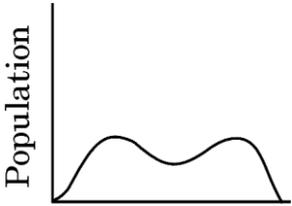


SOLUTIONS
Senior Secondary School Examination, 2025
BIOLOGY (Subject Code-044)
[Paper Code: 57/7/1]

Maximum Marks: 70

Q.No	EXPECTED ANSWER/VALUE POINTS	MARKS	TOTAL MARKS
SECTION A			
1.	(C) / Short non-coding repetitive sequences forming a large portion of eukaryotic genome.	1	1
2.	(D) / Annealing is required to separate both the strands of template DNA.	1	1
3.	(D) / Morphine is often given to persons who have undergone surgery as a painkiller.	1	1
4.	(B) / (ii), (v), (iii), (vi), (iv), (i)	1	1
5.	(B) / XO type of chromosomes determine male sex in grasshoppers.	1	1
6.	(A) / Multicarpellary, Apocarpous	1	1
7.	(C) / 	1	1
8.	(B) / Macrophages – Mucus-secreting cells that trap microbes entering into the body.	1	1
9.	(D) / Production of insulin by rDNA technique	1	1
10.	(B) / 70	1	1
11.	(A) / 8.1%	1	1
12.	(B) / ELISA – Antigen antibody interaction	1	1
13.	(C) / Assertion (A) is true, but Reason (R) is false.	1	1
14.	(A) / Both Assertion (A) and Reason (R) are true and Reason (A) is correct explanation of Assertion (A)	1	1
15.	(A) / Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).	1	1
16.	(A) / Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).	1	1

21.	<p>(a) Klinefelter's syndrome</p> <p>(b) Development of breasts or Gynaecomastia / underdeveloped masculine character/ sterility/ tall stature with feminised character.</p> <p>(c) Aneuploidy/ Non disjunction or Failure of segregation of chromatids during cell division results in gain of extra X chromosome in male / trisomy of sex chromosome.</p>	<p>½</p> <p>½</p> <p>1</p>	2
	SECTION C		
22.	<p>(a) Oral Pills Merits – Effective with less side effects/reversible/ cost effective/ user friendly.</p> <p>Demerits – Have side effects when taken for a long time/ Pills if not taken and not repeated in a particular pattern may fail to prevent conception/wrong usage may promote conception</p> <p>Surgical Method : Merits – Highly effective / Block gamete transport</p> <p>Demerits – Not reversible / Can affect health if not performed in hygienic conditions.</p> <p>(b)IUD's prevent conception by -Increase phagocytosis of sperms. -Some suppress sperm motility and fertilizing capacity of sperms by releasing Cu⁺⁺ ions. - Hormone releasing IUD's make uterus unsuitable for implantation and cervix hostile to sperms.</p> <p style="text-align: right;">(Any two points)</p>	<p>½</p> <p>½</p> <p>½</p> <p>½</p> <p>½+½</p>	3
23.	<p>(a)This is adaptive radiation leading to divergent evolution. Example – Many varieties of Darwin's finches on the same island arose from the original seed-eating finches with altered beaks enabling them to become insectivorous and vegetarian finches / A number of marsupials different from each other evolved from an ancestral stock but all within the Australian island /or any other relevant example.</p> <p>(b)</p> <ul style="list-style-type: none"> • Example-Evolution of Placental mammals and Australian Marsupials or any other corresponding example of these categories respectively. • Convergent evolution. 	<p>½</p> <p>1</p> <p>1</p> <p>½</p>	3
24.	<p>(a) Lysine – Serine – Proline – Tyrosine</p> <p style="text-align: center;">AAC UCC CCC UAC</p> <p>(b) Lysine – Proline – Proline – Tyrosine</p>	<p>1</p> <p>1</p>	

	(c) UUG AGG GGG AUG / UUG GGG GGG AUG	1	3						
25.	Typhoid – Sustained high fever 39-40°C/ stomach-pain/ constipation. Pneumonia- severe problems in respiration/in severe cases the lips and fingernails may turn grey to bluish in colour/ chills /cough Malaria- If chills and high fever occurs in every 3 – 4 days.	1 1 1	3						
26.	(a) Animals that have their DNA manipulated to possess and express an extra or foreign gene are known as transgenic animals. (b)(i)Vaccine safety – Transgenic mice are being developed for use in testing the safety of vaccines before they are used on humans. Transgenic mice are being used to test the safety of the polio vaccine. (ii)Biological products – Transgenic cow-Rosie produced human protein enriched milk(2.4 gram per litre).The milk contains human alpha-lactalbumin and was nutritionally a more balanced product for human babies than natural cow milk or any other example.	1 1 1	3						
27.	(a)Large number of plants can be grown in short period of time, useful where sexual reproduction is not possible, plants without seeds can be multiplied, every plant has same genetic makeup. <p style="text-align: right;">(Any two advantages)</p> (b)Any part of the plant or explant is grown in a test tube under sterile conditions, in nutrients medium (containing sucrose, vitamins, inorganic salts,amino acids, growth regulators like auxin and cytokinin etc) (c)Banana, Apple, Tomato, etc. (Any two food plants)	$\frac{1}{2}+\frac{1}{2}$ $\frac{1}{2}+\frac{1}{2}$ $\frac{1}{2}+\frac{1}{2}$	3						
28.	In an aquatic ecosystem-Grazing food chain (GFC). In a terrestrial ecosystem-Detritus food chain (DFC). Differences –	$\frac{1}{2}$ $\frac{1}{2}$							
<table border="1" style="width: 100%;"> <thead> <tr> <th style="width: 50%;">Grazing Food Chain</th> <th style="width: 50%;">Detritus food chain</th> </tr> </thead> <tbody> <tr> <td>Transfer of energy starts from producers in a food chain.</td> <td>Transfer of energy starts from detritus /decomposing organic matter.</td> </tr> <tr> <td>More energy flows through this.</td> <td>Less amount of energy flows through this .</td> </tr> </tbody> </table>		Grazing Food Chain	Detritus food chain	Transfer of energy starts from producers in a food chain.	Transfer of energy starts from detritus /decomposing organic matter.	More energy flows through this.	Less amount of energy flows through this .		
Grazing Food Chain	Detritus food chain								
Transfer of energy starts from producers in a food chain.	Transfer of energy starts from detritus /decomposing organic matter.								
More energy flows through this.	Less amount of energy flows through this .								

	<table border="1"> <tr> <td>Energy obtained from Sun</td> <td>Energy obtained from dead organic matter</td> </tr> <tr> <td>Major conduit of energy in aquatic system</td> <td>Major conduit of energy in terrestrial system</td> </tr> </table> <p style="text-align: center;">(Any two differences)</p>	Energy obtained from Sun	Energy obtained from dead organic matter	Major conduit of energy in aquatic system	Major conduit of energy in terrestrial system	1x2	3
Energy obtained from Sun	Energy obtained from dead organic matter						
Major conduit of energy in aquatic system	Major conduit of energy in terrestrial system						
SECTION D							
29.	<p>(a)</p> <ul style="list-style-type: none"> • Sewage treatment plant • used to treat sewage water before it can be released into water body. <p>(b) Air helps in growth of flocs (aerobic bacteria along with fungal filaments), which decompose organic matter in the sewage using oxygen.</p> <p>(c)(i) Bacterial 'flocs' settle down to form activated sludge.</p> <p style="text-align: center;">OR</p> <p>(c) (ii) BOD is directly related to the measure of the organic matter present in water/ Greater the BOD more is the polluting potential</p>	<p>½</p> <p>½</p> <p>1+1</p> <p>1</p> <p>1</p>	4				
30.	<p>(a) A – Geitonogamy B – Autogamy</p> <p>(b) -Anthers and stigma to be close to each other in a bisexual flower cleistogamous flower / closed flower / Pollen release and stigma receptivity at the same time</p> <p style="text-align: center;">(Any two conditions)</p> <p>(c)(i) Advantage → Assured seed set /no dependence on pollinators / pure breed can be obtained. Disadvantage → No genetic variation / Inbreeding depression</p> <p style="text-align: center;">OR</p> <p>(c) (ii)</p> <ul style="list-style-type: none"> • <i>Oxalis/ Viola</i> or common pansy/ <i>Commelina</i> . • Some flowers do not open at all /cleistogamy/ closed flower hence show autogamy. 	<p>½</p> <p>½</p> <p>1+1</p> <p>½</p> <p>½</p> <p>½</p> <p>½</p>	4				

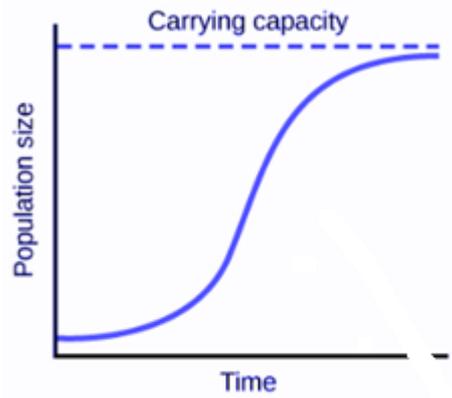
SECTION E			
31.	<p>(a)</p> <ul style="list-style-type: none"> -It should be able to generate its replica. -Be chemically and structurally stable. -Provide scope for slow changes(mutation) required for evolution. -Able to express itself in the form of ‘Mendelian Characters’. <p>DNA is double-stranded whereas RNA is single-stranded, DNA has thymine instead of uracil which is present in RNA and thus DNA is more stable, DNA has 2’-H group whereas RNA has 2’-OH group at every nucleotide which is reactive and easily degrades RNA, RNA is also catalytic, both RNA and DNA can mutate but RNA mutates faster than DNA.</p> <p style="text-align: right;">(Any Two)</p> <p>Based on above points DNA molecule is preferred as an ideal genetic material .</p> <p style="text-align: center;">OR</p> <p>(b)</p> <p>(i)</p> <p>Polygenic Inheritance-Inheritance of a trait that is controlled by three or more genes / the phenotype reflects contribution of all alleles (three or more) and effect of each allele is additive.</p> <p>Pleiotropy – When a single gene shows multiple phenotypic expressions.</p> <p>(ii)</p> <p>Dominance – In heterozygous pair of gene dominant allele is expressed over the recessive allele/ F1 progeny resemble either of the two parents which is dominant.</p> <p>Codominance – In a pair of genes when both alleles express themselves/ F1 generation(one of the progeny) resembles both the parents.</p> <p>Incomplete dominance – When in heterozygous state none of the allele is able to express itself and phenotype is in between/ Phenotype of F1 progeny is in between the two parent.</p> <p style="text-align: center;">Correct differences explained with the help of cross should be evaluated</p>	<p>$\frac{1}{2} \times 4$</p> <p>1×2</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	5
32.	<p>(a)</p> <p>(i)</p> <ul style="list-style-type: none"> A – Spermatozoa B – Spermatid /Spermatozoa C – Sertoli cells D – Spermatogonium <p>(ii)</p> <p>Secondary spermatocyte – 23 chromosomes</p> <p style="padding-left: 20px;">Spermatid – 23 chromosomes</p> <p>(iii)</p> <p>Spermiogenesis – Process by which spermatids are transformed into spermatozoa.</p>	<p>$\frac{1}{2} \times 4$</p> <p>$\frac{1}{2} + \frac{1}{2}$</p> <p>1</p>	

	<p>Spermiation – Process by which sperm had their head embedded in Sertoli cells are released from seminiferous tubules.</p> <p style="text-align: center;">OR</p> <p>(b) (i) P-Megaspore mother cell Q-Megaspores (four megaspores)</p> <p>(ii) (I) Meiosis. (II) <ul style="list-style-type: none"> • Only one cell • Monosporic development </p> <p>(III) Three free nuclear division</p> <p>(IV) The mature female gametophyte has 3 cells at micropylar end – Egg apparatus (two synergids and one egg cell) with thickenings called filiform apparatus in synergids, three cells at chalazal end – Antipodals, large central cell with two polar nuclei, so it is 8-nucleated and 7-celled. /</p> <div style="text-align: center;"> </div>	<p style="text-align: center;">1</p> <p style="text-align: center;">1/2 1/2</p> <p style="text-align: center;">1/2</p> <p style="text-align: center;">1/2 1/2</p> <p style="text-align: center;">1/2</p> <p style="text-align: center;">1/2x4</p>	
33.	<p>(a) (i) Alien species invasion – when alien species are introduced unintentionally or deliberately some of them turn invasive and cause decline or extinction of indigenous species.</p> <p>I. Nile Perch – In Lake Victoria in East Africa Nile Perch caused extinction of 200 species of cichlid fish.</p> <p>II. <i>Lantana</i> and <i>Eichhornia</i> – Caused environmental damage and threat to native species.</p> <p>III. <i>Clarias gariepinus</i> – African catfish introduced for aquaculture purposes poses a threat to indigenous catfishes in our rivers.</p> <p>(ii) Regions with high levels of species richness, high degree of endemism have been declared as biodiversity hotspots to conserve biodiversity.</p> <p>In India – Indo-Burma , Himalaya , Western Ghats and Sri Lanka (Any two regions)</p>	<p style="text-align: center;">1</p> <p style="text-align: center;">1</p> <p style="text-align: center;">1/2</p> <p style="text-align: center;">1/2</p> <p style="text-align: center;">1/2+1/2</p> <p style="text-align: center;">1/2+1/2</p>	5

OR

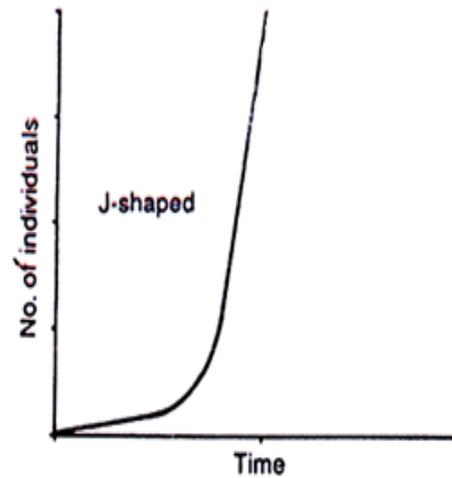
(b) (i)
$$dN/dt = rN \left[\frac{K - N}{K} \right]$$

(ii)



Sigmoid growth curve

(iii)



J-shaped growth curve

(iv)

-Logistic Growth curve / Sigmoid growth curve is more realistic
-A given habitat in nature has enough resources to support a maximum possible number beyond which further growth is not possible/ resources become limiting factor

1

1

1

1+1

5