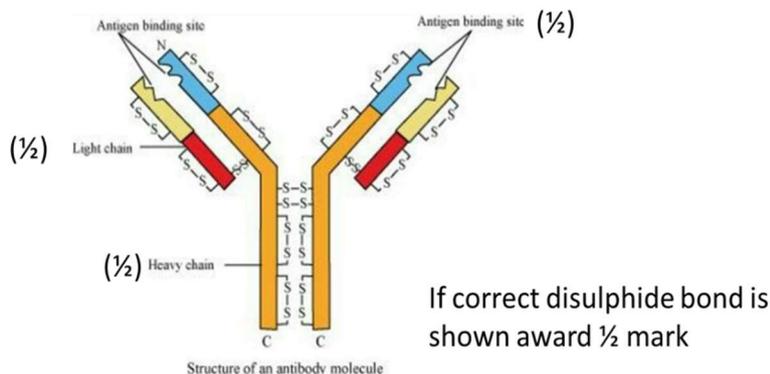


SOLUTIONS
Senior Secondary School Examination, 2025
BIOLOGY (Subject Code–044)
[Paper Code: 57/5/3]

Maximum Marks: 70

Q.NO.	EXPECTED ANSWER/ VALUE POINTS	Marks	Total Marks
SECTION A			
1.	(D) / Promoter	1	1
2.	Award 1 mark if the child has attempted any one option.	1	1
3.	(C) / ESTs	1	1
4.	(C) / Autosomal dominant trait	1	1
5.	(C) / Spleen	1	1
6.	(D) / (i) and (iv)	1	1
7.	(C) / Spotted cuscus – Lemur	1	1
8.	(A) / AGGUAUCGCAU	1	1
9.	(A) / tRNA	1	1
10.	(B) / <i>Streptococcus</i>	1	1
11.	(C) / Cellulase	1	1
12.	(A) / 1 : 1	1	1
13.	(A) / Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).	1	1
14.	(C) / Assertion (A) is true, but Reason (R) is false.	1	1
15.	(D) / Assertion (A) is false, but Reason (R) is true.	1	1
16.	(C) / Assertion (A) is true, but Reason (R) is false.	1	1
SECTION B			
17.	(a) - Diagram (ii) is the correct replicating fork - The DNA – dependent DNA polymerase catalyse polymerisation only in one direction, that is 5'→3' - On one template strand with polarity 3'→ 5' DNA synthesis is continuous and on other template strand with polarity 5'→3' DNA replication is discontinuous. (b) DNA ligase	½ ½ ½ ½	2

18.	<p>(a) <i>Taq</i> polymerase</p> <p>(b) It forms overhanging stretches called sticky ends, which facilitates hydrogen bond formation with their complementary cut parts by DNA ligase.</p> <p>(c) <i>Escherichia coli/E.coli</i></p>	<p>$\frac{1}{2}$</p> <p>$\frac{1}{2}+\frac{1}{2}$</p> <p>$\frac{1}{2}$</p>	<p>2</p>									
19.	<p>(a) Fig species can be pollinated only by its ‘partner’ wasp species and no other species, the female wasp uses the fruit not only as an oviposition (egg-laying) site, but also uses the developing seeds within the fruit for nourishing the larvae, the wasp pollinates the fig inflorescence while searching for suitable egg-laying site.</p> <p style="text-align: center;">OR</p> <p>(b) Ecological pyramid of number.</p> <div style="text-align: center;"> <p>Trophic levels</p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td style="padding-right: 20px;">Secondary Consumer/SC</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">32</td> <td style="padding-left: 20px;">Birds</td> </tr> <tr> <td style="padding-right: 20px;">Primary Consumer/PC</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">20</td> <td style="padding-left: 20px;">insects</td> </tr> <tr> <td style="padding-right: 20px;">Primary Producer/PP</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">1</td> <td style="padding-left: 20px;">Banyan tree</td> </tr> </table> </div> <p>1 mark for correct Trophic levels</p> <p>1 mark for correct diagram of Inverted pyramid of number</p>	Secondary Consumer/SC	32	Birds	Primary Consumer/PC	20	insects	Primary Producer/PP	1	Banyan tree	<p>$\frac{1}{2} \times 4$</p> <p>1+1</p>	<p>2</p>
Secondary Consumer/SC	32	Birds										
Primary Consumer/PC	20	insects										
Primary Producer/PP	1	Banyan tree										
20.	<p>(a)</p> <ul style="list-style-type: none"> • Amniocentesis : Some of the amniotic fluid of the developing foetus is taken to analyse the fetal cells and dissolved substances. • Misuse : Sex-determination of foetus which lead to increase in female foeticide <p style="text-align: center;">OR</p> <p>(b)</p> <ul style="list-style-type: none"> • Gonorrhoea, chlamydiasis, genital warts, trichomoniasis, syphilis, genital herpes, hepatitis-B, AIDS (Any two diseases) <p>Pelvic inflammatory diseases (PID), abortions, still births, ectopic pregnancies, infertility or even cancer of the reproductive tract (Any two complications)</p>	<p>1</p> <p>1</p> <p>$\frac{1}{2}+\frac{1}{2}$</p> <p>$\frac{1}{2}+\frac{1}{2}$</p>	<p>2</p>									
21.	<p>(a)-Each antibody molecule has four peptide chains/an antibody molecule is represented as H_2L_2</p> <ul style="list-style-type: none"> -Two small chains called light chains -two longer chains called heavy chains -It has an antigen binding site at N end (amino end) - It has disulphide bond between different parts of proteins or proteins of different chains <p style="text-align: right;">(Any four points)</p> <p style="text-align: center;">//</p>	<p>$\frac{1}{2} \times 4$</p>										



1/2 x4

OR

(b) - Ensuring availability of HIV free blood in blood banks

- Ensuring the use of only disposable needles and syringes in public and private hospitals and clinics
- Free distribution of condoms.
- Controlling drug abuse.
- Advocating safe sex.
- Promoting regular check-ups for HIV in susceptible populations.
- Preventing infection during blood transfusions in patients.
- Monitoring of pregnant women for HIV

(Any four Measures)

1/2 x4

2

SECTION C

22.

(a) The given type of pollination prevents inbreeding depression/ prevents loss of fertility/promote hybrid vigour/ improve genetic variability

1

(b) - The plant will not show geitonogamy

1

- because in this flowering plant pollen release and stigma receptivity are not synchronised/as the flowers are present on different plants.

1

3

23.

- Made crops more tolerant to abiotic stresses (cold, drought, salt, heat).
- reduced reliance on chemical pesticides (pest resistant crops).
- helped to reduce post-harvest losses.
- increased efficiency of mineral usage by plants (this prevents early exhaustion of fertility of soil).
- enhanced nutritional value of food (eg. golden rice i.e. vitamin 'A' enriched rice).
- tailor-made plants to supply alternative resources to industries in the form of starches, fuels and pharmaceuticals.

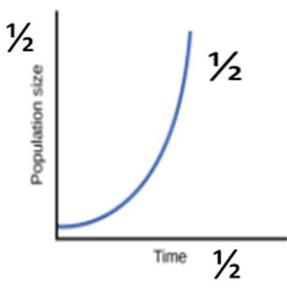
1x3

(Any three advantages)

3

24.

The signals of parturition originate from the fully developed fetus and the placenta, which induce mild uterine contractions called fetal ejection reflex, this triggers release of oxytocin from the maternal pituitary, Oxytocin acts on the uterine muscles and causes stronger uterine

	<p>(c) (i) Convergent evolution: Different structures evolving for the same function and hence having similarity.</p> <p style="text-align: center;">OR</p> <p>(c) (ii) Divergent evolution: Same structure developed along different directions due to adaptations to different needs.</p>	1	
		1	4
30.	<p>(a) 15 – 16 years or Adolescence period (12-18 years of age)</p> <p>(b) Clearing of forest / deforestation / Narco-deforestation / extinction of species / promotes monoculture that will further lead to loss of</p> <p>(c) (i)</p> <ul style="list-style-type: none"> • Inflorescence / flower tops / leaves / resin. • Affects the cardiovascular system of the body/any other correct effect <p style="text-align: center;">OR</p> <p>(c) (ii) - Erythroxyllum coca - Causes hallucinations.</p>	1 1 1 1 1 1	4
	SECTION E		
31.	<p>(a) (i) When resources in the habitat are unlimited each species has the ability to realize fully its innate potential to grow in number, the population grow in an exponential or geometric fashion, It results in a J-shaped curve when we plot population density in relation to time.</p> <p>(ii) $dN/dt = (b - d) rN$ / $dN/dt = rN$ / $Nt = N_0e^{rt}$</p> <p>r = intrinsic rate of natural increase N = size of the population b = birth rate d = death rate</p> <p>(iii) Exponential growth curve</p> 	1/2 x3 1/2 1/2 1 1 1/2	

OR

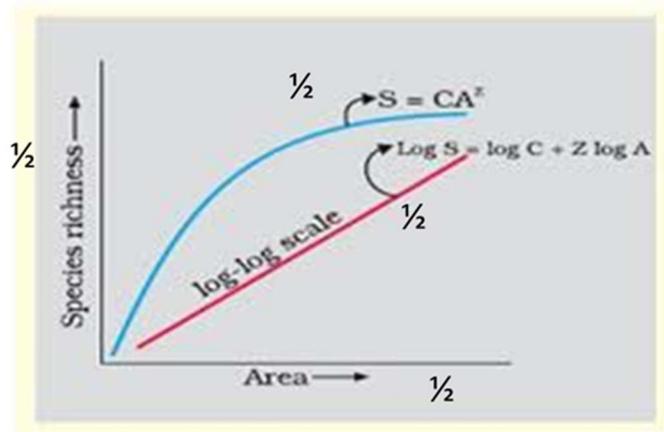
(b) (i)- Within a region species richness increases with increasing explored area, but only up to a limit

1+1

(ii) $\log S = \log C + Z \log A$ / $S = CA^Z$

1

(iii)



1/2 x4

5

32.

(a) Using *Agrobacterium* vectors nematode-specific genes were introduced into the host plants, the introduction of DNA was such that it produced both sense and anti-sense RNA in the host cells, these two RNA's being complementary to each other formed a double stranded (dsRNA), that initiated RNAi and thus silenced the specific mRNA of the nematode, consequently the parasite could not survive in a transgenics host expressing specific interfering RNA

1x5

OR

(b) - Denaturation : strands of dsDNA are separated by heating

1/2+1/2

- Annealing: Multiple copies of the gene (or DNA) of interest is synthesised 'in vitro' using two sets of primers

1/2+1/2

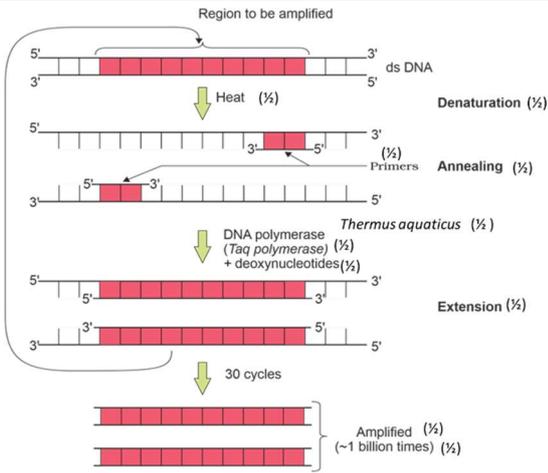
- Extension : the enzyme thermostable DNA polymerase/*Taq* polymerase, isolated from a bacterium *Thermus aquaticus*, extends the primers using the deoxyribonucleotides provided in the reaction and the genomic DNA as the template

1/2 x4

- Amplification : replication of DNA is repeated many times to form more than a billion copies of a fragment of DNA

1/2+1/2

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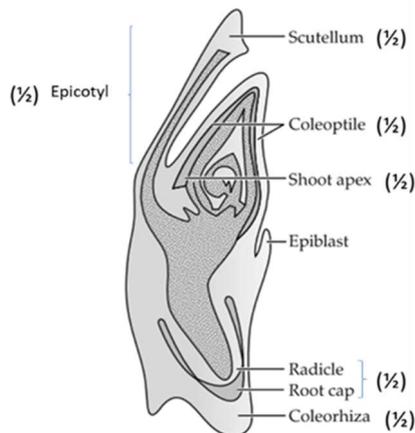


1/2 x10

5

33. (a) (i) Embryo of a monocotyledon seed has one cotyledon called scutellum, situated towards one side (lateral) of the embryonal axis at its lower end, the embryonal axis has the radical and root cap, enclosed in an undifferentiated sheath coleorhiza, The portion of the embryonal axis above the level of attachment of scutellum is epicotyl, and a few leaf primordia enclosed in a hollow foliar structure the coleoptile

1/2 x6



1/2 x6

(Marks to be allotted if the key points are depicted in the diagram in lieu of explanation.)

(ii)

• Some of the Nucellar cells surrounding the embryo sac start dividing, and protrude into the embryo sac and develop into embryos.

1

• Apomixis/Polyembryony

1

OR

(b) (i) - Rete testis, The seminiferous tubules of the testis open into the Vasa efferentia through rete testis

1/2+1/2

- Vasa efferentia, leave the testis and open into epididymis located along the posterior surface of each testis

1/2+1/2

	<p>- Epididymis, the epididymis leads to Vas deferens</p> <p>- Vas deferens, this ascends to the abdomen and loops over the urinary bladder.</p> <p>(ii) FSH acts on Sertoli cells, stimulates secretion of some factors which help in the process of spermiogenesis (which is a part of spermatogenesis).</p>	<p>$\frac{1}{2} + \frac{1}{2}$</p> <p>$\frac{1}{2} + \frac{1}{2}$</p> <p>$\frac{1}{2} + \frac{1}{2}$</p>	<p>5</p>
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