Marking Scheme

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Senior School Certificate Examination, 2023

SUBJECT NAME BIOLOGY (SUBJECT CODE 044) (PAPER CODE 57/5/1)

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-X, 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.

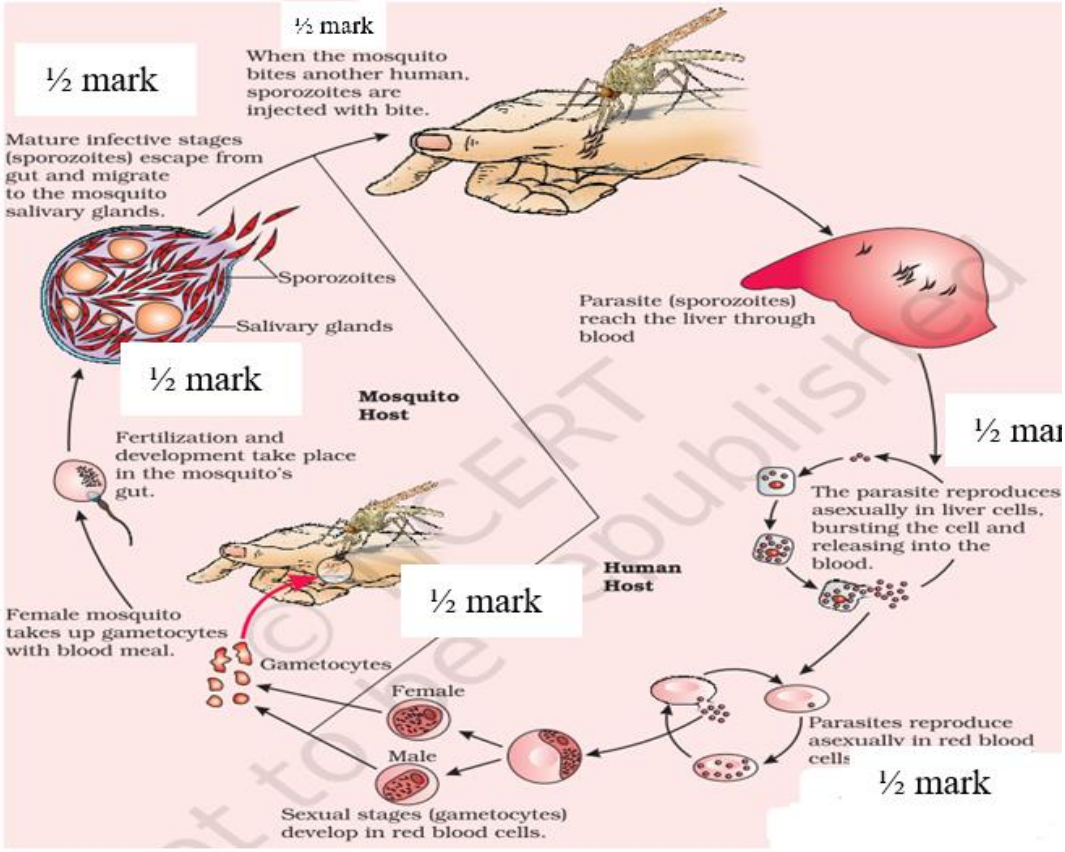
MARKING SCHEME
Senior Secondary School Examination, 2023
BIOLOGY (Subject Code–044)
[Paper Code: 57/5/1]

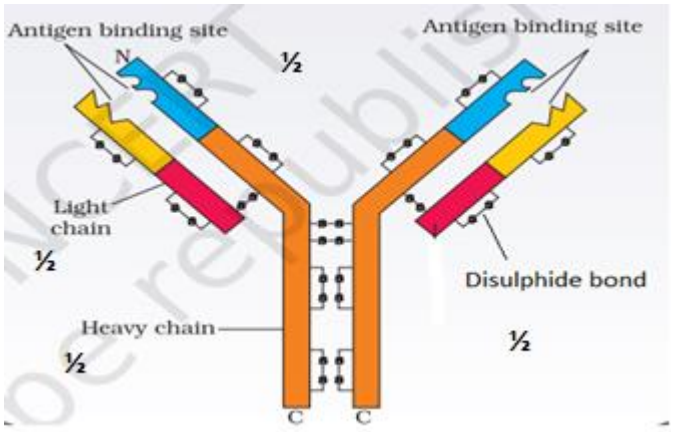
Maximum Marks:70

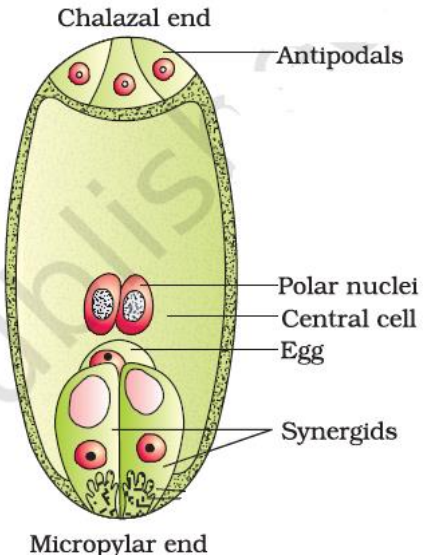
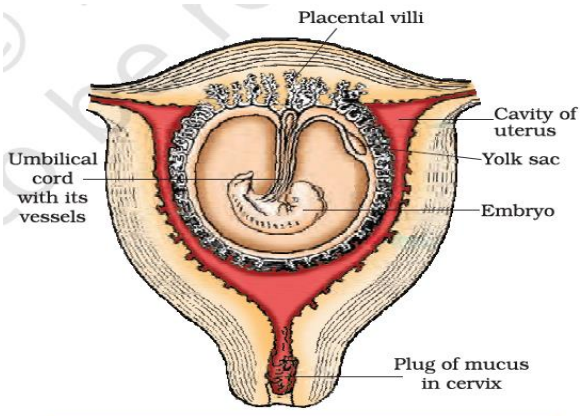
Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
	SECTION—A		
1	(b) / Neanderthal man.	1	1
2	(d) / (A) – (i), (B) – (iii), (C) – (iv), (D) – (ii).	1	1
3	(d) / Increase in antigens.	1	1
4	No correct option is available. One mark is to be awarded for attempting the question.	1	1
5	(d) / Mutualism.	1	1
6	(d) / *Haemophilus influenzae*: Blockage of the intestinal passage.	1	1
7	(a) / $gm^{-2}\,yr^{-1}$.	1	1
8	(d) / 5′ C-T-G-C-A G 3′ 3′ G A-C-G-T-C 5′.	1	1
9	(c) / 359 invertebrates.	1	1
10	(d) / A – (ii), B – (iv), (C) – (i), (D) – (iii).	1	1
11	(d) / (i) and (iv).	1	1
12	(c) / X – Suspensor (2n), Y – Cotyledon (2n), Z – Radicle (2n), U – Plumule (2n).	1	1
13	(b) / Both (A) and (R) are true, but (R) is not the correct explanation of (A).	1	1
14	(c) / (A) is true, but (R) is false.	1	1
15	(b) / Both (A) and (R) are true, but (R) is not the correct explanation of (A).	1	1
16	(d) / (A) is false, but (R) is true.	1	1
	SECTION B		
17	(a) Accept all values within 47 ± 2 (years of age) (b) Accept all values from 6-8 years of age	1 1	2
18	*Calotropis* plant produces highly poisonous, cardiac glycosides.	1 x 2	2

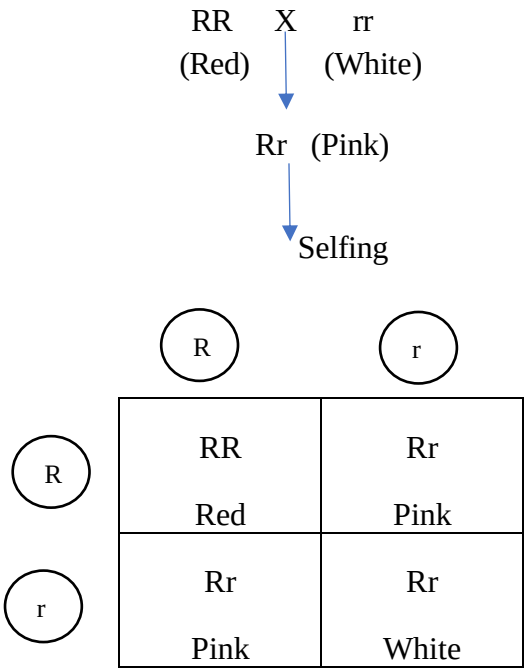
19	Case I -Homozygous dominant GG × gg Green Pods Yellow Pods ↓ G G g | Gg | Gg g | Gg | Gg Phenotype: All green coloured pod Case II- Heterozygous dominant Gg × gg Green Pods Yellow Pods ↓ G g g | Gg | gg g | Gg | gg Phenotype: 50% green & 50% yellow colour pod	½ ½ ½ ½	2
20	(a) (i) *Nucleopolyhedrovirus* (ii) Species specific, no negative impact on other plants / mammals / birds / fish / non target insects, beneficial insects are conserved, useful for ecologically sensitive area. **(Any Two)** **OR** (b) Malignant tumor grows very rapidly, and starves the normal cells by competing for vital nutrients, invades and damages surrounding normal tissue , shows metastasis / spread to other body parts or tissues. **(Any Two)**	1 ½ ×2 1 ×2	2
21	(a) *Thermus aquaticus* (b) Thermostable DNA polymerase remains active during the high temperature induced denaturation of double stranded DNA / It is not required to be added every time after denaturation in every cycle.	1 1	2
	SECTION – C		
22.	• Vasectomy • A small part of the vas deferens is cut / removed, tied-up to block sperm transport	1 1 × 2	3

23	(a) (i) Identify all the approximately 20,000 – 25,000 genes in human DNA (ii) Determine the sequences of the 3 billion chemical base pairs that make up human DNA. (iii) Store this information in databases. (iv) Improve tools for data analysis. (v) Transfer related technologies to other sectors, such as industries. (vi) Address the ethical / legal / social issues (ELSI) that may arise from the project. **(Any four)** (b) *Caenorhabditis elegans* / *Drosophila* (**or any other correct example)**	½ × 4 1	3
24	Before industrialization thick growth of almost white lichens covered tree trunks and walls, from the mixed population of white and black winged moths white winged moth survived and increased in number due to camouflaging, dark coloured moth were picked out by predators and thus decreased in their numbers. After industrialization tree trunks became dark due to industrial smoke and soot / absence of lichen, dark coloured moth survived and increased in number due to camouflaging, white winged moths were picked out by predators and thus decreased in their numbers.	½ × 6	3
25	- Emasculation : Removal of the anther from the flower bud before the anther dehisces. - Bagging : Covering the emasculated flower with a bag of suitable size to prevent contamination of its stigma with unwanted pollen. - Dusting of desired pollen on the stigma and re-bagging. **(Half mark each if only name of process Emasculation and Bagging is mentioned)**	1 × 3	3
26	(a) Sporozoites (infectious form of *Plasmodium*) enter in the blood of human through female *Anopheles* mosquito's bite, sporozoites multiply asexually (asexual phase) in liver, Red Blood Cells (RBCs), and form gametocytes in RBCs of human host which are taken by female *Anopheles* mosquito with blood meal, fertilization and further development take place in the mosquito's gut leading to formation of sporozoites (sexual phase), that are stored in its salivary glands hence needs both host for its continuity. //	½ × 6 //	

	 **OR** (b) Balanced diet, personal hygiene, regular exercise / yoga, vaccination, proper disposal of waste, control of vectors, maintenance of hygienic food and water, any other relevant point **(Any Six)**	½ × 6 ½ × 6	3
27	In bacteria toxin is produced in inactive form/protoxin, insect ingests it, protoxin/inactive protein becomes active due to alkaline pH of gut (solubilize), toxin binds to epithelial cells (of midgut) and creates pores, causes swelling, lysis and death.	½ × 6	3
28	(a) Oxygen production, pollination, aesthetic pleasure of thick woods and flowers, bird watching, mitigate droughts and floods, cycle nutrients, generate fertile soils, provide wildlife habitat, maintain biodiversity, provide storage site for carbon, provide aesthetic/ cultural/ spiritual values, any other relevant point **(Any two)** (b) Philosophical or spiritual realisation that every species has an intrinsic value / Moral duty to care for their well-being / pass on our biological legacy in good order to future generations.	1 × 2 1	3
	SECTION-D		
29	(a) • Incubation period • Infected person may not take precautions during this period as there are no symptoms of the diseases. // • Period of illness	½ ½ // ½	

	• Number of microorganisms is high and can be transmitted via droplet infection. (b) • Time period between infection and appearance of its symptoms. • AIDS/any other correct example • T lymphocytes **OR** (b)  (c) • Period of illness • B lymphocytes / B cells	½ 1 ½ ½ ½ × 4 ½ ½	4
30	(a) Gain or loss of chromosome due to failure of segregation of chromatids during cell division cycle is known as aneuploidy. (b) 22 + XY, 22 + 0 (c) Klinefelter's syndrome Gynaecomastia/ feminine development, sterile individual, tall stature, overall masculine development **(Any two)** **OR** (c) Down's Syndrome: Short statured with small round head, furrowed tongue, partially open mouth , broad palm with palm crease , physical/ psychomotor/mental retardation , flat back of head , loops on finger tips , congenital heart disease , big and wrinkled tongue , broad flat face **(Any two)**	1 ½ ×2 1 ½ ×2 1 ½ × 2	4
	SECTION E		
31	(a) (i) (Meiosis) Megaspore mother cell (2n) → Tetrad (n) Degeneration of 3 cells (one functional megaspore left) ← 3 Mitosis without cell wall formation / Free Nuclear division	½ × 6	

	(n) (Cell wall formation) 8 nuclear stage ⟶ Embryo sac (7 celled 8 nucleated stage) (ii)  **(Any four parts labelling)** **OR** (b) (i) After implantation finger like projections appear on the trophoblast called chorionic villi which are surrounded by the uterine tissue and maternal blood, these tissues become interdigitated with each other, and jointly form a structural and functional unit between developing embryo and maternal body called placenta. (ii)  **(Any four parts labelling)**	½ × 4 1×3 ½ × 4	5
32	(a) DNA fingerprinting **Steps** i) Isolation of DNA ii) Digestion of DNA by restriction endonuclease enzyme iii) Separation of DNA fragments, by electrophoresis iv) Transferring of separated DNA fragments to synthetic membrane such as nitrocellulose or nylon. v) Hybridization, using labelled VNTR probe. vi) Detection of hybridized DNA fragments by autoradiography	1 ½ ½ ½ x 2 ½ ½ × 2 ½	

	OR (b) Incomplete Dominance Snapdragon flower / Dog flower /*Antirrhinum*  Phenotype - Red : Pink : White 1 : 2 : 1 Genotype - RR : Rr : rr 1 : 2 : 1	½ ½ ½ ½ ½ ½ ½ ½ ½	5
33	(a) (i) Optimum growth conditions : Temperature , pH , Substrate , Salts , Vitamins , Oxygen **(Any four)** (ii) Log phase / Exponential phase (iii) • No • it needs separation and purification / down-streaming process / quality control testing / needs to be formulated with suitable preservatives / clinical trials. **OR** (b) (i) (I) E - Genus co – Species R – Strain I – Order of isolation of enzyme	½ × 4 1 1 1 ½ × 4	

	(II) Recognition site – 5′GAATTC 3′ 3′CTTAAG 5′ Cleavage site – Between G and A from both sides // ↓ 5′GAATTC 3′ 3′CTTAAG 5′ ↑ **(NOTE: half mark to be awarded for correct recognition site and half mark for cleavage site)** (ii) • Sticky ends • Sticky ends form hydrogen bonds with their complimentary cut counterparts, this stickiness facilitates the action of the enzyme DNA ligase.	½ ½ // 1 1 ½ ×2	5