Marking Scheme
Strictly Confidential
(For Internal and Restricted use only)
Senior Secondary School Certificate Examination,2024
SUBJECT NAME BIOLOGY (Q.P. CODE 57/1/2)

General Instructions: -

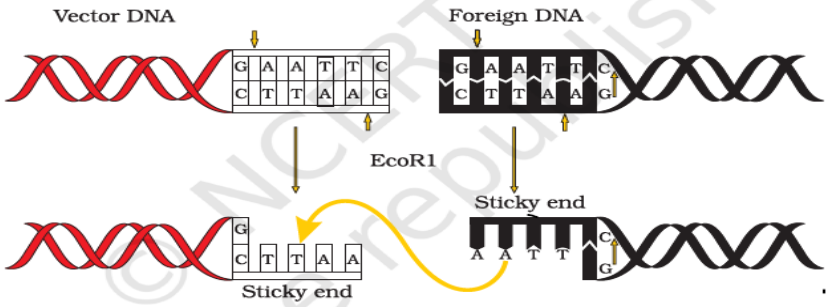
1	You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested 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: 57/1/2]

1	(C) / N–glycosidic linkage	1	1
2.	(B) / i-iv-v-ii-iii	1	1
3.	(D) / Heterotrophic bacteria	1	1
4.	(A) / Cry-I Ac and Cry-II Ab	1	1
5.	(A) / CGT GCT TTC AAA	1	1
6.	(C) / Maize	1	1
7.	(D) / Mice	1	1
8.	(B) / Allergy	1	1
9.	(C) / Day 10 to 17 of menstrual cycle.	1	1
10.	(B) / 44 + XXY– Overall feminine development	1	1
11.	(B) / 1024	1	1
12.	(C) / (i) and (ii)	1	1
13.	(D) / Assertion (A) is false, but Reason (R) is true	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.	(C) / Assertion (A) is true, but reason (R) is false.	1	1
	SECTION - B		
17.	• Yes -Apomixis is asexual reproduction as there is no formation of gametes and fertilisation. • In apomictic seeds – There will be no segregation of characters in hybrid progeny, Farmers can keep using apomictic seeds year after year / no need to buy hybrid seeds every year as production of hybrid seeds are very costly.	½ ½ ½+½	2
18	(a) (i) -Readymade or preformed antibodies or antitoxins against the snake venom , -A quick immune response is required in this case. (ii) Passive immunity **OR**	 ½ 1 ½	

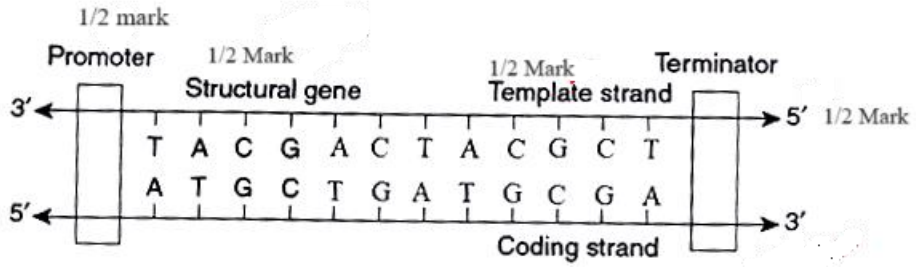
	(b)The organic farmers hold the view that complete eradication of pests is not only possible but also undesirable because without them beneficial predatory and parasitic insects which depend upon them as food or hosts will not survive / One of the key belief of organic farmers is that biodiversity furthers health. Greater biodiversity leads to more sustainable ecosystem.	2	2
19.	Name of the Naturalist –Lamarck -Evolution of life forms driven by use and disuse of organs. -He said Giraffes in an attempt to forage leaves on tall trees had to adapt by elongation of their necks. -They passed on this acquired character of elongated neck to their succeeding generations and slowly over the years all the future generations had long necks.	½ ½ ½ ½	2
20.	• Ova from wife or female donor and sperm from husband or male donor are collected , induced to form a zygote under simulated conditions in the laboratory (*In vitro*) (outside body) , Zygote or embryo are transferred into the female body for development. • Test tube baby programme – because initial process is carried out in the laboratory / in vitro	½x3 ½	2
21.	(a) -Prickly pear cactus / Opuntia -Being exotic species it become invasive as it did not have any natural predators. (b) By introducing cactus feeding predator (a moth) from its natural habitat.	½ ½ 1	2
	SECTION - C		
22.	(a) (i) Transgenic animals are those which have their DNA manipulated to possess and express a foreign gene. (ii) First transgenic Cow – Rosie, -Produced human protein enriched milk (2·4 g/litre) / cow milk containing human alpha lactalbumin protein is nutritionally more balanced product for human babies than natural cow milk. **OR**	1 1 1	

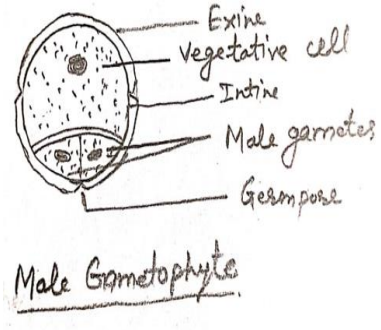
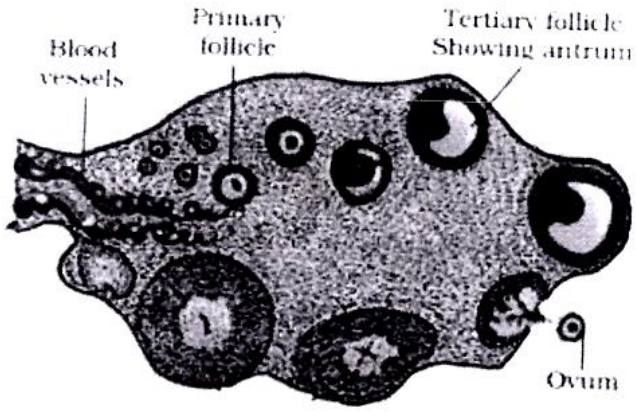
	(b) (i) In EcoRI (comes from *Escherichia coli* RY13) -E represent Genus *Escherichia* , -co represent species *coli,* -R represent RY 13 strain, -I represent order in which the enzyme were isolated from that strain of bacteria. (ii)  	½x4 ½ ½	3
23.	A – Fever / chills / cough / headache / greyish blue lips and nails / severe problem in Respiration , B – *Salmonella typhi* , C – Nasal congestion / discharge / sore throat / cough / hoarseness /tiredness, D – *Microsporum / Trichophyton / Epidermophyton* , E – Internal bleeding / fever / muscular pain / anaemia / blockage of intestinal passage, F – Amoebiasis / Amoebic dysentery.	½x6	3
24.	• -Pills contain progestogens or progestogen – estrogen combination. -They inhibit ovulation , and implantation as well as, alter the quality of cervical mucus to prevent or retard the entry of sperms. • -Pills have to be taken daily for a period of 21 days starting within first five days of menstrual cycle. -After a gap of 7 days it has to be repeated in the same pattern till the female desires to prevent conception.	½ ½x 3 ½ ½	3
25.	(a) -Satellite DNA / Repetitive DNA/ VNTR	1	

	-Do not code for any protein , form a large portion of human genome, show high degree of polymorphism **(any two points)** (b) Useful in forensic applications , helps in determining population and genetic diversities ,forms the basis of paternity testing , to study evolution, to trace path of hereditary diseases. **(any two applications)**	½+½ ½+½	3
26.	(a) Sickle cell Anemia **Cause** – Substitution of glutamic acid by valine at sixth position of beta globin chain of haemoglobin molecule / due to single base substitution at the sixth codon of the beta globin gene from GAG to GUG. **Symptoms**– Change in shape of RBC from biconcave disc to elongated sickle like structure causes anemia due to which oxygen carrying capacity of the RBCs decreases / tiredness/ breathlessness **(Give half mark if cause or symptom any one is correct).** (b) Autosomal recessive genetic disorder. Controlled by pair of allele Hb^A Hb^S Hb^A Hb^S × Hb^A Hb^S (carrier male) (carrier female) Hb^A Hb^S Carrier Hb^S Hb^S Affected	½ ½ ½ ½ ½ 1	3
27.	(a) • Miller experimentally showed formation of amino acids , and this proved theory of chemical evolution of life / formation of organic molecules from inorganic molecules. • Oparin , Haldane (b)Analysis of meteorite content also revealed similar compounds indicating that similar processes are occurring in space.	½ 1 ½+½ ½	3

28.	(a)-Primary productivity – It is the amount of biomass or organic matter produced per unit area over a time period by plants during photosynthesis - weight (gm^{-2}) or energy (kcal m^{-2}) / -Rate of biomass production by producers -(gm^{-2} yr^{-1}) or (kcal m^{-2}) yr^{-1} (b) Primary productivity of a place in Rajasthan is low due to following factors -lesser number of plant species at the particular place in Rajasthan - lower availability of nutrients in Rajasthan. -lesser photosynthetic capacity of plants in Rajasthan -Unfavourable environment like water scarcity or high temperature etc. in Rajasthan . **(Any three)**	1 ½ 1 ½ ½x3	3
	SECTION – D		
29.	(a) Colony 4 is transformed with plasmid containing recombinant DNA, as they will not show resistance towards tetracycline. (b) **Award 2 marks to each student** . (c) Restriction endonuclease / ligase / *Taq* DNA Polymerase **OR** (c) Insertional inactivation of gene encoding for *β*- galactosidase will lead to colorless bacterial colonies (recombinant)	½ +½ 2 1 1	4
30.	(a) This region is less seasonal with constant and more predictable environment / More solar energy so higher productivity and higher diversity / it represent tropical lattitudes which remain relatively undisturbed for millions of years and had a long evolutionary time for species diversification . **OR** (a) Region I represent temperate region subjected to frequent glaciation and get lesser evolutionary time for species diversification / has more seasonal with less constant and less predictable environment which lead to lower species diversification / have lower solar energy available which reduces productivity and inturn contributes to lesser diversity. (b) Latitudinal gradient in diversity (c) Conventional taxonomic methods are not suitable for identifying microbial species, and many species are not culturable under laboratory conditions.	1 1 1 1+1	4

	SECTION – E		
31.	(a) (i) -Contact Inhibition is present in normal cells but not in cancer cells, -When normal cells come in contact with other cells it inhibits their uncontrolled growth. (ii) Cellular oncogenes / Proto-oncogenes , when activated under certain conditions could lead to oncogenic transformation of the cells. (iii) (1) Biopsy and histopathology– A piece of suspected tissue cut into thin sections is stained , and examined under microscope by pathologist for increased cell counts. (2) MRI – detects cancer of internal organs , uses strong magnetic fields and non–ionising radiations to detect pathological and physiological changes in living tissue **OR** (b) (i) (1) In aeration tanks there is growth of aerobic microbes and fungi (flocs) that consume major part of organic matter in effluent thus reducing BOD (2) • -Activated sludge • -used as inoculum in aeration tanks. (3) bacterial flocs are allowed to sediment. (Activated sludge) (ii) -*Rhizobium* (Bacteria), live symbiotically in nodules of roots of leguminous plants and fix atmospheric nitrogen into organic form and provide nitrogen to the plant. -*Glomus* (fungi), live in symbiotic association with roots of higher plants and absorb phosphorus from the soil and passes it to plants. -Cyanobacteria (*Anabaena, Nostoc ,Oscillatoria*), Add organic matter to the soil and increase fertility (Paddy fields) (**Any two can be explained**)	½ 1 ½ +½ ½ +½ ½ 1 1 ½ ½ 1 ½+½ ½ +½ ½ +½	5

32.	(a) -Incomplete dominance -Codominance -Pleiotropy -Polygenic Inheritance -linkage **(Any four)**	½x 4	
	Incomplete Dominance – snapdragon / *Antirrhinum* sp. / 4 O' clock plant / Dog flower / *Mirabilis jalapa* , When F1 hybrid resembles in between two parents	½x 2	
	Co-dominance- ABO blood grouping in human beings, In AB blood group both alleles I^A and I^B are able to express themselves.	½x 2	
	Pleiotropy-One gene controls many character, eg.Phenylketonuria in human beings- in this case single gene mutation causes mental retardation reduction in hair and skin pigmentation.	½x 2	
	Polygenic Inheritance -When one trait is controlled by three or more genes, eg skin colour controlled by 3 genes(A, B, C). Each type of the allele in the genotype would determine the darkness or lightness of the skin in an individual.	½x 2	
	Linkage- Some of the closely linked genes do not follow Mendelian inheritance pattern of independent assortment, eg. Gene for eye colour and body colour in fruitfly did not segregate independently and F2 ratio deviates from 9:3:3:1. **(Any three correct explanation with example)**	½x 2	
	OR		
	(b) (i)  	½ x4	
	(ii) By switching the position of promoter and terminator the coding strand becomes template strand .	1	
	(iii)		

	-If both strands acts as template, they would code for RNA molecule with complementary sequences hence would form a dsRNA and prevent translation. -If both strands acts as template, they would code for RNA molecules with different sequences and if they code for proteins, they will make different proteins.Hence one segment of DNA would be coding for two different proteins and complicate genetic information transfer machinery. - Single stranded RNA molecule is required for the process of translation. **(Any Two)**	1x2	5
33.	(a) (i) Each microspore mother cell in sporogenous tissue undergoes meiosis , forming microspores tetrad by the process called microsporogenesis , microspores form cluster of four cells called microspore tetrad , as the anther matures and dehydrates, each microspore undergo assymetric division to produce a vegetative cell and a generative cell. (ii)  **OR** (b) (i)  	½x5 ½x5 ½x4	

	(ii) At embryonic stage (iii) Both LH and FSH attain a peak level in mid of menstrual cycle rapid secretion of LH leading to maximum level is called LH surge , which induces rupture of graffian follicle and cause ovulation , ovulatory phase is followed by luteal phase during which remaining parts of graffian follicle transform as corpus luteum , it produces large amount of progesterone needed for maintaining endometrium , in absence of fertilization corpus luteum degenerates which causes disintegration of the endometrium leading to menstruation.	½ ½x5	5