change in the genes (genotype) in a population leading to evolution.</p>	1 1+1 1 1	4
30.	<p>(a)</p> <ul style="list-style-type: none"> • Acquired Immunity or Active Immunity • based on memory <p>(b) Two types of immune response are</p> <p>-Humoral response, antibodies found in the blood.</p> <p>- Cell mediated response, T-lymphocytes mediate CMI.</p> <p style="text-align: center;">/</p>	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}+\frac{1}{2}$ $\frac{1}{2}+\frac{1}{2}$ /	

	<p>-Primary immune response, when our body encounters a pathogen for the first time.</p> <p>- Secondary immune response, subsequent encounter with a same pathogen elicits a highly intensified response.</p> <p>(c) (i)</p> <p>- B-cells or B-lymphocytes produce an army of proteins (called antibodies) in response to pathogens into our blood to fight the pathogens.</p> <p>- T-cells or T-lymphocytes themselves do not produce (secrete) antibodies but help B-cells to produce them.</p> <p style="text-align: center;">OR</p> <p>(c) (ii) Anamnestic response is highly intensified secondary immune response on subsequent encounter with same pathogen after primary response.</p>	<p>1/2+1/2</p> <p>1/2+1/2</p> <p>1/2</p> <p>1/2</p> <p>1</p>	<p>4</p>
SECTION E			
<p>31.</p>	<p>(a) (i) Seeds provide nutrition to the growing embryo, Seeds help plants to overcome unfavourable conditions by dormancy, Hard seed coat provides protection to the young embryo, Being product of sexual reproduction they generate new genetic combinations leading to variations, Seeds have better adaptive strategies for dispersal to new habitat.</p> <p style="text-align: center;">(Any three advantages)</p> <p>(ii) Perisperm is residual persistent nucellus whereas pericarp is the wall of the ovary that develops into a wall of the fruit.</p> <p>(iii) Occurrence of more than one embryo in a seed, citrus/ Mango</p> <p style="text-align: center;">OR</p> <p>(b) (i)</p> <ul style="list-style-type: none"> • (Anterior) Pituitary gland 	<p>1 X3</p> <p>1</p> <p>1/2+ 1/2</p> <p>1</p>	

	<ul style="list-style-type: none"> • -In ovary development of follicles occur under the action of FSH (follicular phase), - LH surge occurs during the mid-cycle and induces rupturing of Graafian follicle and release of the ovum (ovulation)/ LH surge causes ovulation - Ovulation is further followed by luteal phase where corpus luteum is formed which secretes progesterone for maintenance of endometrium / the ruptured Graafian follicle is turned into corpus luteum which secretes progesterone. <p>(ii) Human Chorionic Gonadotropin /hCG, Human Placental Lactogen /hPL</p> <p>(iii)</p> <ul style="list-style-type: none"> • Inner cell mass of the growing embryo or blastula or blastocyst contains stem cells, • Which have the potency to give rise to all the tissues and organs. 	<p>½ x3</p> <p>½+½</p> <p>1</p> <p>½</p>	<p>5</p>
<p>32</p>	<p>(a) Made crops more tolerant to abiotic stresses, reduced reliance on chemical pesticides, helped to reduce post-harvest losses, increased efficiency of mineral usage by plants, enhanced nutritional value of food, make tailor-made plants to supply alternative resources in industries (in form of starches/ fuels/ pharmaceuticals), for normal physiology and development, to study diseases, to get biological products, for vaccine safety, for chemical safety testing</p> <p style="text-align: right;">(Any five benefits)</p> <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> • Insulin consists of two short polypeptide chains – A and B, that are linked by disulphide bridges. • In humans insulin is synthesised as a prohormone which contains an extra stretch called C-peptide, insulin gets matured when C-peptide is removed. • Allergy or reactions to foreign protein. 	<p>1 x5</p> <p>1+1</p> <p>1+1</p> <p>1</p>	<p>5</p>
<p>33</p>	<p>(a) (i)</p> <p>- Example: Fig tree and wasp,</p>		

- Fig tree can be pollinated only by ‘wasp’ and no other species,
- The female wasp uses the fruit for oviposition (egg-laying) site,
- Fig develops seed for nourishing wasp larvae and wasp help in pollination of the inflorescence,
- Since Fig tree and wasp are dependent on each other it is a mutualistic relationship,
- Both Fig tree and wasp have evolved for survival and co-evolution.

½x6

/

- One petal of *Ophrys* (Mediterranean Orchid) bears an uncanny resemblance to the female bee in size or colour or markings, male bee is attracted to what it perceives as a female and pseudocopulates with the flower, and during that process it is dusted with pollen from the flower, when the same bee pseudocopulates with another flower it transfers pollens, if the female bee’s colour pattern change even slightly for any reason during evolution, pollination success will be reduced unless the orchid flower coevolves to maintain the resemblance of its petals to the female bee.

½ X 6

(ii) Endemism indicates species confined to a specific region and not found anywhere else.

1

Western Ghats and Sri Lanka, Indo-Burma, Himalayas.

(Any two)

½+½

OR

(b) (i) Population Density $N_{t+1} = N_t + [(B + I) - (D + E)]$
 $= 500 + [(100 + 300) - (50 + 250)]$
 $= 500 + 100$
 Thus $N_{t+1} = 600$

1

1

(1 mark for formula, 1 mark for calculation)

(ii)

	In situ conservation	Ex-situ conservation
(a)	This is an on-site conservation / Threatened plants and animals are conserved in their natural habitats	This is an off-site conservation / Threatened plants and animals are taken out from their natural habitat and placed in special setting where they can be protected and given special care.

		(b) It involves natural habitat of an organism.	It involves man-made habitats.		
		(c) It is not suitable in case of rapid decline in the number of a species due to any factors.	It is best option in case of rapid decline in the number of species due to any factors.		
		(d) Management and monitoring of target species is involved in this.	Sampling, storage and transfer of target species from natural habitats to manmade habitats is involved.		
		(any three differences)			
				1x3	5