

**Marking Scheme**  
**Strictly Confidential**  
**(For Internal and Restricted use only)**  
**Senior Secondary School Examination, 2026 (XII)**  
**SUBJECT NAME : Biology (Q.P. CODE 044/57-2-3)**

**General Instructions: -**

<b>1</b>	The CBSE has decided to introduce On Screen Marking (OSM) for the evaluation of Class XII answer Book with the 2026 Examination.
<b>2</b>	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.
<b>3</b>	<b>“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.”</b>
<b>4</b>	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. <b>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.</b>
<b>5</b>	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.
<b>6</b>	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.
<b>7</b>	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. <b>This is most common mistake which evaluators are committing.</b>
<b>8</b>	If a question has parts, please award marks on the right-hand side for each part in the OSM Portal. Marks awarded for different parts of the question will be totaled up by the OSM System.
<b>9</b>	If a question does not have any parts, marks must be awarded in the left-hand margin in the OSM Portal. This may also be followed strictly.

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 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 :- <ul style="list-style-type: none"> <li>• 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.)</li> <li>• Half or a part of answer marked correct and the rest as wrong, but no marks awarded.</li> </ul>
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	The Examiners should acquaint themselves with the guidelines given in the <b>“Guidelines for Spot Evaluation”</b> before starting the actual evaluation.
16	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.
17	<b>If a candidate attempts both alternatives/options in a question where only one option/ alternative is required to be attempted, the Evaluator shall award marks in both the options. The system will take the higher of two scores and disregard the other response.</b>
18	<b>In a question having two options/alternatives, if a candidate has attempted only one, then the evaluator shall mark “NA” (Not attempted) against the option that has not been attempted by the candidate.</b>

**MARKING SCHEME**  
**Senior Secondary School Examination, 2026**  
**BIOLOGY (Subject Code-044)**  
**[Paper Code: 57/2/3]**

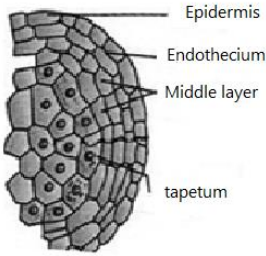
**Maximum Marks: 70**

Q.No.	EXPECTED ANSWERS/VALUE POINTS	Marks	Total Marks
	<b>SECTION A</b>		
1.	(A) / Free living and non-pathogenic.	1	<b>1</b>
2.	(D) / Genetic	1	<b>1</b>
3.	(C) / Green Seed	1	<b>1</b>
4.	(B) / Infectious for dicot plant; has Ti plasmid.	1	<b>1</b>
5.	(C) / Soil Sample III	1	<b>1</b>
6.	(B) / 6%	1	<b>1</b>
7.	(A) / Sickle cell Anaemia	1	<b>1</b>
8.	(B) / a – Meiosis I , b – Meiosis II , c – No division , d - Mitosis	1	<b>1</b>
9.	(D) / Interspecific Competition	1	<b>1</b>
10.	(B) / Share common ancestors	1	<b>1</b>
11.	(C) / Patient takes immuno-suppressants for first few weeks only after transplantation	1	<b>1</b>
12.	(C) / Ethidium Bromide	1	<b>1</b>
13.	(C) / Assertion (A) is true, Reason (R) is false.	1	<b>1</b>
14.	(C) / Assertion (A) is true, Reason (R) is false.	1	<b>1</b>
15.	(A) / Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation for Assertion (A).	1	<b>1</b>
16.	(A) / Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation for Assertion (A).	1	<b>1</b>
	<b>SECTION B</b>		
17.	(a) (i) Placenta (ii) - Nutrition: It facilitates the supply of nutrients to embryo.	$\frac{1}{2}$   $\frac{1}{2}$	

	<p>- Hormonal regulation: Acts as an endocrine gland and produces hCG /Human Chorionic Gonadotropin, hPL / Human Placental Lactogen, estrogen, progestogens. <b>(Any two hormones)</b></p> <p style="text-align: center;"><b>OR</b></p> <p>(b)</p> <p>(i) Fertilisation can only occur if the ovum and sperms are transported simultaneously to the ampullary region / use of contraceptive devices / low sperm count or poor sperm quality / absence of ovulation / lactational amenorrhea / coitus interruptus / periodic abstinence <b>(Any other correct reason)</b></p> <p>(ii)</p> <table><tr><td>Meiosis I in Spermatogenesis</td><td>Meiosis I in Oogenesis</td></tr><tr><td>Starts at puberty</td><td>Starts during embryonic stage</td></tr><tr><td>Results in production of two equal haploid secondary spermatocyte</td><td>Results in production of unequal haploid secondary oocyte and first polar body</td></tr></table> <p style="text-align: center;"><b>(Any One correct difference)</b></p>	Meiosis I in Spermatogenesis	Meiosis I in Oogenesis	Starts at puberty	Starts during embryonic stage	Results in production of two equal haploid secondary spermatocyte	Results in production of unequal haploid secondary oocyte and first polar body	<p><math>\frac{1}{2}+\frac{1}{2}</math></p> <p>1</p> <p>1</p>	<p>2</p>
Meiosis I in Spermatogenesis	Meiosis I in Oogenesis								
Starts at puberty	Starts during embryonic stage								
Results in production of two equal haploid secondary spermatocyte	Results in production of unequal haploid secondary oocyte and first polar body								
18.	<p>(a) Using recombinant DNA technology a company Eli Lily, prepared human insulin in <i>E.coli</i> bacteria, in large quantity / By recombinant DNA technology a company Eli Lily prepared two DNA sequences corresponding to A and B chains of human insulin, introduced them in plasmids of <i>E.coli</i>, A and B chins produced separately are extracted and combined by creating disulfide bonds.</p> <p>(b) Animal derived insulin may cause allergy or any other types of reactions whereas insulin produced by r DNA technology does not / Insulin produced by rDNA technology is produced in large quantity in comparison to animal derived insulin</p>	<p><math>1\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p>	<p>2</p>						
19.	<p>(a) A- Mycorrhiza, B- Free living nitrogen fixing bacteria, C- Symbiotic nitrogen fixing bacteria.</p> <p>(b) <i>Azotobacter</i> <b>(Any other correct example)</b></p>	<p><math>\frac{1}{2} \times 3</math></p> <p><math>\frac{1}{2}</math></p>	<p>2</p>						

20.	<p>(a) (i) Commensalism , Egret is benefitted and cattle neither benefitted nor harmed / as the cattle move they stir up and flush out insects from vegetation which might be difficult for egrets to find and catch.</p> <p>(ii) Brood Parasitism, The Cuckoo lays its eggs in the nest of the crow as the eggs resemble the eggs of crow the crow (host) incubates the eggs.</p> <p style="text-align: center;"><b>OR</b></p> <p>(b)</p> <ul style="list-style-type: none"> <li>- Genetic level: A single species might show high diversity at the genetic level over its distributional range like Medicinal plant <i>Rauwolfia vomitoria</i> shows genetic diversity in terms of potency of concentration of active chemical reserpine / India has more than 50,000 genetically different strains of rice / India has more than 1000 varieties of mango.</li> <li>- Ecological level: At ecosystem level India has deserts /rain forests / mangroves / coral reefs / wetlands /estuaries / Alpine meadows that shows a greater ecosystem diversity than Scandinavian countries like Norway</li> </ul>	$\frac{1}{2} + \frac{1}{2}$  $\frac{1}{2} + \frac{1}{2}$  1  1	2
21.	<p>(a) (i) Substitution of Glutamic acid by Valine at the sixth position of beta globin chain of haemoglobin molecule / Polymerisation of haemoglobin molecule under low oxygen tension</p> <p>(ii)</p> <ul style="list-style-type: none"> <li>- Sickle cell anaemia</li> <li>- Change in shape of the RBC from biconcave to elongated sickle like structure / Oxygen carrying capacity of haemoglobin reduces.</li> </ul> <p style="text-align: center;"><b>OR</b></p> <p>(b)</p> <ul style="list-style-type: none"> <li>- DNA is double stranded and the two strands being complimentary make it more stable than RNA</li> <li>- The presence of thymine at the place of uracil confers additional stability to DNA.</li> <li>- 2'-OH group in RNA is reactive group and makes it labile and easily degradable therefore DNA chemically is less reactive</li> <li>- DNA being more stable mutate at slower rate than RNA <b>(Any Two)</b></li> </ul>	1  $\frac{1}{2}$ $\frac{1}{2}$       1+1	2
	<b>SECTION C</b>		
22.	<p>(a) Due to immune response shown by the body / due to ability of the body to fight against foreign agents (pathogens)</p> <p>(b) Physical barrier, Skin on our body prevents entry of pathogens / Mucus coating (of respiratory, gastrointestinal, urinogenital tract) help in trapping microbes entering our body.</p> <ul style="list-style-type: none"> <li>- Physiological barrier, Acid from stomach / saliva in the mouth / tears from eyes – all prevent microbial growth.</li> <li>- Cellular barrier, Neutrophils and monocytes in the blood as well as macrophages in tissues can phagocytose and destroy microbes.</li> </ul> <p>Cytokine barrier, Virus infected cell secrete proteins interferons that protect non-infected cells from further viral infection <b>(Any Two)</b></p>	1          $\frac{1}{2} \times 4$	3

23.	(a) Genetic Code: It is the sequence of three nitrogenous bases (codon) on mRNA that directs the sequence of amino acids during synthesis of proteins. (b) To provide complementarity between nucleotides and amino acids / to support the notion that change in nucleic acids was responsible for change in amino acids in proteins / to establish the correlation between genetic information and protein synthesis / to constitute a combination of four bases to code twenty amino acids. (c) As a codon from bacteria to human code for the same amino acid.	1  1  1	3								
24.	(a) Propagation of large number of plants in short duration, new plants are genetically identical to the original plants from which they have grown, production of disease free plants. (Any two) (b) Tomato, Banana, Apple (Any other two correct examples)	1+1  ½+½	3								
25.	(a) <i>Drosophila melanogaster</i> (b) - They could be grown on simple synthetic medium in the laboratory. - Complete their life cycle in about two weeks. - Single mating produces large number of progeny flies. - Clear differentiation of sexes – male and female flies are easily distinguishable. Has many types of hereditary variations that can be seen under low power microscopes. / (Any other correct reason) (Any four)	1    ½x4	3								
26.	(a) <table border="1"><thead><tr><th>Homologous organs</th><th>Analogous organs</th></tr></thead><tbody><tr><td>Organs having the same basic anatomical structure but modified to perform different functions.</td><td>Organs not similar in structure but perform similar function.</td></tr><tr><td>Have common ancestry</td><td>Do not have common ancestry</td></tr><tr><td>Show divergent Evolution</td><td>Show Convergent Evolution</td></tr></tbody></table> (Any one difference) (b) <ul style="list-style-type: none"><li>Homologous Organs show divergent Evolution, Analogous organs show Convergent Evolution.</li><li><b>Homologous Organs</b> – Plants example - Thorns and tendrils of Bougainvillea and Cucurbita Animals example- pattern of bones of forelimbs of Whales, bats, Cheetah and humans/ vertebrate hearts/ vertebrate brains. <b>Analogous Organs</b> – Plants example – Sweet potato (root modification) and Potato (Stem modification) Animals example- wings of butterfly and birds / eye of Octopus and mammals / flippers of Penguin and Dolphin. (Any other related example)</li></ul>	Homologous organs	Analogous organs	Organs having the same basic anatomical structure but modified to perform different functions.	Organs not similar in structure but perform similar function.	Have common ancestry	Do not have common ancestry	Show divergent Evolution	Show Convergent Evolution	1         ½+½  ½+½	3
Homologous organs	Analogous organs										
Organs having the same basic anatomical structure but modified to perform different functions.	Organs not similar in structure but perform similar function.										
Have common ancestry	Do not have common ancestry										
Show divergent Evolution	Show Convergent Evolution										
27.	-										

	 <p style="text-align: center;"><b>(Award ½ marks for each correct labelling)</b></p> <ul style="list-style-type: none"> <li>- Outermost layer: Epidermis helps in protection / in dehiscence of anther to release the pollens.</li> <li>- Innermost layer: Tapetum provides nourishment to the developing pollen grains</li> </ul>	$\frac{1}{2} \times 4$          $\frac{1}{2}$ $\frac{1}{2}$	<b>3</b>
28.	<p>(a)</p> <ul style="list-style-type: none"> <li>- Amniocentesis</li> <li>- Some of the amniotic fluid of the developing foetus is taken to analyse the fetal cells and dissolved substances.</li> <li>- Advantage: It tests the presence of certain genetic disorders / down syndrome / haemophilia / sickle cell anaemia / determine the survivability of the foetus</li> <li>- Disadvantage: to determine the sex of unborn child and if found female may lead to female foeticide.</li> </ul> <p>(b) Saheli is different from other pills in term of:</p> <ul style="list-style-type: none"> <li>- Composition: It is non-steroidal.</li> <li>- Advantage: Once a week pill / low side effects / high contraceptive value</li> </ul>	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$  $\frac{1}{2}$ $\frac{1}{2}$	<b>3</b>
<b>SECTION D</b>			
29.	<p>(a) Genetic Engineering / Recombinant DNA Technology</p> <p>(b)</p> <ul style="list-style-type: none"> <li>• Plasmid is an autonomously replicating circular extra chromosomal DNA.</li> <li>• It is used as a vector to transfer foreign genes into host cells.</li> </ul> <p>(c) Antibiotic resistant gene, <i>Salmonella typhimurium</i></p> <p style="text-align: center;"><b>OR</b></p> <p>(c)</p> <ul style="list-style-type: none"> <li>- Exonuclease: Remove the nucleotides from the ends of DNA strand.</li> <li>- Endonuclease: Make cuts at specific positions within DNA strand.</li> </ul>	1 1 1 $\frac{1}{2} + \frac{1}{2}$  $\frac{1}{2}$ $\frac{1}{2}$	<b>4</b>
30.	<p>(a) Water, Soil, sunlight, temperature, organic substances, inorganic substances</p> <p style="text-align: right;"><b>(Any two)</b></p> <p>(b)</p>	$\frac{1}{2} + \frac{1}{2}$	

	<table><tr><th>Role of producers</th><th>Role of decomposers</th></tr><tr><td>Conversion of inorganic molecules into organic material with the help of sunlight through the process of photosynthesis</td><td>Break down of dead and decayed organic material into simpler inorganic substances through the process of decomposition</td></tr></table> <p>(c) <b>Food Chain</b> : Phytoplanktons → zooplanktons → Fish</p> <p><b>Trophic Levels</b> : producers/ 1<sup>st</sup> trophic level      Primary consumer/ 2<sup>nd</sup> trophic level      Secondary consumer/ 3<sup>rd</sup> trophic level</p> <p style="text-align: center;"><b>OR</b></p> <p>(c) Some energy is dissipated and lost as heat to the environment / only 10% of energy being transferred to the next trophic level.</p>	Role of producers	Role of decomposers	Conversion of inorganic molecules into organic material with the help of sunlight through the process of photosynthesis	Break down of dead and decayed organic material into simpler inorganic substances through the process of decomposition	2	
Role of producers	Role of decomposers						
Conversion of inorganic molecules into organic material with the help of sunlight through the process of photosynthesis	Break down of dead and decayed organic material into simpler inorganic substances through the process of decomposition						
		1					
		1	<b>4</b>				
	<b>SECTION E</b>						
31.	<p>(a) (i)</p> <p>(1) A- Morula, B- Blastocyst, C-Inner Cell Mass, D-Trophoblast</p> <p>(2) Inner cell mass get differentiated into an embryo.</p> <p>(3) Stem cells, they have the potency to give rise to all tissues and organs.</p> <p>(ii) It acts on uterine muscles and causes strong uterine contractions, Oxytocin is released from maternal Pituitary.</p> <p style="text-align: center;"><b>OR</b></p> <p>(i)</p> <ul style="list-style-type: none"><li>- Avoid sex with unknown partners / multiple partners.</li><li>- Use condoms during coitus.</li><li>- In case of doubt, one should go to a qualified doctor for early detection and get complete treatment if diagnosed with infection</li></ul> <p>(ii)</p> <ul style="list-style-type: none"><li>- Discourage children from believing in myths and having misconception about sex related problems.</li><li>- Proper information of reproductive organs.</li><li>- Safe and hygienic sexual practices</li><li>- Proper information of sexually transmitted diseases/STDs</li></ul>	<p>½ x4</p> <p>1</p> <p>½+½</p> <p>½+½</p> <p>1x3</p> <p>½ x4</p>					



	<p>- Information about AIDS would help those in adolescent age group to lead a reproductively healthy life. (or any other correct point)</p> <p style="text-align: right;"><b>(Any Four)</b></p>		<b>5</b>
32.	<p>(a) (i)</p> <ul style="list-style-type: none"> <li>• Disease : Acquired Immuno Deficiency Syndrome /AIDS</li> <li>• Causative Agent : Human Immuno deficiency Virus / HIV</li> </ul> <p>(ii)</p> <ul style="list-style-type: none"> <li>- After getting the entry into the body of the person virus enters macrophages</li> <li>- RNA genome of the virus replicates to form viral DNA with the help of enzyme reverse transcriptase</li> <li>- The viral DNA gets incorporated into the host cell's DNA and directs the infected cells to produce virus particles.</li> <li>- Simultaneously HIV enters into helper T-lymphocytes (T<sub>H</sub>) and produce progeny viruses which attack other T-lymphocytes leading to weakened immune system.</li> </ul> <p style="text-align: center;">//</p> <div data-bbox="424 943 1062 1482" data-label="Diagram"> <p>The diagram illustrates the life cycle of a retrovirus within a macrophage. It starts with a retrovirus (consisting of a viral RNA core and a viral protein coat) infecting a macrophage. The viral RNA is introduced into the cytoplasm. Reverse transcriptase enzyme is used to produce viral DNA. This viral DNA then incorporates into the host's genome in the nucleus. The infected cell then produces new viral RNA, which is used to create new viruses. These new viruses are then released and can infect other cells. The diagram is divided into sections for the macrophage, animal cell, cytoplasm, nucleus, and DNA, with arrows indicating the flow of the viral components and the production of new viruses.</p> </div> <p>(iii)</p> <ul style="list-style-type: none"> <li>- By Sexual contact with infected person.</li> <li>- Transfusion of contaminated blood and blood products.</li> <li>- Sharing of infected needles by intravenous drug abusers.</li> <li>- Infected mother to her child through placenta.</li> </ul> <p style="text-align: right;"><b>(Any Two)</b></p> <p style="text-align: center;"><b>OR</b></p> <p>(b) (i) They reduce our dependence on toxic chemicals and pesticides / They create a system where insects called pests are not eradicated but kept at manageable level by complex system of checks and balances / No negative impact on plants mammals birds fish or non – target insects <b>(Any other correct reason)</b></p>	<p>1+1</p> <p><math>\frac{1}{2} \times 4</math></p> <p><math>\frac{1}{2} + \frac{1}{2}</math></p> <p>1</p>	



F<sub>1</sub> generation — Rr  
(All with red coat)

↓  
Rr X Rr  
R r

F <sub>2</sub> generation	R	RR Red coat	Rr Red coat
	r	Rr Red coat	rr White coat

F<sub>2</sub> phenotypic ratio: 3 Red Coat : 1 White Coat

**(2) Red is incompletely dominant**

Gametes      RR (Red coat)      X      rr (White coat)  
                  ↙      ↘                      ↙      ↘  
                  R      R                      r      r

F<sub>1</sub> generation — Rr  
(All with Pink coat)  
                                  ↓  
                                  Rr X Rr

	R	r
R	RR Red coat	Rr Pink coat
r	Rr Pink coat	rr White coat

F<sub>2</sub> phenotypic ratio: 1 Red : 2 Pink : 1 White

1/2

1/2

1/2

1/2

1/2

1/2

1/2

**5**

