Marking Scheme

Strictly Confidential

(For Internal and Restricted use only)

Senior Secondary School Certificate Examination,2024

SUBJECT NAME BIOLOGY (Q.P. CODE 57/4/2)

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 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).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, 2024
BIOLOGY (Subject Code–044)
[Paper Code: 57/4/2]

	SECTION-A		
1	(A)/ antipodal, zygote and endosperm	1	1
2.	(A)/ Aneuploidy	1	1
3.	(D)/ P – Transcription, Q – mRNA, R – Translation	1	1
4.	(A)/ A – connective, B – Endothecium, C – Pollen grain	1	1
5.	(C)/ Ovum - A, Morula - E, Blastocyst - G	1	1
6.	(C)/ A - III, B - I, C - IV, D - II	1	1
7.	(C)/ Autosomal Recessive	1	1
8.	(B)/ Antigen- Antibody interaction	1	1
9.	(B)/ Divergent evolution	1	1
10.	(D)/ Restriction Enzymes	1	1
11.	(D)/ Y chromosomes	1	1
12.	(D)/ A - (ii), B - (iv), C – (i), D – (iii)	1	1
13.	(C)/ (A) is true, but (R) is false.	1	1
14.	(A)/ Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).	1	1
15.	(A)/ Both Assertion (A) and Reason (R) are true and Reason (R) is correct explanation of Assertion (A).	1	1
16.	(B)/ Both Assertion (A) and Reason (R) are true and Reason (R) is not correct explanation of Assertion (A).	1	1
	SECTION - B		
17.	• Artificial insemination refers to the transfer of semen collected from the husband or male donor into the vagina or into the uterus of the female. It is medically advised when: (i) The male partner is unable to inseminate the female. (ii) The sperm count is low in the ejaculate.	1 ½ ½	2
18	• The genetically – engineered lymphocytes have a limited life span or are mortal hence the patient requires periodic infusion of genetically engineered lymphocytes. • There could be a permanent cure if the gene isolated from bone marrow cells producing ADA is introduced into the cells at early embryonic stage.	1 1	2
19.	• X- In woman X thickness of uterine wall increases after mid of menstrual cycle; Reason- due to fertilization of egg/pregnancy/conceived	½+½	

	• Y- In woman Y thickness of uterine wall decreases after mid of menstrual cycle ; Reason- egg has not been fertilized/leading to the breakdown of lining of the uterus/menstrual flow/ bleeding.	½+½	2
20.	(a) Biodiversity hotspots are the regions with very high level of species richness**,** and high degree of endemism (b) Western Ghats, The Himalayas, Indo – Burma region **(Any two)**	½+½ ½+½	2
21.	(a)		

	Grazing Food Chain	Detritus Food Chain
1.	It starts with producers.	Starts from dead organic matter/ detritus
2.	2^{nd} trophic level is occupied by herbivores.	2^{nd} trophic level is occupied by detritivores.
3.	In aquatic ecosystem a major fraction of energy flows through this type of food chain	In terrestrial ecosystem much larger fraction of energy flow through such type of food chain

1+1

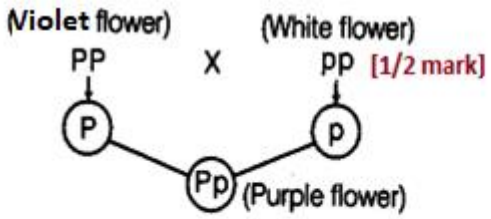
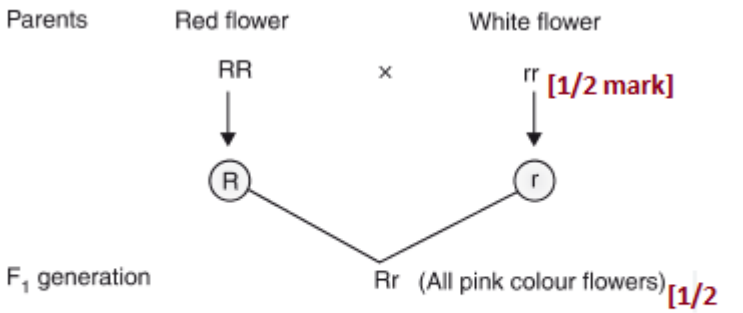
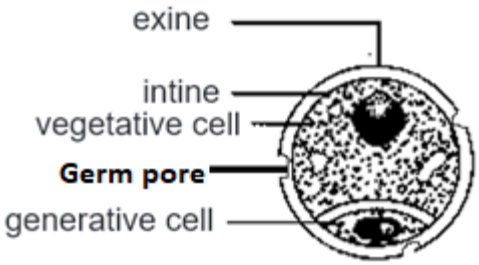
(Any two corresponding points points)

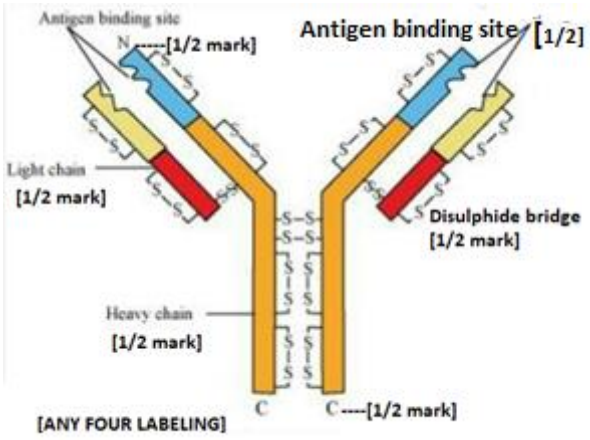
OR

(b)

- Brood parasitism is a method of parasitism in which the parasitic bird lays its eggs in the nest of the host bird and let the host bird to incubate them. — 1
- Example – The cuckoo bird lays its eggs in the nest of crow, egg of cuckoo bird resembles crows' egg in size and colour to reduce the chance of host bird detecting and ejecting them from nest — ½+½

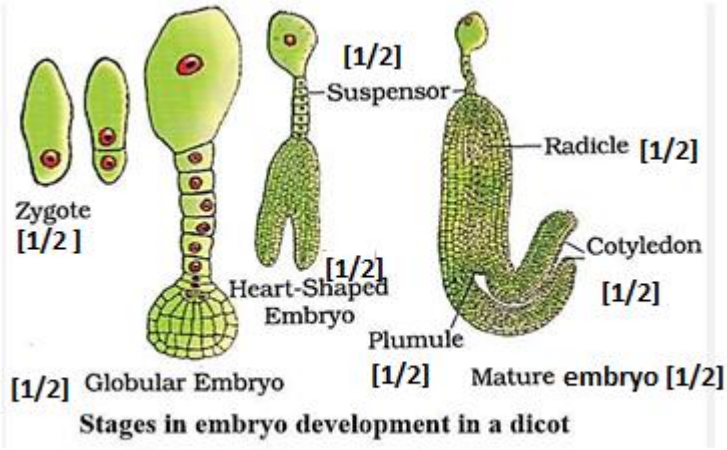
2

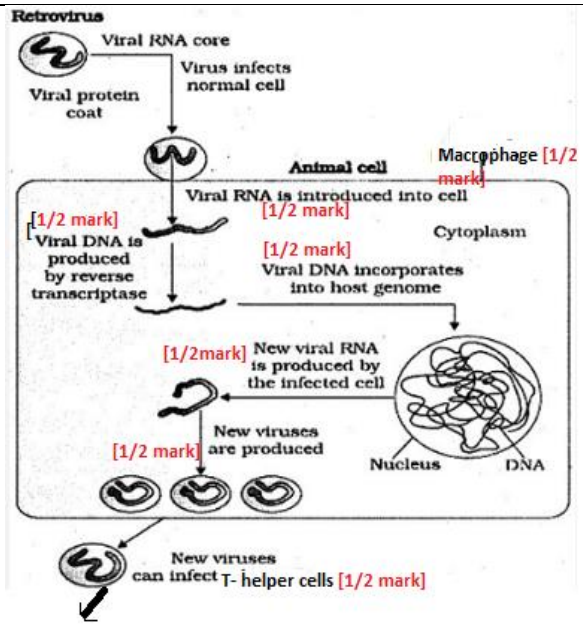
	SECTION - C		
22.	•  All purple flower [1/2 mark] It shows complete dominance.[1/2 mark] •  It is a case of incomplete dominance [1/2 mark]	½x3 ½x3	3
23.	 [Vegetative cell, generative cell, exine, intine, germ pore] **(Any four labeling to be considered)** Vegetative cell- contain abundant food reserve for pollen germination Generative cell- Divide to produce male gametes Exine – Protective layer Intine- Involved in the formation of pollen tube. Germ pore- Pollen tube emerges from this point. **[Marks to be given to two correct labeling with their respective correct function only]**	½ x4 ½ x2	3

24.	(a) (i) Cannabinoids (ii) Inhalation**,** Oral ingestion (iii) Brain/Heart (cardiovascular system) **OR** (b)  [Four labeling – Antigen binding site, Light chain, Heavy chain, C-terminal, N terminal, Disulphide bridge - ½ mark each] • They are chemically Proteins • B- lymphocytes/B- cells	1 ½+½ 1 ½ X4 ½ ½	3
25.	(a) Production of Biological products- Human protein α-1 antitrypsin used to treat emphysema produced by transgenic organism / Transgenic cow 'Rosie' produce human protein enriched in α- lactalbumin (b) Studying Diseases- Transgenic models of human disease like cystic fibrosis, cancer etc. are designed to increase our understanding of how genes contribute to development of disease. (c) Chemical safety testing- Transgenic animals are made that carry genes which make them more sensitive to toxic substance. They are then exposed to toxic substance and the effect studied.	1 1 1	3
26.	(a) • A– vector DNA, • B is foreign DNA/ Desired DNA/ Alien DNA (b) 5′ G A A T T C 3′ 3′ C T T A A G 5′	½+½ 1	

	(c) It cuts the DNA between bases G and A only **,** It give rise to sticky ends of 'A' DNA and 'B' DNA which is joined by ligase enzyme to form recombinant DNA.	½+½	3
27.	(a) *Mycorrhiza* (Fungal symbiont of the association) Absorb phosphorus from soil and these nutrients are passed on to the host plant. (b) *Anabaena* – Fix atmospheric nitrogen and adds organic matter to the soil, thereby increasing soil fertility. (c) *Rhizobium* – Fix atmospheric nitrogen (in leguminous plants) into organic form which is used by the plant as nutrient.	1 1 1	3
28.	(a) A – Modern human being B – Baby chimpanzee C – Adult chimpanzee • Skull of baby chimpanzee is more like adult human skull (A and B) (b) (i) *Dryopithecus* (ii) *Ramapithecus*	½ x3 ½ ½+½	3
	SECTION - D		
29.	(a) • hnRNA/ heterogeneous nuclear RNA • RNA polymerase II (b) hnRNA undergo capping at 5' end (methyl guanosine triphosphate/mGppp), and tailing at 3' end (with poly A tail or adenylate residue), further splicing is carried out, where non coding sequences or introns are removed and coding sequence or exons are joined together/ diagrammatic representation with given markers can also be considered. (c) • In prokaryotes - 1 • In eukaryotes-3 **OR** (c) In prokaryotes the transcription takes place in the cytoplasm/cytosol whereas in Eukaryote transcription occurs in the Nucleus,	½ ½ ½x4 ½ ½ 1	4
30.	(a) • A- exponential growth curve/ J-shaped curve • B- Logistic growth curve/ S- shaped curve/ sigmoid curve	½ ½	

	(b) • It represents carrying capacity (K) • Maximum possible number of individuals beyond which no growth of population is observed. **OR** (b) Growth curve B is formed when resources (food and space) in nature are limited have environmental checks while growth curve A is formed when resources are unlimited with no environmental checks. (c) (i) • 'B'/ Logistic growth curve • As resources are never infinite in nature. (ii) • J-shaped curve/ exponential growth It is a continuous growing population.	½ ½ 1 ½ ½ ½ ½	4
	SECTION - E		
31.	(a) (i) (1)Menstruation phase – This flow is due to breakdown of endometrium lining of uterus and blood vessels along with unfertilized ovum continues for 3-5 days. This happens when ovum is not fertilized. (2) Follicular phase – In this phase follicle develops into mature Graafian Follicle. This is known as proliferative phase because endometrium lining regenerates. It last for 10 days. (3) Luteal phase – This phase lasts for about 10-14 days. This is also known as secretory phase. In this phase corpus luteum is formed which secretes large amount of progesterone that is required for maintenance of pregnancy. (ii) • Yes, • Chances of fertilization are nil if abstain from Coitus from day 10-17th day of menstrual cycle. **OR**	1 1 1 1 1	

	(b) (i) • The embryo development starts only after a certain amount of endosperm is developed because it is an adaptation for assured nutrition to the developing embryo thus endosperm development precedes embryonic development • To provide nutrition to the embryo. (ii)  **Stages in embryo development in a dicot** **[Any 6 labeling to be considered]**	1+1 ½x6	5
32.	(a) HIV enters human body and enter macrophage cells , where viral RNA is introduced in the cell, Viral DNA is produced by reverse transcription, Viral DNA incorporated in host genome, New viral RNA is produced by the infected cell, New viruses are produced, which enter T-helper cells replicate and produces its progeny, Progeny viruses attack other T helper cells, this is repeated leading to progressive decline in the number T helper cells, person become immunodeficient and HIV AIDS develop./	½x10	



½x10

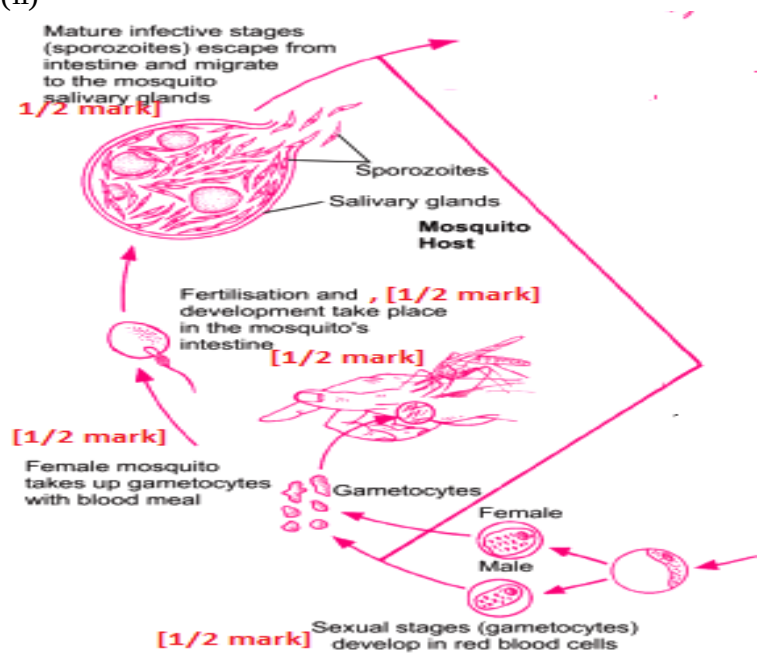
OR

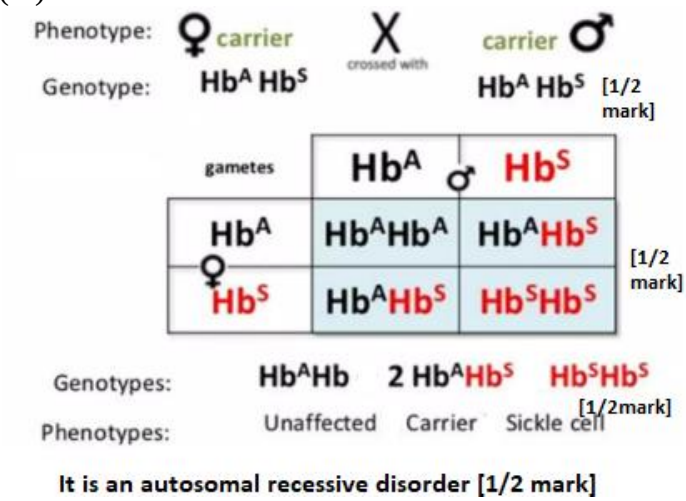
(b)

(i)

- Chills , and high feverfever occurs in a cyclic order/every 2-3 days,
- fever is due to the toxic haemozoin,
- release at the time of RBC rupture.

½+½
½
1

	(ii)  	½x5	5
33.	(a) (i) • X to $\overline{X}$ is 5' ⟶ 3' • No more amino acids will be added • as the last codon UAA is a stop codon (ii) • AUG • Anticodon - UAC • methionine (iii) • The amino acids are activated in the presence of ATP , and linked to their cognate tRNA or the adapter molecule, • Amino acids are activated so peptide bonds can be formed using this energy. **OR**	½ x3 ½ x3 ½+½ 1	

	(b) (i) the RBC in such patients takes up a sickle shape instead of biconcave. (ii) The defect is caused by the substitution of Glutamic acid (Glu) by Valine (Val) **,** at the sixth position of the beta globin chain of the haemoglobin molecule /The substitution of amino acid in the globin protein results due to the single base substitution at the sixth codon of the beta globin gene, from GAG to GUG. (iii)  **It is an autosomal recessive disorder [1/2 mark]**	1 1+1 ½ x4	5