Marking Scheme
Strictly Confidential
(For Internal and Restricted use only)
Senior School Certificate Examination, 2025
SUBJECT NAME - BIOLOGY (SUBJECT CODE 044) (PAPER CODE 57/1/3)

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 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 delibration 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 totaled 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	**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 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.**

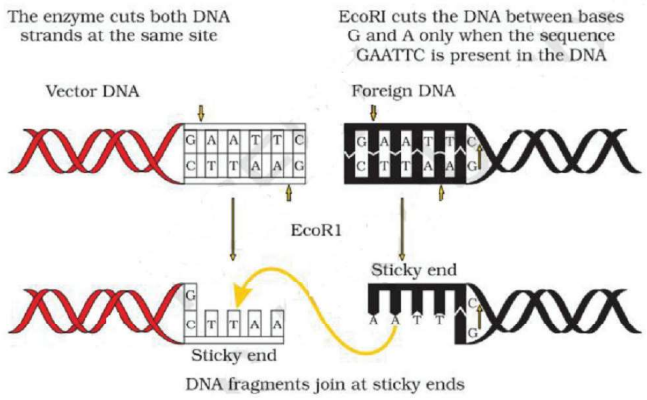
MARKING SCHEME
Senior Secondary School Examination, 2025
BIOLOGY (Subject Code–044)
[Paper Code: 57/1/3]

Maximum Marks: 70

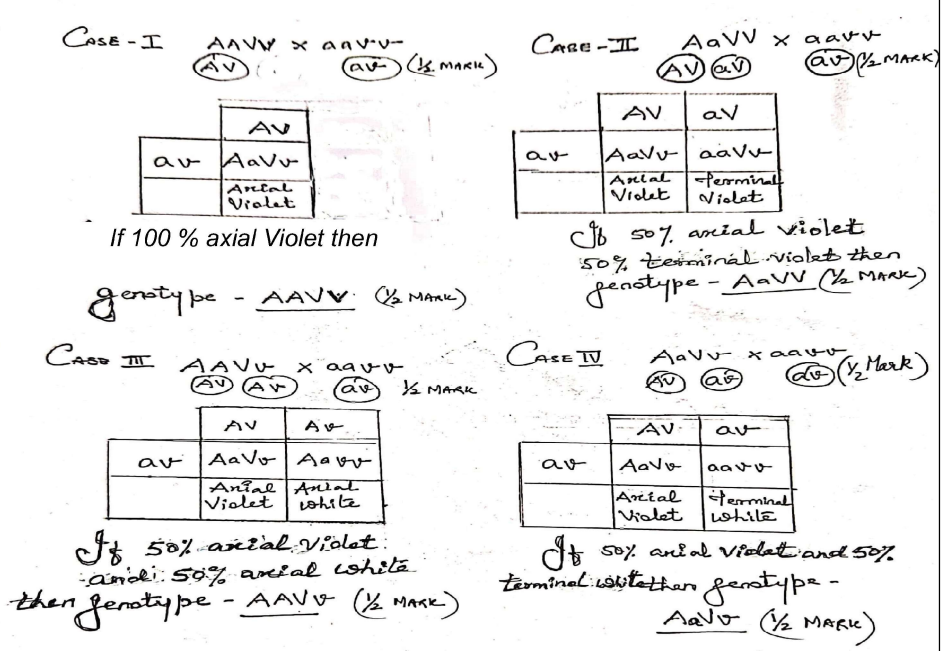
Q.No.	EXPECTED ANSWERS /VALUE POINTS	Marks	Total Marks
	SECTION A		
1	(C) / Inverted Pyramid of biomass	1	1
2	(D)/ Wind	1	1
3	(B)/ P-Zygote Q- Suspensor R- Cotyledon S- Plumule	1	1
4	(B)/ *Australopithecines*→ *Homo erectus*→ Neanderthal → *Homo sapiens*	1	1
5	(C) / 50%	1	1
6	(D) /Pea and Groundnut	1	1
7	(D)/ Genetic Engineering Approval Committee	1	1
8	(D)/ Cell mediated immune response	1	1
9	(C) /1 billion times	1	1
10	(A)/ Preventing the process of translation of mRNA of the nematode	1	1
11	(B)/ 5'-AAUGCUAGGCAC-3'	1	1
12	(D) /1:1:1:1 ratio of phenotypes and genotypes	1	1
13	(B) / Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).	1	1
14	(C) /Assertion (A) is true, but Reason (R) is false.	1	1
15	(C) / Assertion (A) is true, but Reason (R) is false.	1	1
16	(B) / Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).	1	1

	SECTION B		
17	(A) c = aa and d = AA/Aa (B) (i) Autosomal (ii) Recessive	½ + ½ ½ ½	**2**
18	1 = Turner's Syndrome (44 + XO) 2 = Down's Syndrome (45 + XY / 45 + XX) **Turner's Syndrome** (i) Absence of one of the X chromosome 45 with XO. (ii) Sterile female (iii) Rudimentary ovaries/ lack of secondary sexual characters /Short stature and underdeveloped feminine character **Down`s syndrome/ Trisomy** i) Trisomy 21st chromosome/ autosomal chromosome extra ii) Sterile male or sterile female iii) affected are short statured with small round head/furrowed tongue/physical psychomotor and mental development is retarded/ partially open mouth /broad flat face/any other relevant symptoms **(Any one differences)**	½ ½ **1**	**2**
19	**(A)** Heroin is obtained by acetylation of morphine / Both are opioids. Effects – Morphine is a very effective sedative/painkiller Heroin is a depressant/slows down body functions. OR **(B)** (i) (1)Whisky/ Brandy/ Rum (2) Wine/ Beer (ii) Cyanobacteria fix atmospheric nitrogen, add organic matter to soil and increase soil fertility. **(Any two uses)**	1 ½ ½ ½ ½ ½+½	2
20	**(A)** Natural old forest will be more productive, As it contains more biomass or high biodiversity which will trap and store solar radiation in form of biomass **,** Young forest is still developing and contain fewer tress will not capture solar radiations as much as old forest, so productivity is low **,** Shallow polluted lake contains less number of producers and high amount of dead organic matter so productivity is less in comparison to natural old forest. OR **(B)**	½×4	

	Net Primary Productivity	Gross Primary Productivity		
	i)Gross primary productivity minus respiration loses (R) is the net primary productivity. ii)It is the available biomass for the consumption to heterotrophs.	i)Gross primary productivity of an ecosystem is the rate of production of organic matter during photosynthesis. ii)A considerable amount of gross primary utilised by plants respiration. **(Any one point)**	**2**	**2**
21	(A) The genetically engineered lymphocytes have a life span because these cells are not immortal hence, the patient requires periodic infusion There could be permanent cure if the gene isolated from bone marrow cells producing ADA is introduced into cells (lymphocytes) at early embryonic stages **OR** (B) Micro-injection: Recombinant DNA is directly injected into the nucleus of an animal / Biolistics or gene gun: plants cells are bombarded with high velocity micro-particles of gold or tungsten coated with DNA / Heat shock : Recombinant DNA can then be forced into such cells by incubating the cells with recombinant DNA on ice, followed by placing them briefly at 42° C (heat shock), and then putting them back on ice. **(Any two techniques)**		1 1 ½ + ½ ½ + ½ ½ + ½	**2**
22	**SECTION C** Differences			
	Divergent evolution	Convergent evolution		
	Divergent evolution occurs when same structures developed along different directions due to adaptations to different needs	Convergent evolution occurs when different structures evolving for the same function and hence having similarities	1+1	
	Divergent evolution produces homologous structures.	Convergent evolution can result in analogous structures		
	It indicates common ancestory	It indicates similar habitat has resulted in selection of similar adaptive features		
	(Any two correct differences) Similarities : ◆ both are influenced by the environment ◆ both contribute to species evolution or any other valid point . (Kindly note- compare and contrast include both similarities and differences)		½ + ½	**3**
23	(a) Amniocentesis , In amniocentesis some of the amniotic fluid of the developing		½ + ½	

	embryo is taken to analyse the foetal cells and dissolved substances to test the presence of genetic disorders. (b) Medical Termination of Pregnancy/MTP, Yes, as MTP is comparatively safe upto 12 weeks (the first trimester) of pregnancy. (c) When it is performed by quacks / if foetus is a normal female followed by MTP leading to female foeticide	½ x 3 ½	**3**
24	(a) 3' – CTTAAG – 5' (b) EcoRI (c) -Restriction enzyme cut the strand of DNA a little away from the Centre of the palindrome site, but between the same two bases on the opposite strands. This leaves single stranded portion at the two ends known as sticky ends. /  **-Role of sticky ends :** Sticky ends forms hydrogen bond with their complementary cut counter part/ they help injoining of vector DNA and foreign DNA during rDNA technology/ stickiness of ends facilitates the action of enzyme DNA ligase	½ ½ 1 1	**3**
25	(a) Sporozoites (b) In the gut of the female *Anopheles* mosquito (c) P: Salivary glands Q: Gametocytes (d) Asexual phase = In human Sexual phase =In mosquito	½ ½ ½ ½ ½ ½	**3**
26	(a) Nucleosome (b) P = DNA Q = Histone octamer (c) Basic/ Positively charged	½ ½+½ ½	

	(d) Euchromatin 1. Loosely packed chromatin 2. Lightly stained 3. Transcriptionally active chromatin	Heterochromatin 1. Densely packed chromatin 2. Darkly stained 3. Transcriptionally inactive chromatin **(Any two difference)**	½ + ½	**3**
27	(A) Columbia , as it is located near the equator / as we move from equator towards poles the biodiversity decreases. (B) Paul Ehrlich gave rivet popper hypothesis in an airplane (ecosystem) all parts are joined together using thousands of rivets (species), If every passenger travelling starts popping a rivet to home (causing a species to become extinct) it may not affect flight safety (ecosystem functioning) initially, but as more and more rivets are removed, the plane becomes dangerously weak over a period of time, furthermore which rivet is removed may also be critical loss of rivets on wings (key species) is more serious threat to flight safety.		**½+½** **½ x 4**	**3**
28	(a) Recombinant DNA is formed by joining together two DNA fragments from two different sources. cDNA or complimentary DNA is formed by the reverse transcription of mRNAs. (b) After treatment with divalent cation such as calcium, which increases the efficiency with which DNA enters the bacterium through pores in its cell wall, then incubated the cell on ice, followed by placing them briefly at 42°C (heat shock) and then putting them back on ice.		**½** **½** **½ x 4**	**3**
	SECTION D			
29	(a) The butterfly acquires this chemical during its caterpillar stage by feeding on a poisonous weed. (b) Nt+1 = Nt + [(B + I) – (D + E)], 800 = Nt + [(200 + 200) – (150 + 100)] 800 = Nt + (400 – 250) 800 = Nt + 150 Nt = 800 – 150 = 650 Comment As the population density is increasing with time so age pyramid would be of expanding population. (c) Single huge banyan tree - measured in terms of biomass or percent cover , carrot grass- measured in terms of percent cover **OR** (d) Pug marks, faecal pellets.		1 **½ + ½** 1 **½ + ½** **½ + ½**	**4**
30	a) Luteinizing hormone /LH , helps in ovulation / induce rupturing of graffian follicles b) Ovary : Maturation of follicles. Uterus : Proliferation of endometrium lining.		½ + ½ 1 +1	

	c) Q - Progesterone , Maintains pregnancy / maintenance of endometrium **OR** Corpus luteum, Graffian follicle transform into corpus luteum after ovulation	½ + ½ ½ + ½	**4**
	SECTION E		
31	(A) (i)  (ii) In Honey bee males are haploid, females are diploid OR **(B)** Steps of DNA fingerprinting: 1. Isolation of DNA from both the samples R and S 2. Digestion of the DNAs of both the samples same restriction endonucleases 3. Separation of DNA fragments by electrophoresis by placing them in different wells of the agarose gel 4. Transferring (blotting) of separated DNA fragments to synthetic membranes, such as nitrocellulose or nylon. 5. Hybridisation using labelled VNTR probe followed by detection of hybridised DNA fragments by autoradiography	**½x8** **½+½** 1×5	5

32	(A) (i) ◆ MALT is Mucosa Associated Lymphoid Tissue ◆ It is located within the lining of the major tracts like Respiratory or digestive or urogenital tract. (ii) Cytokine barriers – virus infected cells secrete proteins called interferons which protect non-infected cells from further viral infection. (iii) Enzyme Linked Immuno-sorbent Assay or ELISA ,ELISA is based on the principle of antigen-antibody interaction / PCR or Polymerase Chain Reaction , amplification of nucleic acid (iv) Both Bone marrow and thymus provide micro- environment for the development and maturation of T-lymphocytes / immature lymphocyte differentiate into antigen sensitive lymphocytes / Bone marrow is the main lymphoid organ where all blood cells including lymphocytes are produced and some lymphocytes migrate to thymus for development and maturation. **OR** (B) (i) a) H = *Clostridium butylicum* I = Bacteria b)J = Statin K = Fungi / Yeast c)L = *Trichoderma polysporum* M = Immunosuppressant /Suppress immune system in patients with newly transplanted organs (ii) Species specific, narrow spectrum insecticidal properties, No negative impact on non target species like plants or mammals or birds or fishes, Any other valid point **(any two point)**	½ ½ 1 1 + 1 1 ½ ½ ½ ½ ½ ½ 1 + 1	**5**
33	(A) (a)		

vegetative cell	generative cell
It is big with abundant food reserve and an irregular shaped nucleus	Generative cell is small, floats in the cytoplasm of the vegetative cell
Helps in the formation of pollen tube	Forms two male gamete

½

1

	(Any one difference) (1/2 mark for correct names and 1 mark for the correct difference) (b) (i) 1 = Autogamy 2 = Geitonogamy 3 = Xenogamy (ii) a = by Insects or wind b = by Water (iii) Genetic variation, Healthier offspring,Elimination of recessive traits, Disease resistance ,Evolution, no inbreeding depression **(Any two)** **OR** (B) (i) P is able to penetrate or fertilise the ovum ,whereas Q and R are unable to penetrate or fertilize. (ii) When a sperm comes in contact with the zona pellucida layer of the ovum it induces changes in the membrane that blocks the entry of additional sperms. (iii) Entry of sperm induces completion of meiotic division of the secondary oocyte and formation of second polar body and a haploid ovum (ootid) (iv) ◆ **Acrosome :** It is filled with the enzyme which helps the sperm to enter into the cytoplasm of the ovum ◆ **Middle piece** : It has numerous mitochondria which produce energy for the movement of tail that facilitate sperm motility for fertilisation	½ ½ ½ ½ ½ 1 ½+½ ½+½ 1 1 1	**5**