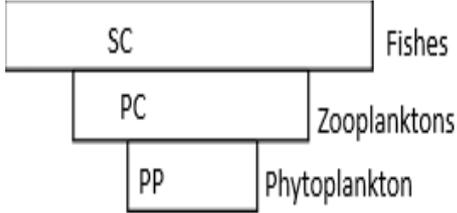
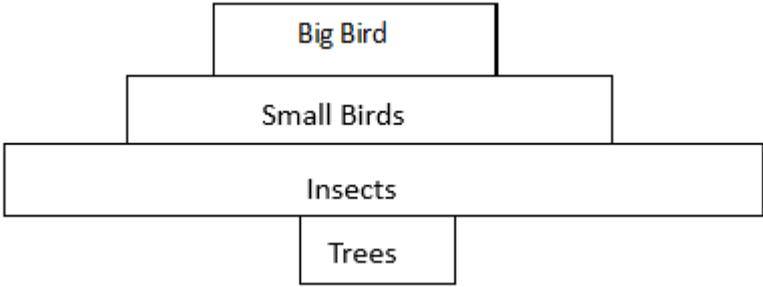


SOLUTIONS
Senior Secondary School Examination, 2025
BIOLOGY (Subject Code-044)
[Paper Code: 57/2/2]

Maximum Marks:70

Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
	SECTION—A		
1	(B) / 22	1	1
2	(B) / I-Pericarp, II-Endosperm, III-Coleorhiza	1	1
3	(D) / 7,8	1	1
4	(B) / 0 : 1 : 3	1	1
5	(C) / Father- I^{B_i} , Mother- $I^{A_i B}$, Child- I^{A_i}	1	1
6	(B) / (iii), (i), (ii), (iv)	1	1
7	(D) / (a)-(i), (b)-(iii), (c)-(ii)	1	1
8	(C) / mating between relatives (consanguineous mating)	1	1
9	(C) / Naturally acquired passive immunity	1	1
10	(B) / 8	1	1
11	(A) / The smaller the fragment size, the farther it moves.	1	1
12	(B) / <i>Monoascus purpureus</i>	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 (A) and (R) are true, and (R) is the correct explanation of (A).	1	1
16	(A) / Both (A) and (R) are true, and (R) is the correct explanation of (A).	1	1
	SECTION B		
17	(A) (i) P- Estrogen, Q- Progesterone (ii) P- Growing follicles, Q- Corpus luteum OR (B) (i) P- Lutenizing hormone(LH) , Q- Follicle stimulating hormone (FSH)	$\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$	

	<p>(ii)</p> <ul style="list-style-type: none"> In male- Acts at the Leydig cells and stimulate the synthesis and secretion of androgen In Female- Causes ovulation/ rupturing of graffian follicle/ 	<p>1/2</p> <p>1/2</p>	<p>2</p>
18	<p>(a) HBA1 , HBA2</p> <p>(b) Thalassemia is a quantitative problem of synthesising too few globin molecules, while Sickle cell anaemia is a qualitative problem of synthesising an incorrectly functioning globin molecule</p>	<p>1/2+1/2</p> <p>1/2+1/2</p>	<p>2</p>
19	<p>(A)</p> <p>-In case of snakebite, quick response is required as natural production of antibodies will take more time therefore preformed antibodies against the snake venom are injected.</p> <p>-In tetanus, preformed antibodies are directly injected because quick immune response is required against deadly microbes.</p> <p style="text-align: center;">(or any other relevant example)</p> <p style="text-align: center;">OR</p> <p>(B) The symptoms do not appear immediately as parasite initially multiply within the liver cells, and then attack RBCs, resulting in their rupture and, release toxic substance haemozoin.</p>	<p>1/2+1/2</p> <p>1/2+1/2</p> <p>1/2 x4</p>	<p>2</p>
20	<p>(a) EcoRI</p> <p>(b)</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>5' CAG 3'</p> <p>3' <u>GTCTTAA</u> 5'</p> </div> <div style="text-align: center;"> <p>5' <u>AATTCTTA</u> 3'</p> <p>3' <u>GAAT</u> 5'</p> </div> </div> <p style="text-align: center;">(Any relevant representation)</p> <p>(c) Ends are called as sticky ends because they form hydrogen bonds with their complementary cut counterparts.</p>	<p>1/2</p> <p>1/2+1/2</p> <p>1/2</p>	<p>2</p>

21	<p>(A)</p>  <ul style="list-style-type: none"> • Inverted pyramid of biomass • The Biomass of fishes is much more than that of zooplankton and phytoplankton so the pyramid is inverted. <p style="text-align: center;">OR</p> <p>(B)</p>  <p>(1½ mark for the correct diagram, ½ mark for correct tropic level)</p>	1 ½ ½ 2	2
SECTION – C			
22.	<p>(a) 3200 male gametophyte</p> <p>(b)</p> <ul style="list-style-type: none"> -Intine made up of cellulose, and pectin. -Exine made up of sporopollenin. 	1 ½+½ 1	3
23	<p>(a)</p> <ul style="list-style-type: none"> (i) ZIFT – Zygote Intra Fallopian Transfer (ii) ICSI – Intra Cytoplasmic Sperm Injection (iii) IUT – Intra Uterine Insemination (iv) GIFT – Gamete Intra Fallopian Transfer <p>(b)</p> <p>It is used to determine the sex of the baby , and it may leads to female foeticide.</p>	½ x4 ½ + ½	3

24

Cross-1 $GG \times Gg$ [$\frac{1}{2} + \frac{1}{2}$]
 Homozygous dominant female Heterozygous male
 gamete $G \quad G$ $G \quad g$ [$\frac{1}{2}$]
 F₁

	G	g
G	GG	Gg
g	Gg	gg

 [1]
 All dominant progenies are [$\frac{1}{2}$]
 produced

//

Cross-2 $gg \times Gg$ [$\frac{1}{2} + \frac{1}{2}$]
 Homozygous recessive female Heterozygous male
 gamete $g \quad g$ $G \quad g$ [$\frac{1}{2}$]
 F₁

	G	g
g	Gg	gg
g	Gg	gg

 [1]
 50% dominant & 50% recessive [$\frac{1}{2}$]
 Progenies are produced

$\frac{1}{2} + \frac{1}{2}$

$\frac{1}{2}$

1

$\frac{1}{2}$

$\frac{1}{2} + \frac{1}{2}$

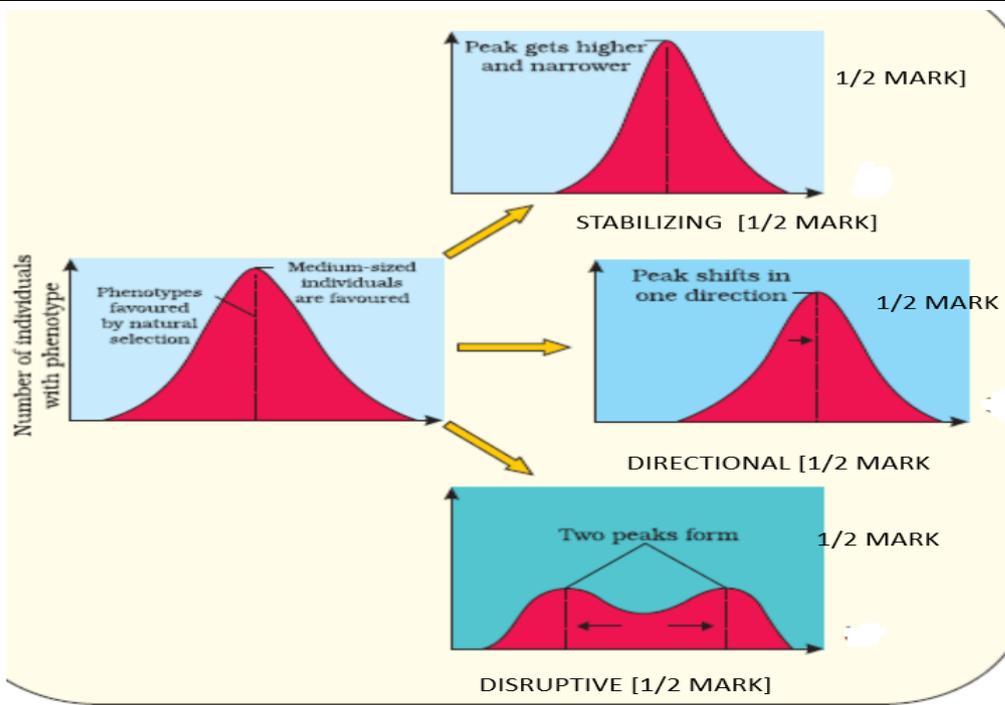
$\frac{1}{2}$

1

$\frac{1}{2}$

3

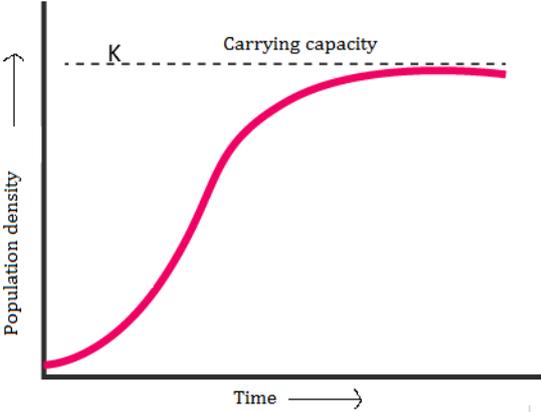
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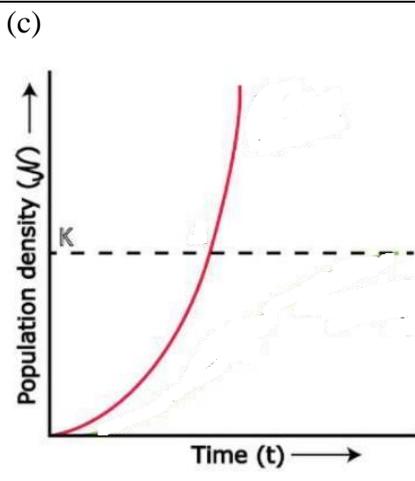


$\frac{1}{2} \times 6$

(Correct diagram with labelling or correct explanation with diagram to be considered)

3

26	<p>(a) Sports persons abuse certain drugs to increase their muscle strength and bulk and aggressiveness for better performance in sports.</p> <p>(b) Cocaine/coca alkaloids , cannabinoids , any other correct example (any two)</p> <p>(c) <i>Erythroxylum</i> , <i>Cannabis</i> ,any other correct example (any two)</p>	1 $\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$	3
27	<p>(a) Insulin synthesized in our body as Prohormone (proinsulin) which contain extra stretch of C-peptide apart from A and B peptide, Eli Lilly company synthesized insulin in functional form with only two peptide A and B.</p> <p>(b) Insulin from animal sources caused some allergy or other type of immune reactions to the foreign protein / Insulin can be easily obtained in large quantity from bacteria</p>	1+1 1	3
28	<p>(a)</p>  <p>(b)</p> <ul style="list-style-type: none"> • Verhulst-Pearl logistic growth/ Logistic growth curve/ Sigmoid growth curve • Since resource for growth for most animal populations are finite and become limiting sooner or later. 	1 $\frac{1}{2}$ $\frac{1}{2}$	



Equation : $\frac{dN}{dt} = rN$ / $\frac{dN}{dt} = (b-d)N$ / $N_t = N_0 e^{rt}$

1/2

1/2

3

SECTION-D

29

- (a) B-lymphocytes ,and T-lymphocytes.
- (b) Because the antibodies are found in the blood hence antibody-mediated immunity is also called humoral immune response.
- (c)
 - (i) Our immune system is able to distinguish between ‘self’ and ‘non-self’ cells/molecules.
 - (ii) Cell-mediated immune response , T-lymphocytes are involved.

1/2 + 1/2

1

1

1/2 + 1/2

OR

(d)

Active immunity	Passive immunity
When antibodies are produced by B-cells within the body	Preformed antibodies are injected into the body for defence.
It is comparatively slow	It provides quick response

1

1

4

30

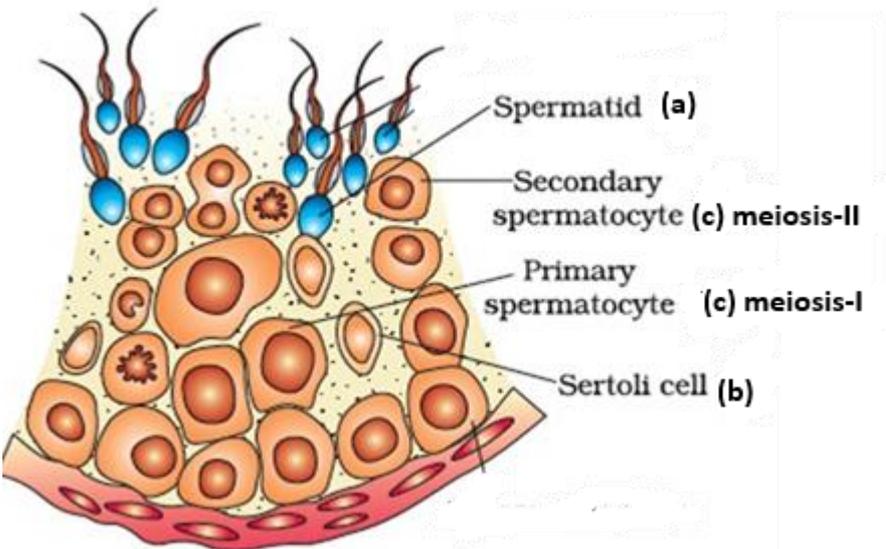
- (a) DNA -dependent RNA polymerase
- (b) B-coding strand, A-Template strand

1

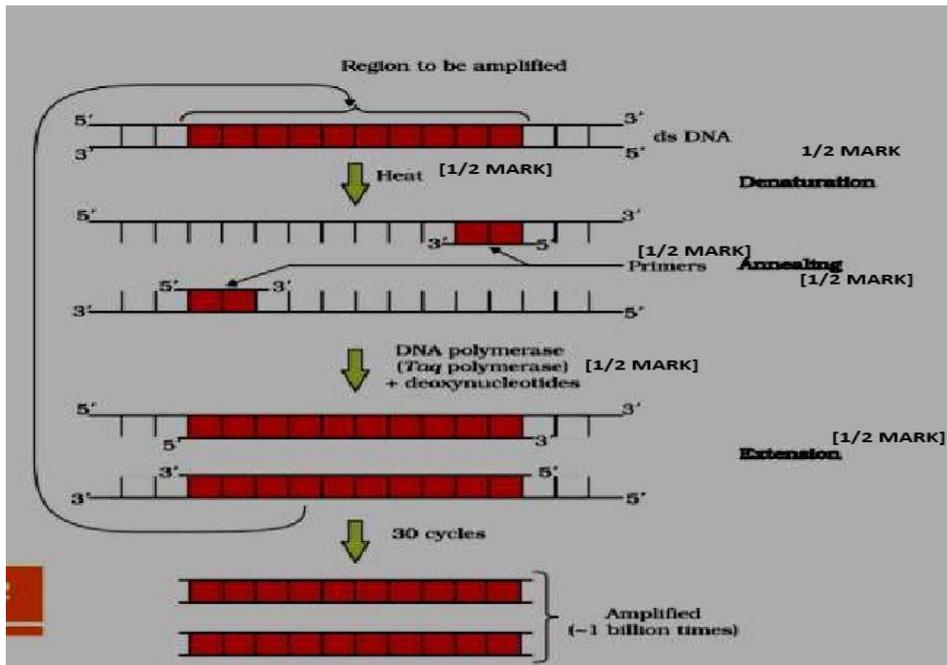
1/2 + 1/2

	<p>(c)</p> <p>-C is promoter, it is the sequence of DNA where the enzyme DNA dependent RNA polymerase binds for initiation of transcription.</p> <p>-D is the terminator, it is the sequence of DNA where the process of transcription terminated.</p> <p style="text-align: center;">OR</p> <p>(d)</p> <p>-C is located towards 5' end (upstream) of coding strand</p> <p>-D is located towards 3' end (downstream) of coding strand</p>	$\frac{1}{2} + \frac{1}{2}$	$\frac{1}{2} + \frac{1}{2}$
		1	1
		4	

SECTION E

31	<p>(A)</p> <p>(i)</p> <div style="text-align: center;">  </div> <p>(ii)</p> <p>-Secretions of male accessory glands (prostate, bulbourethral glands and seminal vesicles) constitute the seminal plasma.</p> <p>-Seminal plasma is rich in fructose, calcium and, certain enzymes</p> <p style="text-align: right;">(any two)</p> <p>-Seminal plasma along with sperms constitutes the semen.</p>	$\frac{1}{2} \times 4$	1
		$\frac{1}{2} + \frac{1}{2}$	1

	<p style="text-align: center;">OR</p> <p>(B)</p> <p>(i) Entry of sperm into the cytoplasm of the ovum induces the completion of second meiotic division of the secondary oocyte.</p> <p>(ii) As the zygote moves through the fallopian tube the mitotic divisions (cleavage) start , it results into 2 -16 daughter cells called blastomeres , Embryo with 8 to 16 blastomeres is called <i>morula</i> , Morula continues to divided and form <i>Blastocyst</i> which moves further into uterus, The blastomeres in the blastocyst are arranged into an outer layer <i>trophoblast</i> and an inner group of cells called the inner cell mass , the trophoblast gets attached to the endometrium, and the inner cell mass gets differentiated as the embryo. , the uterine cells divide rapidly to cover blastocyst which gets embedded in the endometrium and this is called as implantation</p> <p>(If the student explain given points with the help of diagram it should be considered)</p>	<p style="text-align: center;">1</p> <p style="text-align: center;">$\frac{1}{2} \times 8$</p>	<p style="text-align: center;">5</p>
32	<p>(A)</p> <p>(i) A bacterial cell is made competent by treating it with a specific concentration of a divalent cation such as calcium, which increases the efficiency with which DNA enters the cell through pores in its cell wall.</p> <p>(ii) -Denaturation , DNA is heated to a high temperature resulting in the separation of two strands of DNA</p> <p>-Annealing , two primers are annealed to each of the single-stranded template DNA.</p> <p>-Extension , enzyme Taq polymerase extends the primers using the nucleotides provided in the reaction and the genomic DNA as template.</p> <p style="text-align: center;">//</p>	<p style="text-align: center;">1+1</p> <p style="text-align: center;">$\frac{1}{2} + \frac{1}{2}$</p> <p style="text-align: center;">$\frac{1}{2} + \frac{1}{2}$</p> <p style="text-align: center;">$\frac{1}{2} + \frac{1}{2}$</p>	



OR

(b)

(i) Transgenic animals : Animals that have had their DNA manipulated to possess and express an extra (foreign) gene are known as transgenic animals.

1

(ii) Common reasons to produce transgenic animals are :

-Normal physiology and development , Transgenic animals can be specifically designed to allow the study of how genes are regulated and how they affect the normal functions of the body and its development.

1/2 + 1/2

-Study of disease , Many transgenic animals are specially made to serve as models for human diseases so that investigation of new treatments for diseases is made possible.

1/2 + 1/2

-Biological products , Transgenic animals that produce useful biological products can be created

1/2 + 1/2

-Vaccine safety , Transgenic mice are being developed for use in testing the safety of vaccines before they are used on humans.

1/2 + 1/2

-Chemical safety testing , Transgenic animals are made that carry genes which make them more sensitive to toxic substances than non-transgenic animals.

1/2 + 1/2

(Any Four)

5

(A)

(i)

-Tropical latitudes have remained relatively undisturbed for millions of years and thus had a long evolutionary time for species diversification

1

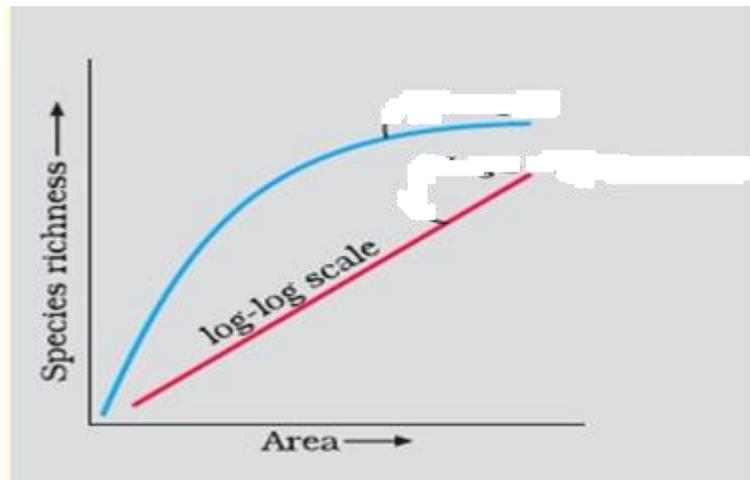
-Tropical environments are less seasonal more constant and predictable. Such constant environments promote niche specialisation and lead to a greater species diversity

1

-More solar energy is available in the tropics which contributes to higher productivity which leads to greater species diversity.

1

(ii)



1

-Alexander von Humboldt

 $\frac{1}{2}$

-Within a region species richness increased with increasing explored area but only up to a limit.

 $\frac{1}{2}$ **OR**

(B)

(i)

-Habitat loss and fragmentation, Deforestation leads to habitat loss and ultimately causing extinction of animals and plants / When large habitats are broken into small fragments that also leads to population decline / mammals and birds with large territories and certain animals with migratory habits are badly affected.

 $\frac{1}{2} + \frac{1}{2}$

- Overexploitation, overexploitation of natural resources by humans leads to extinction of many species / For example overexploitation of Steller's sea cow or passenger pigeon or many marine fishes led to their extinction.

 $\frac{1}{2} + \frac{1}{2}$

	<p>-Alien species invasions, When alien species are introduced unintentionally or deliberately for whatever purpose some of them turn invasive and cause decline or extinction of indigenous species/ For example <i>Parthenium</i> or <i>Lantana</i> or water hyacinth pose threat to indigenous species (or any other correct example)</p> <p>-Co-extinctions, When a species becomes extinct the plant and animal species associated with it in an obligatory way also became extinct/ For example unique assemblage of parasites and plant pollinator mutualism where extinction of one invariably leads to the extinction of the other</p> <p style="text-align: center;">(any three points)</p> <p>(ii)</p> <p>-Ex-situ conservation : In this threatened animals and plants are taken out from their natural habitat and placed in special setting where they can be protected and given special care.</p> <p>-e.g. : Zoological parks, Botanical gardens, Wildlife safari parks, seed banks, pollen bank (any two or any other relevant examples)</p>	<p style="text-align: center;">$\frac{1}{2} + \frac{1}{2}$</p> <p style="text-align: center;">$\frac{1}{2} + \frac{1}{2}$</p> <p style="text-align: center;">1</p> <p style="text-align: center;">$\frac{1}{2} + \frac{1}{2}$</p>	<p style="text-align: center;">5</p>
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