

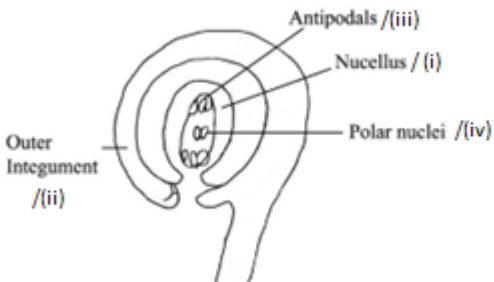
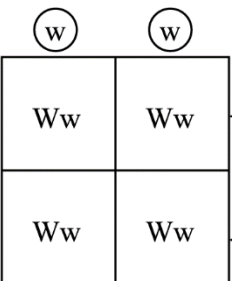
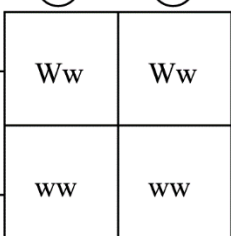
Marking Scheme Strictly Confidential (For Internal and Restricted use only) Senior Secondary Supplementary School Examination, 2026 (XIIth) SUBJECT NAME BIOLOGY (Q.P. CODE 57/7/1)	
<u>General Instructions: -</u>	
1	You are aware that evaluation is the most important process in the actual and correct 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 marks _____70_ (example 0 to 80/70/60/50/40/30 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 Examination, 2026
BIOLOGY (Subject Code-044)
[Paper Code: 57/7/1]
Maximum Marks: 70

Q.No.	EXPECTED ANSWERS / VALUE POINTS	Marks	Total Marks
	SECTION A		
1.	(B) / Coleorrhiza	1	1
2.	(C) / P-Vasa efferentia, Q-Vas deferens	1	1
3.	(A) / Did not segregate independent of each other	1	1
4.	(A) / UAA, UGA, UAG	1	1
5.	(A) / Evolution of different species from a common ancestor to other geographical areas	1	1
6.	(C) / P-Deoxynucleotide Q-Thermostable DNA polymerase	1	1
7.	(A) / <i>Propionibacterium sharmanii</i>	1	1
8.	(B) / Passive immunity	1	1
9.	(B) / Corn borer	1	1
10.	(A) / (i) and (ii)	1	1
11.	(A) / Inorganic nutrients from humus	1	1
12.	(B) / Infectious for dicot plant; has Ti plasmid	1	1
13.	(A) / Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation for Assertion (A).	1	1
14.	(B) / Both Assertion (A) and Reason (R) are true, butt Reason (R) is not the correct explanation for Assertion (A).	1	1
15.	(D) / Assertion (A) is false, but Reason (R) is true.	1	1
16	(A) / Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation for Assertion (A).	1	1
	SECTION B		
17.	(a) <i>Oxalis</i> and <i>Viola</i> produce cleistogamous flowers / flowers that do not open at all even at maturity/ closed flowers These flowers are bisexual in which the anthers and stigma lie close to each other leading to fertilisation to produce assured seed sets even in absence of pollinators. OR	1 1	

	(b) Nucellus - 2n / diploid; MMC- 2n / diploid; functional megaspore -n / haploid; female gametophyte- n / haploid	$\frac{1}{2} \times 4$	2
18.	(a) GIFT (Gamete Intra Fallopian Transfer)– Transfer of an ovum collected from a donor into the fallopian tube of another female who cannot produce one but can provide suitable environment for fertilization. (b) ICSI (Intra Cytoplasmic Sperm Injection)– It is a specialised procedure in which the sperm is directly injected into the cytoplasm of the ovum to form zygote in the laboratory condition.	1 1 2	
19.	(a) - Francis Crick (Award $\frac{1}{2}$ mark for representing each process) OR (b) A molecule that can act as a genetic material must fulfill the following criteria: - It should be able to generate its replica (Replication). - It should be stable chemically and structurally. - It should provide the scope for slow changes (mutation) that are required for evolution. - It should be able to express itself in the form of Mendelian Characters	$\frac{1}{2}$ $1\frac{1}{2}$ $\frac{1}{2} \times 4$ 2	
20.	(a) Stratification in an ecosystem refers to vertical distribution of different species occupying different levels. (b) In a forest the trees occupy the upper/top most vertical strata, shrubs the second, the herbs and the grasses the bottom layers.	$\frac{1}{2}$ $\frac{1}{2} \times 3$ 2	
21.	(a) (i) <i>Papaver somniferum</i> - Morphine is extracted from the latex of poppy plant and by acetylation of morphine heroin is formed. (ii) It is a depressant / it slows down the body functions. OR (b) - Withdrawal syndrome refers to the characteristic and unpleasant manifestation of the body of an addict when regular dose of drugs/alcohol is abruptly discontinued. - Symptoms :- - Anxiety	$\frac{1}{2}$ $\frac{1}{2}$ 1 1	

	- Shakiness - Excess sweating - Nausea (Any two)	$\frac{1}{2} \times 2$	2
	SECTION C		
22.	(a)  (b) Endosperm is triploid because it is developed after triple fusion of one male gamete with two polar nuclei / develop by fusion of three haploid nuclei.	$\frac{1}{2} \times 4$ 1	3
23.	• It is a cross to know the genotype of an unknown dominant trait by crossing it with homozygous recessive trait. • eg : White flower  100% are violet Homozygous dominant  Dominant phenotype of violet colour pea flower White flower  50% are violet and 50% white Heterozygous (Award 1 mark to each cross)	1 1+1	3
24.	Hardy-Weinberg's principle states that allele frequencies in a population are stable and remain constant from generation to generation / the gene pool remain constant and this is called genetic equilibrium. (Any deviation in frequency of alleles represents evolutionary change) P – represents the frequency of allele A / p^2 represents the frequency of allelic combination AA q – represents the frequency of allele a / q^2 represents the frequency of allelic combination aa $2pq$ represents the frequency of allelic combination Aa	1 $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	

	Hence $p^2 + 2pq + q^2 = 1$	$\frac{1}{2}$	3
25.	(a) - The immune system shows an exaggerated response to allergen. - It produces antibodies IgE. (b) Drugs like adrenalin, antihistamine, steroids can reduce the symptoms of allergic reactions (Any 2 drugs) (c) Serotonin and histamine.	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$	3
26.	The three different approaches include – - Enzyme replacement therapy – The functional enzyme adenosine deaminase is injected into the patient periodically. - Bone marrow transplantation – Bone marrow from a normal individual is transplanted in the patient which can produce the functional enzyme adenosine deaminase. - Gene therapy – A functional ADA-cDNA is introduced into the cultured lymphocytes through a retroviral vector which are subsequently returned to the patient.	1 1 1	3
27.	(a) - Commensalism - Mutualism (b) (i) Commensalism – It is an interspecific interaction in which one of the species is benefitted and the other is neither benefitted nor harmed/ Orchid grow as an epiphyte while mango is neither benefitted nor harmed (ii) Mutualism – It is an interspecific interaction in which both the partner species are benefitted / Wasp pollinate fig inflorescence while fig offers egg laying site and some of its developing seeds as food for developing wasp larvae.	1 1 $\frac{1}{2}$ $\frac{1}{2}$	3
28.	- A hotspot is a region with very high levels of species richness and high degree of endemism. - Criteria used for determining hotspot - high levels of species richness - high degree of endemism - Western Ghats, Eastern Himalayas, Indo-Burma (Any two)	1 $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2} \times 2$	3
SECTION D			
29.	(a) Since males have single copy of X chromosome and those who receives defective or mutated copy from mother gets affected. (b) (i) The possibility of a female becoming haemophilic is extremely rare because mother of such a female has to be atleast carrier (X^hX) and father should be haemophilic (X^hY) (Unviable in later stage of life) (ii) Haemophilia is an X-linked disorder and father passes only the Y chromosome to the son. (c) (i) Individual 2 - XX^h	1 1 1 $\frac{1}{2}$	

	5 - X^hY OR (c) (ii) Haemophilia categorised as Mendelian disorder because this occurs due to alteration or mutation in a single gene.	$\frac{1}{2}$ 1	4
30.	(a) Primary sludge, primary effluent. (b) - The anaerobic bacteria digest the other bacteria and fungi or flocs in the sludge. - A mixture of gases (Methane, hydrogen sulphide & CO_2) called biogas is produced which can be used as source of energy. (c) (i) Aerobic bacteria and fungi. OR (c) (ii) • BOD refers to the amount of oxygen that is required by bacteria to oxidise organic matter in one litre of water. • BOD will increase.	$\frac{1}{2} + \frac{1}{2}$ 1 1 $\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	4
	SECTION E		
31.	(a) <pre> graph TD Hypo[Hypothalamus] -- GnRH --> AP[Anterior Pituitary] AP -- LH --> LC[Leydig cells] AP -- FSH --> SC[Sertoli Cells] LC --> T[Testosterone] T --> SG[Spermatogenesis] SC --> F["(Factors)"] F --> SPI[Spermiogenesis] </pre> OR (b) - Each primary oocyte is surrounded by a layer of granulosa cells and become the primary follicle. - When a primary follicle becomes surrounded by more layers of granulosa cells and a new theca called secondary follicle - The secondary follicle transforms into a tertiary follicle with the development of a fluid filled cavity (antrum) around the primary oocyte.	$\frac{1}{2} \times 10$ 1x5	

	- At this stage primary oocyte completes meiosis-I and forms a large haploid secondary oocyte and tiny first polar body. - The tertiary follicle grows further and changes into the mature follicle or Graafian follicle.		5
32.	(a) (i) - The amino acids are activated in the presence of ATP and linked to their cognate tRNA - It is necessary for translation as the formation of peptide bond between two such charged tRNAs would be favoured energetically when they are brought close enough. (ii) It catalyses the process of peptide bond formation (iii) When small subunit of ribosome binds to the mRNA at the start codon (AUG) that is recognised by the initiator tRNA the process of protein synthesis from mRNA begins, and the two sites on the large subunit of ribosome bind to the amino acids which are close to each other for the formation of peptide bond. (iv) - At 5' end before the start codon and at the 3' end after the stop codon - They are required for efficient translation process. OR (b) (i) A regulatory gene, a promoter, an operator, structural genes (ii) (iii) Lactose is the inducer / it inactivates repressor.	1 1 1 $\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ 1 $\frac{1}{2} \times 6$ 1	5
33.	(a) (I) (i) A selectable marker helps in identifying and eliminating the non-transformants and selectively permitting the growth of transformants/ A selectable marker helps in differentiating between recombinants and non-recombinants. (ii) Ampicillin resistance / (amp^R) gene, Tetracycline resistance / (tet^R) gene (Any other correct example of gene) (iii) - 'Ori' is a sequence from where replication process starts. - It is also responsible for controlling the copy number of the linked DNA.	1 $\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	

	(II) - Tumor inducing plasmid or Ti plasmid of <i>Agrobacterium tumefaciens</i> has been manipulated in such a way that it is no more pathogenic but still able to deliver genes of interest ligated to it into plant cell. - Retroviruses are disarmed and are used to deliver gene of interest into animal cells. OR (b) - Gel electrophoresis - The DNA fragments (provided in the sample) being negatively charged can be separated by forcing them to move towards the anode under an electric field through a medium/matrix made up of agarose, the DNA fragments separate out according to their size i.e. smaller the fragment size the farther it will move, separated DNA fragments are visualised as orange bands after staining with ethidium bromide followed by exposure to UV radiation, the separated bands of DNA are cut out and extracted from the gel-piece called elution.	1 1 1 1x4	5
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