Marking Scheme

Strictly Confidential

(For Internal and Restricted use only)

Senior School Certificate Examination, 2023

SUBJECT NAME BIOLOGY (SUBJECT CODE 044) (PAPER 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-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:57/1/2]

Maximum Marks: 70

Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
	SECTION A		
1.	(b) / R – S – T	1	1
2.	(a) / Point (i)	1	1
3.	(c) / X = Promoter, Y = Sigma factor, Z = RNA polymerase.	1	1
4.	(a) / Declining population.	1	1
5.	(b) / α-lactalbumin	1	1
6.	(c) / Directional selection as giraffes with longer necks are selected **//** (d)/Stabilizing selection as giraffe with medium necks length are selected.	1 **//** 1	1
7.	(c) / 1 and 3	1	1
8.	(c) / 1300	1	1
9.	(b) / (i) → (iv) → (ii) → (iii) → (v)	1	1
10.	(c) / (iii) → (i) → (ii) → (iv)	1	1
11.	(d) / Relaxin	1	1
12.	(b) / Gonorrhoea	1	1
13.	(c) / A is true but R is False	1	1
14.	(c) / A is true but R is false.	1	1
15.	(a) / Both Assertion (A) and Reason are true and Reason (R) is the correct explanation of the Assertion (A).	1	1
16.	(c) / Assertion (A) is true, but Reason (R) is false	1	1
	SECTION B		
17.	(a) From micropylar end, through the synergids (filiform apparatus)/filiform (within synergids) apparatus guides the entry of pollen tube (b) One male nucleus fuses with two polar nuclei to form Primary endosperm nucleus and termed triple fusion, other male nucleus fuses with egg cell nucleus to form zygote i.e. undergoes Syngamy	½×2 ½×2	2
18.	2·4 percent 8·1 percent share of the global species diversity	1 1	2
19.	(a) (i) 'ori' – a sequence from where replication starts and any piece of DNA when linked to this sequence can be made to replicate within the host cells, this sequences is also responsible for controlling the copy number of the linked DNA **(any one)** (ii) Plants – *Agrobacterium tumefaciens* Animals – Retrovirus **(or any other correct example)** **OR** (b)(i) Micro injection, Recombinant DNA is directly injected in the nucleus of an animal cell	1 ½ ½ ½+½	

<table>
<tr><td></td><td>//
Retrovirus, animal cells are infected with disarmed retrovirus

(ii) Biolistics or Genegun, Plants cell are bombarded with high velocity micro particles of gold or tungsten coated with DNA (rDNA)
//
Agrobacterium tumefaciens, delivering gene by disarmed pathogen.</td><td>//
½+½

½+½
//
½+½</td><td>2</td></tr>
<tr><td>20.</td><td>First law of thermodynamics – All organisms are dependent for their food on producers (who capture PAR) either directly or indirectly, unidirectional flow of energy from sun to the producers and then to consumers.

Second law – Organisms need a constant supply of energy to synthesize the molecule they require, to counteract the universal tendency towards increasing disorderliness.</td><td>½+½

½+½</td><td>2</td></tr>
<tr><td>21.</td><td>(a) Blastocyst
(b) Uterine wall/endometrium/innermost layer of uterine wall.
(c) (Outer layer/trophoblast) ‘X’- helps in implantation in uterus/attachment to endometrium.
(Inner cell mass) ‘Y’- gets differentiated into embryo.</td><td>½
½
½

½</td><td>2</td></tr>
<tr><td></td><td>SECTION C</td><td></td><td></td></tr>
<tr><td>22.</td><td>(a) Dryopithecus, Ramapithecus

(b) Time period : 2 million years ago
Place : East African grasslands

(c)
<table><tr><td>Homo habilis</td><td>Homo erectus</td></tr><tr><td>Brain capacity between 650 – 800 cc</td><td>Brain capacity 900 cc</td></tr><tr><td>probably did not eat meat.</td><td>probably ate meat</td></tr></table></td><td>½+½

½
½

½

½</td><td>3</td></tr>
<tr><td>23.</td><td>(a)
<table><tr><td>S. No.</td><td>Malignant tumor</td><td>Benign tumor</td></tr><tr><td>1</td><td>Cells grow very rapidly and invade and damage the surrounding normal tissue.</td><td>Comparatively slow growth and remain confined to their original location and do not spread to other parts of the body</td></tr><tr><td>2</td><td>Show metastasis</td><td>Do not show metastasis</td></tr></table>(Any one difference)

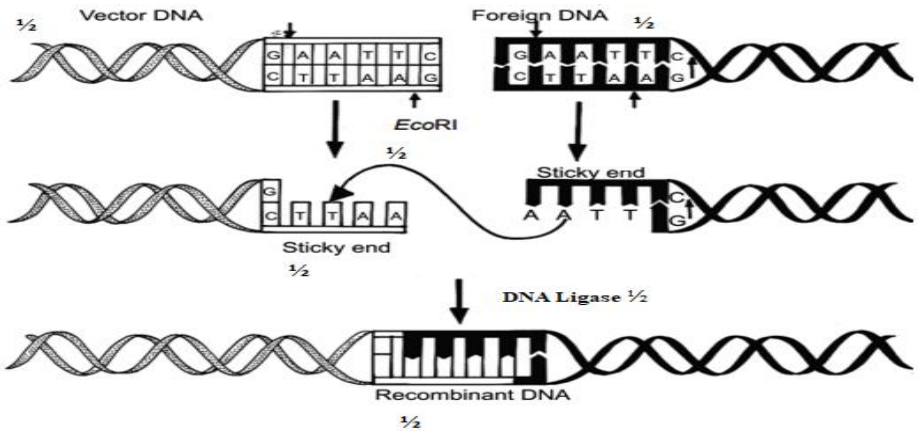
(b)• Metastasis

• Cells from these tumors slough off and reach distant sites through blood, wherever they get lodged in the body they start a new tumor there.</td><td>1

1

½ × 2</td><td>3</td></tr>
</table>

24.



½×6

3

25. (a) (i) (1) ZIFT : Zygote intrafallopian transfer.
(2) ICSI : Intracytoplasmic sperm injection.
(3) IUT : Intra uterine transfer.
(4) GIFT : Gamete intrafallopian transfer.

½ × 4

(ii) •GIFT ½
•GIFT allows the eggs to fertilize and develop in the fallopian tube/ IVF places a directly fertilized egg (zygote) into the uterus/ *in vivo* fertilisation is involved in GIFT. ½

OR

(b) (i)

Perisperm	Pericarp:
Persistent nucellus in some seeds	The wall of ovary develops into wall of fruit.

1

(ii)

Syncarpous	Apocarpous
fused pistils.	free pistils.

1

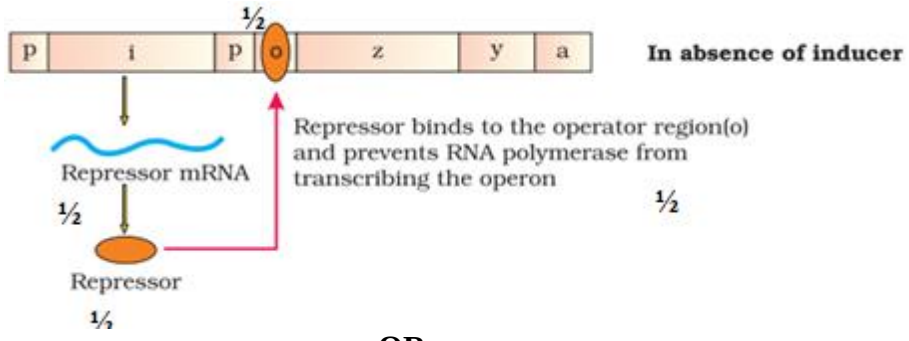
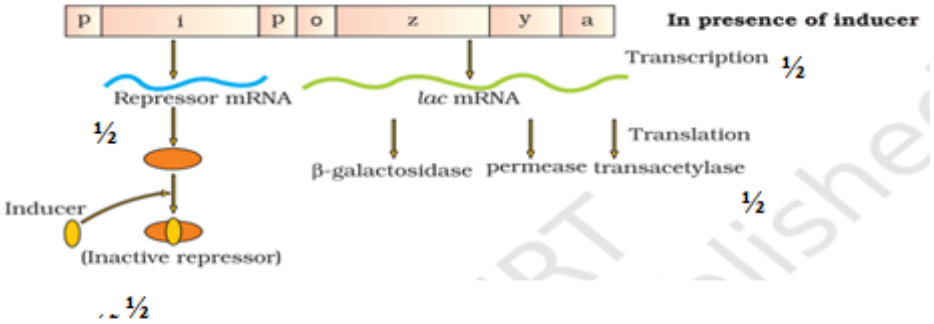
iii)

Plumule :	Radicle :
Future stem/ terminal part of epicotyl / shoot tip of embryonal axis	Future root/ terminal part of hypocotyl / root tip of embryonal axis

1

3

26.	(a) They have the ability of self-renewal / to divide, and differentiate into any kind of cell/tissue/organ. (b) – Inner cell mass of blastocyst / umbilical cord / Bone marrow **(or any other correct source)** **(Any one)** (c) Diabetes treatment via forming islets of Langerhans, Restoration of vision by injecting stem cells, to treat rheumatoid arthritis, reduces pancreatic cancer, to treat genetic disorder like cystic fibrosis, spinal cord injurie, heart disease, any other correct application **(Any two)**	½ × 2 1 ½ × 2	3
27.	(a) Primary Sludge: All the solids that settle down, during the primary treatment of sewage water. (b) Activated Sludge: Produced during the secondary treatment or biological treatment of sewage, primary effluent + aerobic microbes flocs (bacteria and fungus) – get converted to a sediment whose BOD has reduced significantly. (c) Anaerobic sludge digesters: Large tanks where activated sludge is treated with anaerobic bacteria which digest the bacteria and fungi, and produce a mixture of CH_4, H_2S and CO_2/ Biogas	½ × 2 ½ × 2 ½ × 2	3
28.	(i) •Recessive Trait • Individual 3 and 4 both do not suffer from the disease but have passed it to their offspring individual no. 7/ Unaffected parents of individual 7 have transmitted the trait to him. (ii) •Autosomal •Both the sexes have equal chance having the trait. (iii) Individual 7 is – homozygous.	½ ½ ½ ½ 1	3
	SECTION D		
29.	(a) Species diversity decreases as we move from region A to region B. Reasons : less Constant mean annual temperature, lesser habitable land area, availability of lesser solar energy, lesser productivity, any other correct reason in 'B' region. **(Any two)** (b) More the 1200 species of birds, Indian land mass being largely in the tropical latitudes. **OR** (b) Amazonian rainforest (in South America), mainly being in tropical region.	1 1+1 ½+½ ½+½	4
30.	(a) In presence of lactose repressor protein dose not bind to the operator region (O) and allow RNA polymerase to transcribe the operon. **//** In absence of lactose repressor protein bind to the operator region (O) and prevent RNA polymerase from transcribing the operon.	1 **//** 1	

	(b) Presence of Permease enzyme coded by gene 'y' is required that allows lactose to enter the cell for switching on the operon / so that lactose enter inside the cell.	½	
	(c) 'i' stands for 'inhibitor/ this gene transcribes repressor protein which binds to the 'operator' site and switch off the operon.	½	
	(d)  **OR**	½ × 4	
	(d)  	½ × 4	4
	SECTION-E		
31.	(a)(i) • When foetus is fully mature/ after completion of gestation periods / after completion of pregnancy	½	
	• mild uterine contractions originate in response to the signal from a fully developed foetus and placenta	½	
	(ii) Foetal ejection reflex triggers a release of oxytocin from the maternal pituitary, oxytocin acts on uterine muscles and causes contractions and expulsion of baby out of the uterus.	½+½	
	(iii) 1- Mammary lobes, has clusters of cells called alveoli.	½+½	
	2- Mammary alveolus, secrete milk.	½+½	
	3-Lactiferous duct, through this milk is sucked out.	½+½	
	OR (b) (i) • Pollen- light / non-sticky, to travel easily through air	½+½	

	//	//	
	produce in enormous amount, to compensate the wastage during pollination	½+½	
	•Anther –well exposed, pollen easily dispersed into wind current	½+½	
	• Stigma –Large / often feathery, to easily trap air-borne pollen grains	½+½	
	(ii)		
	(1) Pollen grains have hard outer layer exine made up of sporopollenin, which is one of the most resistant organic material known / no enzyme can degrade sporopollenin.	½+½	
	(2) It allows the entry of water, oxygen into the seed at the time of germination.	½+½	5
32.	(a) (i) The vaccine contains the antigen, which stimulates or activates immune cells to produce antibodies (by B lymphocytes) / which generates primary response or humoral immune response.	½+1	
	(ii) Memory cells generate, amnestic response/secondary response	½+½	
	(iii) P = Yes Q = Catching an infection/getting infected R = No S = Yes T = No	½×5	
	OR		
	(b) (i)• Diacetylmorphine • as it is highly addictive, and being a depressant it slows down body functions.	1 ½+½	
	(ii) (1) *Cannabis sativa*, affects the cardiovascular system of the body.	½+½	
	(2) *Erythroxylum coca* /coca plant , interferes with the transport of neurotransmitter dopamine / produces sense of euphoria / increased energy.	½+½	
	(3) *Papaver somniferum*, acts as depressant/ slows down body function/ reduces pain/sedative	½+½	5
	.		
33.	(a)(i) Normal nitrogen/ ^{14}N, heavy nitrogen/ ^{15}N to produce two types of DNA / light and heavy DNA respectively.	½+½ 1	
	(ii) *E. coli* has generation time of 20 minutes so the samples taken at intervals of 20 minutes, to understand the mode of replication when *E.coli* with ^{15}N DNA was cultured in medium ^{14}N (normal) nitrogen.	1	
	(iii) To distinguish or separate heavy DNA from light DNA on the basis of density.	1	
	(iv) Mode of DNA replication is semiconservative.	1	

OR

(b) (i) TTRR ttrr ½

Tall round seeds Dwarf wrinkled seeds

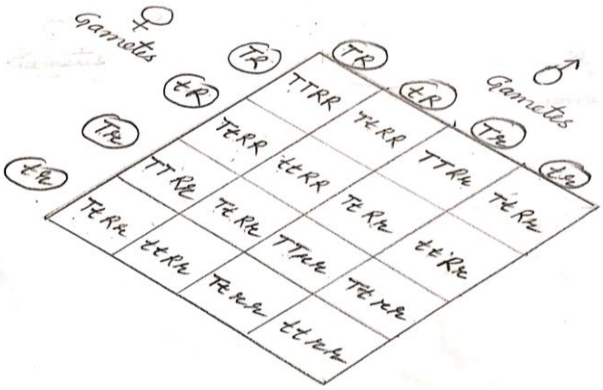
Parents

Gametes TR tr ½

F_1 generation TrRr (All tall round) ½

Selfing

TtRr X TtRr ½



2

(Male and Female gametes along with Punnett square are to be awarded two marks)

F_2 gen.	Tall Round	Dwarf Round	Tall wrinkled	Dwarf Wrinkled
	9	3	3	1

½

(ii) 'when two pairs of traits are combined in a hybrid, segregation of one pair of characters is independent of the other pair of characters'(law of independent assortment). ½

5

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