Marking Scheme
Strictly Confidential
(For Internal and Restricted use only)
SR. SECONDARY SCHOOL SUPPLEMENTARY EXAMINATION, 2025
SUBJECT NAME : BIOLOGY (SUB. CODE-044)

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 Newspaper/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 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 marks70 marks as given in Question Paper 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).This is in view of the reduced syllabus and number of questions in question paper.
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 totaling 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 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/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 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.
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 totaled 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 Supplementary Examination, 2025
BIOLOGY (Subject Code–044)
[Paper Code: 57(B)/S]

MAXIMUM MARKS:70

Q.No.	EXPECTED ANSWER / VALUE POINTS	MARKS	TOTAL MARKS
	SECTION – A		
1	(A) / Ovule and Funicle	1	1
2	(D) / The plane of one base pair stacks over the other in double helix	1	1
3	(A) / From unaffected carrier female	1	1
4	(C) / For 21 days after menstruation	1	1
5	(D) / Ability to easily breakdown structurally and chemically.	1	1
6	(D) / Turner syndrome	1	1
7	(D) / Lactose	1	1
8	(A) / Human and *Drosophila*	1	1
9	(A) / Sap from palms	1	1
10	(B) / *Ramapithecus → Homo habilis → Homo erectus → Homo sapiens*	1	1
11	(B) / If gene isolated from bone marrow cells producing ADA is introduced into cells at early embryonic stage	1	1
12	(C) / Methane, Carbon dioxide and Hydrogen	1	1
13	(C) / Assertion (A) is true but Reason (R) is false.	1	1
14	(C) / Assertion (A) is true but Reason (R) is false.	1	1
15	(D) / Assertion(A) is false but Reason (R) is true.	1	1
16	(A) / Both Assertion (A) and Reason (R) are correct and Reason (R) is the correct explanation of Assertion (A).	1	1
	SECTION B		
17	(a) (i) Sertoli cells-on inner lining of seminiferous tubule. Leydig cells – outside seminiferous tubule/interstitial cells (ii) GnRH (Hypothalamic hormone) acts on anterior pituitary gland, and stimulates secretion of two gonadotropins (LH and FSH)	½ ½ ½ +½	

	OR (b) (i) In males -Urethra is a common duct which carries both sperms and urine. In females: Urethra carries only urine. (ii) • Anterior part of the head of sperm • It is filled with enzymes which helps in fertilisation of ovum	½ ½ **½** **½**	2
18	(a) • *Drosophila melanogaster.* • Reasons for selection: -They could be grown on simple synthetic medium in laboratory, -They complete their life cycle in about two weeks, -A single mating could produce a large number of progeny flies, -Male and female flies are easily distinguishable **(Any three points)** (b) • Incomplete Dominance • Genotypic ratio : RR Rr rr 1 : 2 : 1 Phenotypic ratio : Red Pink White 1 : 2 : 1 **Example:** Dog flower / Snap dragon / *Antirrhinum sp./* any other correct example	**½** ½x3 **½** **½** **½** **½**	2
19	Elephantiasis: caused by *Wuchereria bancrofti/ Wuchereria malai* Ringworm: caused by *Trichophyton /Microsporum/Epidermophyton* In Elephantiasis → Lymphatic vessels of the lower limbs / genital organs In Ringworm → Skin / nails/ scalp	½ ½ ½ ½	2
20	Extracted from seaweeds, to provide sieving effect to separate DNA fragments during gel electrophoresis	1x2	2

21

(a) (i)

- Maximum number of organisms a given habitat can support beyond which no further growth is possible — 1
- Symbol - 'K'. — ½

(ii) Resources like food and space can never be unlimited in a given habitat — ½

OR

(b) (i) – Breakdown of complex ´ organic matter by earthworms — ½

– Loosening of soil by earthworms — ½

(ii) – Low temperature — ½

– Anaerobic condition — ½

2

SECTION – C

22

(a) This is because of occurrence of double fertilization, — 1

One of the male gametes fuses with egg cell and results in the formation of diploid zygote, the other male gamete fuses with 2 polar nuclei present in the central cell to produce a triploid endosperm — ½+½

(b) In banana the fruit is formed without fertilization — 1

3

23

Differences between Spermatogenesis and Oogenesis:

	Spermatogenesis	**Oogenesis**
(i)	It is the process of formation of haploid spermatozoa	It is the formation of ovum
(ii)	Starts at puberty	Starts in foetal life
(iii)	One primary spermatocyte form four functional sperm/spermatozoa	One primary oocyte form one ovum only
(iv)	Occurs throughout the life of male after puberty	Oogenesis ceases after menopause around the 45-50 years of age
(v)	It takes place in testis	It takes place in ovary

(**Any other relevant difference) (Any three)** — 1x3

3

24

- The enzyme DNA dependent DNA polymerase catalyses polymerisation only in one direction i.e. 5' → 3' direction, — 1

	on the template strand with polarity 3' → 5' the replication is continuous, while on the template strand with polarity 5' → 3' it is discontinuous • Enzyme is DNA ligase	½ ½ 1	3
25	(a) Repetitive DNA sequence which do not code for any protein but form a large portion of human genome (b) Satellite DNA is separated from Genomic DNA by density gradient centrifugation (c) Satellite DNA shows high degree of polymorphism which forms the basis of DNA finger-printing	1 1 1	3
26	To follow organic farming approach and develop means of biocontrol, Use of biocontrol measures will greatly reduce dependence on toxic chemicals and pesticide, Ladybird beetles are useful to get rid of aphids, Dragonflies are useful to get rid of mosquitoes, any other relevant point **(Any three points)**	1x3	3
27	Bioreactors are used for processing large volume of culture for obtaining the desired product in large quantities/ In Bioreactor the raw materials are biologically converted into specific product Commonly used Bioreactor – Stirring type bioreactor Advantages: Stirrer: The stirrer facilitates even mixing and oxygen availability throughout the bioreactor Sampling port: This is used to take out small volumes of culture periodically	1 1 ½ ½	3
28	Prey might become extinct, after which predator will also become extinct due to lack of food Some insect and frogs get cryptically coloured to avoid being detected easily by the predator, Monarch butterfly is highly distasteful to be avoided by predator bird, thorns in *Acasia* or cactus are morphological means of defence, *Calotropis* produces highly poisonous cardiac glycosides to avoid grazing by herbivores, chemicals like nicotine caffeine quinines opium are produced as defence against grazers and browsers, Any other relevant example **(Any two examples)**	½ + ½ 1+1	3
	SECTION – D		
29	(a) Stabilising, Directional, Disruptive (b) •Stabilising type	½ x3 ½	

	• Because medium height individuals are maximum in number when compared to tall and short individuals independently	1	
	(c) (i) Mutation, genetic recombination, genetic flow or gene migration, genetic drift, Natural selection **(Any two factors)**	½ + ½	
	OR		
	(c) (ii) Originally drifted population which has undergone change due to genetic flow or genetic drift becomes founder and effect is called founder effect	1	4
30	(a) Preformed antibodies against snake venom	1	
	(b) Passive Immunisation	1	
	Directly inject preformed antibodies / antitoxin to neutralise the effect of toxin for quick immune response.	1	
	(c) (i) For Tetanus	1	
	OR		
	(c) (ii) Active immunity	1	4
	SECTION – E		
31	(a) (i) -When pollen tube containing two male gametes reaches the ovary of the flower it releases one of the male gametes which fuses with an egg to form zygote,		
	- and second male gamete fuses with two polar nuclei present in the Central cell to produce triploid primary endosperm as this involves the fusion of three haploid nuclei it is termed as triple fusion,	1x3	
	- syngamy and triple fusion together takes place in embryo sac this phenomenon is termed as double fertilization		
	(ii) Completely consumed endosperm by developing embryo-pea/groundnut/ any other correct example,	½ + ½	
	Persistent endosperm-castor/ coconut/maize/ any other correct example		
	(iii) Epicotyl-The portion of embryonal axis above the level of cotyledons,	½ + ½	
	Hypocotyl-The cylindrical portion below the level of cotyledons		
	OR		
	(b) (i) Both sperm and ovum are transported simultaneously to the ampullary region of the fallopian tube where fertilisation takes place, during fertilisation a sperm comes in contact with the zona pellucida layer of the ovum, this induces changes in the membrane that blocks the entry of additional sperms, secretions of the acrosome help the sperm to enter the cytoplasm of the ovum through zona pellucida and plasma membrane, this induces the completion of meiotic division of secondary oocyte, to form a	½ x6	

	haplоid ovum (ootid) and 2nd polar body, soon the haploid nucleus of the sperm and that of ovum fuse together to form a diploid zygote (ii) Cleavage (iii) Supply of O_2, supply of nutrients, removal of CO_2 and other excretory wastes, secretion of hormones **(Any two functions)**	1 ½ + ½	5
32	(a) (i) Origin of replication (ori)-This is sequence from where replication starts and alien DNA is linked to ori/ controls the copy number, Selectable markers-It is a gene which helps in identifying and eliminating non-transformants and selectively permitting the growth of transformants, Cloning site or restriction site-In order to link alien DNA the vector needs to have very few preferably single recognitions site for the commonly used restriction enzymes (ii) Because it requires simultaneous plating on two plates having different antibiotics **OR** (b) (i) Treating bacterial cells with specific concentration of a divalent cations such as calcium, the divalent cations increase the efficiency with which DNA enters the bacterium, through pores in its cell wall, recombinant DNA is forced into such cells by incubating cells on ice, followed by giving heat shock (42 ºC), again putting back on ice (ii) Plant cells → Biolistics or gene gun method where cells are bombarded with high velocity micro-particles of gold or tungsten coated with DNA/ Ti plasmid of *Agrobacterium* is manipulated to deliver desired gene in plant cells Animal cells→ Micro injections are used where recombinant DNA is directly injected into the nucleus of an animal cells/ Retrovirus are manipulated to deliver desired gene into animal cells	1x3 2 ½ x6 1 1	5
33	(a) (i)Sexual deceit- Orchid 'Ophrys' employs 'Sexual deceit' for which one petal of its flower bears an uncanny resemblance to the female of the bee in size, colour and markings to attract the male bee. Pseudocopulation - The male bee is attracted to that petal of the flower perceiving it as female bee and 'Pseudo-copulates' with the flower and pollinate it The interaction between Ophrys and Orchid flower is Mutualism (ii) 'Co-evolution' In this case if female bees colour patterns change even slightly for any reason during evolution, pollination success will be reduced unless the orchid flowers co-evolve to maintain resemblance of its petal to female bee	1 1 1 1 ½ + ½	

	OR (b) (i) Tropical latitudes have remained relatively undisturbed for millions of years unlike temperate regions which were subjected to frequent glaciations in the past hence tropics have a greater species diversity, tropical environment unlike temperate ones is less seasonal relatively more constant and predictable, there is more solar energy available in the tropics which contributed to higher productivity (ii) Habitat loss and fragmentation, Over-exploitation, Alien species invasions, Co-extinctions	1x3 ½ x4	5