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

General Instructions: -

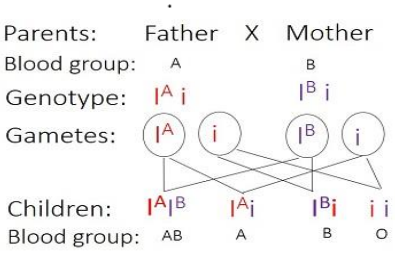
1	You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested 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.

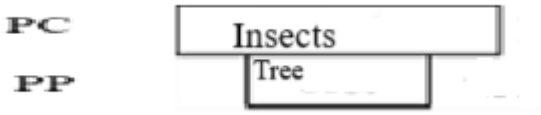
8	If a question does not have any parts, marks must be awarded in the left-hand margin and encircled. This may also be followed strictly.
9	If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out with a note **"Extra 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 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 Supplementary Examination, 2025
BIOLOGY (Subject Code–044)
[Paper Code: 57/S/2]

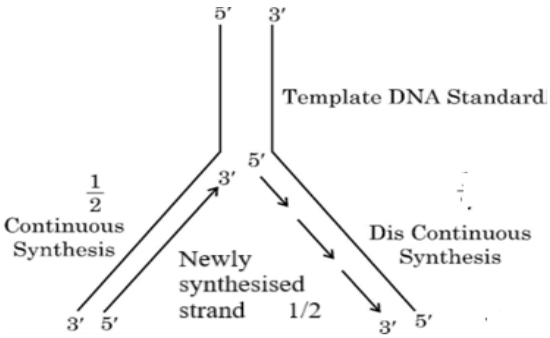
MAXIMUM MARKS:70

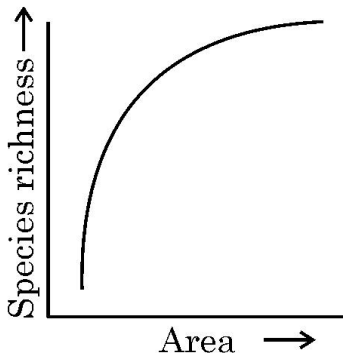
Q.No.	EXPECTED ANSWER / VALUE POINTS	MARKS	TOTAL MARKS
	SECTION – A		
1	(B) / *Thermus aquaticus*	1	1
2	(B) / Sex linked dominant	1	1
3	(D) / A Polypeptide of 31 amino acids will be formed.	1	1
4	(A) / a – Antipodals, b– Polar nuclei, c– Synergids.	1	1
5	(D) / (i) and (iii)	1	1
6	(C) / a– iii, b – iv, c– ii, d -i	1	1
7	(A) / (i) and (iii)	1	1
8	(D) /Blood-cholesterol lowering statins	1	1
9	(B) / *Ramapithecus → Australopithecines → Homo habilis → Homo erectus → Homo sapiens*	1	1
10	(D) / Chilled Ethanol	1	1
11	(B) / Enrichment of Vitamin A	1	1
12	(C) / 2 Red : 2 Pink	1	1
13	(A) / Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).	1	1
14	(C) / Assertion (A) is true, but Reason(R) is false.	1	1
15	(A) / Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).	1	1
16	(A) / Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).	1	1
	SECTION B		
17	(a) To produce a zygote one megaspore mother cell will undergoes one meiotic division to produce one ovule as it shows megasporic development therefore 100 meiotic divisions will take place to produce 100 zygotes,	½	

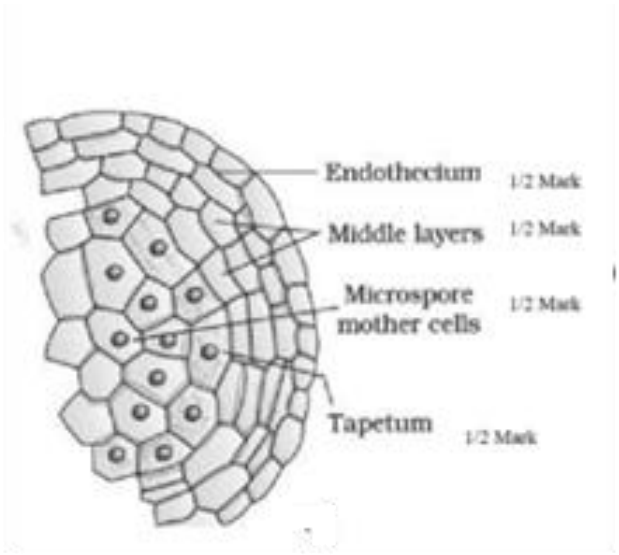
	One microspore mother cell undergoes one meiotic division to produce four pollen grain therefore 25 meiotic division will take place to produce 100 zygotes or 100 pollen grains Total meiotic division 100 + 25 = 125 **OR** (b) Microspore mother cell = 35 So, no. of Pollen grains = 35 x 4 = 140 Megaspore mother cell = 35 So, no. of ovules = 35 (Monosporic development)	½ 1 1 1	2
18	(a) (i) Yes (ii) Since the blood group of husband and wife is B and A respectively, so their genotype can be I^Bi and I^Ai respectively Parents I^Bi , and I^Ai  ½Mark for blood group O baby **OR** (b) (i) The molecule 'X' is repressor (ii) z gene codes for β-galactosidase (iii) In the absence of lactose or inducer	½ ½ + ½ ½ ½ ½ 1	2
19	(a) DNA being negatively charged molecule (present at A end) gets attracted towards positive electrode or anode (B end) (b) Agarose gel, the DNA fragments separate according to their size through sieving effect provided by the agarose gel (c) The separated DNA fragments can be visualised by staining them with ethidium bromide under UV radiation	½ ½+½ ½	2
20	(i) Endocarp (ii) Thalamus Functions- Endocarp - Protects seed Thalamus - Forms the edible part of the fruit	½ + ½ ½ ½	2

21	(a) (i)  Shape is inverted (ii) No, Pyramid of energy is always upright as some amount of energy is always lost (as heat) or decreases on moving from one trophic level to the next trophic level. **OR** (b) (i) Warm and moist environment favours the rate of decomposition (ii) x- Mammals, y- Amphibians.	½ ½ ½x2 1 ½x2	2
	SECTION -C		
22	(a) • Cocaine has a potent stimulating action on CNS producing a sense of Euphoria and increased energy so sportsperson misuse it • It is obtained from *Erythroxylum Coca* • Cocaine interferes with the transport of the neuro-transmitter dopamine (b) Morphine, it slows down body functions / act as depressant	1 ½ ½ ½+ ½	3
23	-The genes encoding the Bt toxin (*cry IAc* and *cry IIAb*) have been isolated from the bacterium *Bacillus thuringiensis*, incorporated into the cotton plants using vector (*Agrobacterium tumefaciens*) - The Bt gene code for the insecticidal crystal protein which exist in inactive protoxin form that is ingested by the insect pest along with the plant parts, the inactive toxin is converted into active form by the alkaline pH of the insect gut, the toxin binds to the surface of the midgut epithelial cells, in these cells it creates pores that cause lysis and swelling of the epithelial cells and cause death of the insect	½x2 ½x4	3
24	(a) Test Tube baby programme can be done or IVF followed by embryo transfer	½	

	In this method ova from donor female and sperm form donor male will be collected, induced to form zygote in laboratory conditions (IVF), the zygote or early embryo upto 8 blastomeres is transferred in fallopian tube (ZIFT) or the embryo more than 8 blastomeres are transferred in uterus called Intra Uterine Transfer (IUT) (b) Amniocentesis is misused to determine the sex of foetus and in many cases it may leads to the female foeticide	½X 3 1	**3**
25	On administration of first dose (L) of a vaccine the body response is of low intensity (X) as the immune system is coming in contact with weak antigens first time (Primary response), but on administration of second dose (M) with same antigen body response becomes intensified as secondary response (Y) -Because of formation of memory cells on first encounter with the antigen the secondary response is faster and stronger	1+1 1	3
26	(a) Mediterranean orchid Ophrys uses 'sexual deceit' to get the pollination done by bees, the one of the petals of orchid resembles to female bees in size or colour or markings, the male bee visits to the petal as female bee (pseudo copulates) and get dusted from the pollens of flower, when the same bee 'pseudo copulates' with another flower it transfers the pollen to another flower (b) (i) Parasitism (ii) Commensalism	½x4 ½ ½	3
27	(a) True Plasmid with a single recognition site will produce one desired fragment whereas the plasmid with multiple recognition site will produce many fragments which will complicate gene cloning (b) False T -DNA of Ti plasmid without modification can turn normal plant cells into tumour and needs to be modified into a cloning vector which is no more pathogenic to plants but is still able to deliver gene of interest into desired plant	**½** **1** **½** **1**	3

28	•  **(Any two correct labelling)** Award marks for continuous and discontinuous synthesis only when polarity is correct. • DNA dependent DNA polymerase, causes polymerization of deoxyribonucleotides Ligase, Joins fragments of short discontinuous strand during DNA replication **(Any other enzyme with correct role)**	½+½ ½+½ ½+½	3
	SECTION D		
29	(a) Failure of segregation of chromatids during cell division cycle results in gain or loss of chromosome(s) called aneuploidy (b) • Klinefelter syndrome • Symptoms – Overall masculine development however the feminine development (development of breast/ Gynaecomastia) is expressed, they are sterile, tall stature with feminised character **(Any two symptoms)** (c) (i) • Presence of additional copy of a chromosome • Chromosome no. 21 **OR** (c)(ii) Symptoms – Short statured with small round head,	1 1 ½+½ ½ ½	

	furrowed tongue, partially open mouth, broad palm with characteristic crease, physical/psychomotor /mental development is retarded, flat back of head, broad flat face, many loops on finger tips, congenital heart disease, big and wrinkled tongue **(Any two symptoms)**	½ x2	4
30	(a) Graph represents that as the latitude increases from 0^0 N to 80^0N the number of ant species decreases from 200 to 25 species / latitudinal gradient of biodiversity/ tropical regions have higher biodiversity than temperate regions (b)  **Equation** :- log S = log C + Z log A S = Species richness; Z = Slope of the line, C = Y – intercept (c) (i) -Plant species number is highest at the low latitudes and decreases towards the poles - there is little biodiversity at poles though it increases in temperate areas but reaches the maximum in tropics - Number of plant species are 118–236/ 0.1 ha in tropical forest and decreases to 21-48 species / 0.1 ha in temperate forest and further very low 0.0-10 species / 0.1 ha in arctic regions **(Any one correlation)** **OR** (c) (ii) Tropical latitudes remained undisturbed for many years,	1 1 1 1	

	Tropics are less seasonal , Constant environment, More Solar energy, Higher productivity, greater biodiversity **(Any two reasons)**	½ + ½	4
	SECTION E		
31	(a) (i)  (ii) It nourishes the developing pollen grains (iii) (I) Presence of sporopollenin in exine leads to preservation of pollen as fossil as it is most resistant organic material and can withstand high temperature and strong acid and alkali (II) Pollen tablets are rich in nutrients **OR** (b) (i) • Spermatogenesis occur in seminiferous tubules of testes • Spermatogonia (at puberty) ↓ mitosis Primary Spermatocytes ↓ 1st Meiosis Secondary Spermatocytes ↓ 2nd Meiosis	½x4 1 1 1 ½ ½x5	

	Spermatids ↓ differentiation Spermatozoa (ii) seminiferous tubule → rete testis (½ mark) → vas efferentia(½ mark) → epididymis (½ mark) → vas deferens (½ mark) → ejaculatory duct	½x4	5
32	(a) (i) • Cancer /Malignant tumor • Causes – X Rays, Gamma rays, UV Rays, carcinogens in Tobacco, oncogenic virus (**Any three**) • Biopsy, Radiography (X Rays), CT scan, MRI, PCR, Antibody against cancer specific antigen can also be used (**Any two methods**) (ii) Symptoms – fever, chills, tip of nails may turn blue or grey (**Any two symptoms)** Precautions : Stay away from the patient, do not share the articles like glass or utensils of infected person with healthy one, try to cover the nose while sneezing so that air droplets should not spread to healthy individuals (**Any two precautions**) **OR** (b) (i) X-Sludge tank Y-Gas holder (ii) • Methane, CO_2 and H_2. • Methanobacterium	½ ½x3 ½+½ ½+½ ½+½ ½+½ ½x3 ½	

	(iii) IARI /Indian Institute of Agricultural Research, KVIC/ Khadi and Village Industries Commission	1x2	5
33	(a) (i) the electrodes (x) are used to create an electric discharge similar to lightening on the primitive earth, to provide high temperature (ii) Amino acids (iii) The formation of organic compounds supported the theory chemical evolution of life (b) • Adaptive radiation is the process of evolution of different species in a given geographical area starting from a point and literally radiating to other geographical area • When more than one adaptive radiation appeared to have occurred in an isolated geographical area one can call it convergent evolution. • e.g. Placental wolf and Tasmanian wolf marsupials or any other correct example **OR** (a)(i) -In the mammalian cells (or eukaryotes) there is a set of positively charged basic proteins called histones, -Histones are rich in basic amino acid residues lysine and arginine which carry positive charge in their side chains, -Histones are organised to form a unit of eight molecule called histone octamer, -The negatively charged DNA is wrapped around the positively charged histone octamer to form nucleosome, -A typical nucleosome contains 200 bp of DNA helix, -Nucleosome constitute the repealing unit of structure in nucleus called chromatin (beads on string), - Chromatin is packed to form chromatin fibres that further coiled and condensed at metaphase of cell division to form chromosomes,	½ + ½ ½ **1** **1** **1** ½ **½ X 8**	

- The packaging of chromatin at higher level requires additional set of proteins called as non-histones chromosomal proteins (NHC)

(ii)

Euchromatin	**Heterochromatin**
It is loosely packed euchromatin	It is more tightly packed
It stains light	It stains dark
It is transcriptionally active region	It is transcriptionally inactive

(Any two differences)

½ + ½

5