Marking Scheme
Strictly Confidential
(For Internal and Restricted use only)
Senior School Certificate Examination, 2025
SUBJECT NAME BIOLOGY (SUBJECT CODE 044) (PAPER CODE 57/4/1)

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-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.

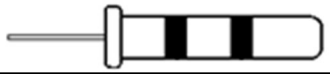
MARKING SCHEME

Senior Secondary School Examination, 2025

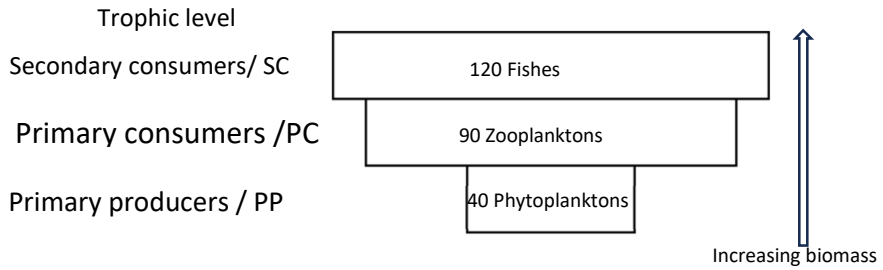
BIOLOGY (Subject Code–044)

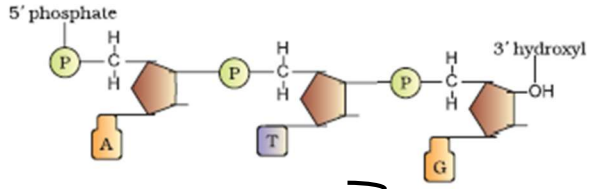
[Paper Code: 57/4/1]

Maximum Marks: 70

Q. No.	EXPECTED ANSER/VALUE POINTS	MARKS	TOTAL MARKS
	Section A		
1.	(C) / Nucleosomes	1	1
2.	(B) / (ii), (iii), (v)	1	1
3.	(B) / Deoxyribonucleoside triphosphate	1	1
4.	(D) / Sex-linked recessive trait	1	1
5.	(D) / Rheumatoid arthritis	1	1
6.	(D) / (ii) and (iv)	1	1
7.	(B) / *Dryopithecus* and *Ramapithecus*	1	1
8.	(C) / Tyrosine	1	1
9.	(D) / ELISA	1	1
10.	(A) / 	1	1
11.	(C) / *Trichoderma polysporum*	1	1
12.	(D) / 3 : 1	1	1
13.	(C) / Assertion (A) is true, but Reason (R) is false.	1	1
14.	(A) / Both Assertion (A) and Reason (R) is the correct explanation of the Assertion (A).	1	1
15.	(D) / Assertion (A) is false, but Reason (R) is true.	1	1
16.	(C) / Assertion (A) is true, but Reason (R) is false.	1	1
	Section B		
17.	(a) - The immunity will decrease. - Immature lymphocytes will not differentiate into antigen – sensitive lymphocytes / development and maturation of T-lymphocytes does not take place.	1 1	

	OR (b) (i) • Virus infected cells secrete proteins called interferons. • Interferons protect non-infected cells from further viral infection (ii) Cytokine barriers.	½ ½ 1	2
18.	(a) 7 amino acids, the genetic code is a triplet (b) 7 amino acids, the genetic code is triplet	½ + ½ ½ + ½	2
19.	(a) • Medical termination of pregnancy before full term /(Intentional or voluntary) termination of pregnancy before full term. • Get rid of unwanted pregnancies either due to casual unprotected intercourse or failure of the contraceptive used during coitus or rapes, if pregnancy is harmful or even fatal either to the mother or to the foetus or both. **(any one reason)** **OR** (b) - Gonorrhoea , syphilis , genital herpes , chlamydiasis , genital warts , trichomoniasis , hepatitis-B , AIDS, any other correct answer **(any two disease)** - Itching , fluid discharge , slight pain , swelling in genital region , redness, any other correct answer **(any two symotoms)**	1 1 ½ + ½ ½ + ½	2
20.	(a) DNA ligase (b) Transformation (c) Same restriction EcoRI is used to cut both the vector DNA and alien DNA because it will produce complementary overhangs or sticky ends which will help in joining two DNA strands through hydrogen bonds.	½ ½ 1	2
21.	(a) The clownfish gets protection from the predators due to the presence of stinging tentacles thus deriving benefit from sea	1 + 1	

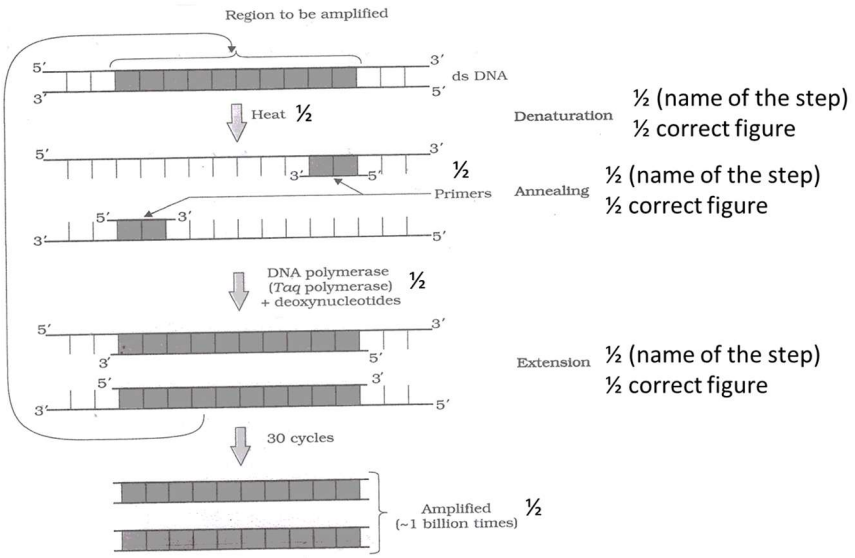
	anemone, the sea anemone neither derive any benefit nor get harmed from the clownfish. **OR** (b)  (Award 1 mark for diagram of inverted pyramid of biomass, and 1 mark for correct trophic level)	1 + 1	2
	Section C		
22.	After implantation of blastocyst finger-like projections appear on the trophoblast**,** called chorionic villi**,** which are surrounded by the uterine tissue**,** and maternal blood**,** the chorionic villi and uterine tissue become interdigitated with each other**,** and form a structural and functional unit between developing embryo or foetus and maternal tissue or body called placenta.	½ x 6	3
23.	(a) True breeding pea plant varieties were selected, distinct contrasting characters were selected for different traits, artificial (self and cross) pollination was conducted carefully, large sample size was used, results were confirmed by performing experiments for several generations, any other correct point **(any two reasons)** (b) When two pairs of traits are combined in a hybrid, segregation of one pair of characters is independent of the other pair of characters.	1 + 1 ½ x 2	3
24.	(a) (a) Phosphoester linkage/ Phosphoester bond (b) Phospho-di-ester linkage / Phospho-di-ester bond (b) Two	½ ½ ½	

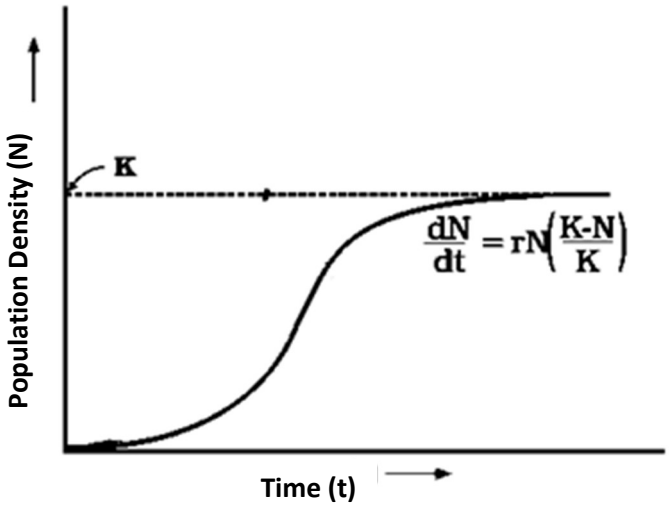
	(c)  correct 3'-5' ends correct sugar phosphate backbone correct nitrogenous bases ½ x 3	½ x 3	3
25.	– The sewage is constantly agitated mechanically and air is pumped into it – This allows the vigorous growth of useful microbes into flocs (masses of bacteria associated with fungal hyphae to form mesh like structures – While growing these microbes consume the major part of the organic matter in the effluent – This significantly reduces the Biochemical Oxygen Demand or BOD	1 1 ½ ½	3
26.	(a) Wind pollination or Anemophily (b) To trap air-borne pollen grains (c) Pollen grains are light and, non-sticky (d) As they need not attract insects or birds or bats/ facilitate the flow of wind	½ ½ ½ + ½ 1	3
27.	(a) Removal of *Lantana* allows other plants to grow, due to which herbivores population increases and that helps to restore the tiger population (b) *Lantana* being invasive does not allow other plants to grow in its surroundings, this will decrease in herbivore population which can in turn cause decline in the tiger population.	1+ 1 ½ + ½	3
28.	• **Advantage of Green revolution**: - Increase in the production of crops, support more population in terms of food **(any one advantage)**	1	

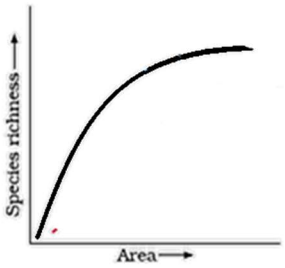
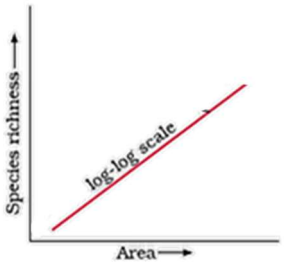
	• **Disadvantages of Green revolution**: - Use of agrochemicals (fertilisers and pesticides) led to the pollution of soil or water in long run (biomagnification) - Crop management practices such as irrigation is expensive - Agrochemicals were too expensive - Led to increase in soil salinity - Agrochemicals reduce natural soil fertility - Crops become dependent on fertilisers & pesticides - Or any other correct answer **(any two disadvantages)**	1 + 1	3
	Section D		
29.	(a) (i) Human and Macaque = Divergent evolution. (ii) Human and Frog = Divergent evolution. (b) Biochemical similarities in haemoglobin suggests common ancestry. (c) (i) Macaque is more closely related to humans than lamprey, because the number of amino acid differences between human and macaque is less / human and macaque have more biochemical similarities in the structure of haemoglobin than human and lamprey. **OR** (c) (ii) Dog is more closely related to human than frog, because the number of amino acid differences between human and dog is less / dog and human have more biochemical similarities in the structure of haemoglobin than human and frog.	½ ½ 1 1+1 1+ 1	4

30.	(a) As opiodis are generally taken intravenously and use of contaminated needles or contaminated injections increases the chances of hepatitis B (liver diseases). (b) Direct drug related disease means diseases due to overdoses of opioids / fatal overdose of opioids. (c) (i) – *Papaver somniferum* – Latex **OR** (c) (ii) Drop in academic performance, unexplained absence from school or college, lack of interest in personal hygiene, withdrawal, isolation, depression, fatigue, aggressive, rebellious behaviour, deteriorating relationships with family and friends, loss of interest in hobbies, change in sleeping and eating habits, fluctuations in weight, appetite, stealing, mental and financial destress, or any other correct point. **(any two signs)**	1 1 1 1 1 + 1	4
	Section E		
31.	(a) (i) After entering one of the synergids the pollen tube releases the two male gametes into the cytoplasm of the synergid, one of the male gametes moves towards the egg cell and fuses with its nucleus thus completing the syngamy to form zygote, the other male gamete moves towards the two polar nuclei located in the central cell and fuses with it causing triple fusion to form Primary endosperm nucleus (PEN) or Primary endosperm cell (PEC). (ii) Primary endosperm cell (PEC) and develops into the endosperm, while the zygote develops into an embryo.	1 x 3 1 + 1	

	OR (b) (i) • Each testicular lobule consists of 1-3 highly coiled seminiferous tubules, in which sperms are produced. • Two types of cells – Male germ cells/ spermatogonia, undergo meiotic divisions finally leading to sperm formation – Sertoli cells, provide nutrition to the germ cells. (ii) – GnRH acts at the anterior pituitary gland, and stimulates secretion of (two) gonadotropins, – luteinising hormone (LH) – follicle stimulating hormone (FSH).	½ + ½ ½ + ½ ½ + ½ ½ + ½ ½ ½	5
32.	(a) • RNA interference or RNA*i* • Steps of RNA*i* – Using *Agrobacterium* vectors nematode-specific genes were introduced into the host plants – The introduction of DNA was such that it produced both sense and anti-sense RNA in the host cells – Two RNA's being complementary to each other form a double stranded RNA (dsRNA) – This initiated RNA*i* and thus silenced the specific mRNA of the nematode. (consequently the parasite could not survive in a transgenic host expressing specific interfering RNA) **OR**	1 1 x 4	
	(b) • Each cycle in PCR has three steps: Denaturation, Annealing, Extension – **Denaturation**: DNA subjected to higher temperature, the two strands of DNA separate due to broken hydrogen bonds between nitrogenous bases	½ x 3 ½ + ½	

	– **Annealing**: Two sets of primers, which are complementary attach on 3' end of both template strands. – **Extension**: the new strand of DNA is formed using thermostable *Taq* polymerase enzyme (derived from *Thermus aquaticus* bacterium), extends the primers and the nucleotides provided in the reaction and the genomic DNA act as the template. – The process of replication of DNA is repeated 30 times the segment of DNA is amplified 1 billion times i.e. 1 billion copies are made. // (Marks to be allotted if the key points are depicted in the form of the diagram)  	½ + ½ ½ + ½ ½ ½ x 10	5
33.	(a) (i) A population growing in a habitat with limited resources initially shows a lag phase, followed by phases of acceleration and deceleration and, finally a asymptote when the population density reaches the carrying capacity.	½ x 3	

	(ii) Equation: $$\frac{dN}{dt} = rN\left(\frac{K-N}{K}\right)$$ (N = population density at time t, r = intrinsic rate of natural increase, k = carrying capacity) (iii) Logistic growth curve / Verhulst – Pearl Logistic Growth curve/sigmoid growth curve/S-Shaped curve. Correct graphical plot of logistic growth curve.  **OR**	1 ½ 2	
	(b) (i) • Within a region species richness increases with increasing explored area but only upto a limit • Nature of the graph - rectangular hyperbola.	1 1	

	(ii)  **Or**  (any one graph)	2	
	(iii) Correct equation – $S = CA^Z$ / log S = log C + Z log A (S = Species richness, A = Area, Z = Slope of the line (regression coefficient), C = Y-intercept)	1	
			5