

**SECOND YEAR HIGHER SECONDARY SECOND TERM EXAMINATION , DECEMBER 2025****Part – III****BIOLOGY****PART – A BOTANY****KEY****Maximum score: 30**

<b>Q.No</b>		<b>Split score</b>	<b>Total score</b>
<b>1</b>	Restriction enzymes.	<b>1</b>	<b>1</b>
<b>2</b>	(c ) Seed coat.	<b>1</b>	<b>1</b>
<b>3</b>	Vitamin ‘A’	<b>1</b>	<b>1</b>
<b>4</b>	chilled ethanol	<b>1</b>	<b>1</b>
<b>5</b>	(a) RNA interference (RNAi). (b) Gene therapy.	$\frac{1}{2}$ $\frac{1}{2}$	<b>1</b>
<b>6</b>	(a) Techniques to alter the chemistry of genetic material (DNA and RNA),to introduce these into host organisms and thus change the phenotype of the host organism. (b) The techniques of genetic engineering which include creation of recombinant DNA, use of gene cloning and gene transfer, overcome this limitation and allows us to isolate and introduce only one or a set of desirable genes without introducing undesirable genes into the target organism.	<b>1</b>  <b>1</b>	<b>2</b>
<b>7</b>	(a) Predation is a nature’s way of transferring energy fixed by plants to higher trophic levels. / Predators keep prey populations under control./ Keeps ecosystem stability./ Biological control methods in agricultural pest control are based on the ability of the predator to regulate prey population. / Predators help in maintaining species diversity, by reducing the competition among prey species. (Any 3).  (b)Some insects and frogs are cryptically-coloured (camouflaged) to avoid being detected by the predator. /Some prey species are poisonous and therefore avoided by the predators. /The Monarch butterfly is highly distasteful to its predator (bird) because of a special chemical in its body. ( Any 1)	<b>1½</b>       $\frac{1}{2}$	<b>2</b>
<b>8</b>	A- Radicle B-Cotyledon C-Plumule D-Suspensor	$\frac{1}{2}$ x4	<b>2</b>
<b>9</b>	One petal of its flower bears an uncanny resemblance to the female of the bee in size, colour and markings.  The male bee is attracted to what it perceives as a female, ‘pseudocopulates’ with the flower, and during that process is dusted with pollen from the flower. When this same bee ‘pseudocopulates’ with another flower, it transfers pollen to it and thus, pollinates the flower	<b>1</b>     <b>1</b>	<b>2</b>

10	<p>(a) (i) Origin of replication (ori) (ii) Selectable marker (iii) Cloning sites / rop gene</p> <p>(b) Transformation is a procedure through which a piece of DNA is introduced in a host bacterium.</p>	<p>1½</p> <p>½</p>	2
11	<p>(a) A population at any given time is composed of individuals of different ages. If the age distribution (per cent individuals of a given age or age group) is plotted for the population, the resulting structure is called an age pyramid.</p> <p>(b) Stable - (B), Expanding - (A), Declining - (C).</p>	<p>½</p> <p>1½</p>	2
12	<p>(a) Bt Cotton</p> <p>(b) Bacillus thuringiensis</p> <p>(c) The Bt toxin protein exist as inactive protoxins but once an insect ingest the inactive toxin, it is converted into an active form of toxin due to the alkaline pH of the gut which solubilise the crystals. The activated toxin binds to the surface of midgut epithelial cells and create pores that cause cell swelling and lysis and eventually cause death of the insect.</p>	<p>½</p> <p>½</p> <p>1</p>	2
13	<p>Transgenic animals serve as models for human diseases so that investigation of new treatments for diseases is made possible. E.g. transgenic models exist for diseases such as cancer, cystic fibrosis, rheumatoid arthritis and Alzheimer's.</p> <p>Transgenic animals that produce useful biological products such as human protein (<math>\alpha</math>-1-antitrypsin) used to treat emphysema. • Similar attempts are being made for treatment of phenylketonuria (PKU) and cystic fibrosis.</p> <p>The first transgenic cow, Rosie, produced human protein-enriched milk (2.4 grams/ litre).</p> <p>Transgenic mice are being used to test the safety of the polio vaccine. If successful and found to be reliable, they could replace the use of monkeys to test the safety.</p> <p>( Any 2 with examples)</p>	<p>1</p> <p>1</p>	2
14	<p>(a) In interference competition, the feeding efficiency of one species might be reduced due to the interfering and inhibitory presence of the other species, even if resources (food and space) are abundant.</p> <p>(b) A species whose distribution is restricted to a small geographical area because of the presence of a competitively superior species, is found to expand its distributional range dramatically when the competing species is experimentally removed is called competitive release.</p>	<p>1</p> <p>1</p>	2
15	<p>(a) Genetic engineering approval committee .</p> <p>(b) Genetically modified organisms .</p>	<p>1</p> <p>1</p>	2
16	<p>(a) Gel electrophoresis .</p> <p>(b) Since DNA fragments are negatively charged molecules they can be separated by forcing them to move towards the anode under an electric field through a medium/matrix.</p>	<p>1</p> <p>1</p>	2

<b>17</b>	(a) (i) Denaturation; (ii) Primer annealing; and (iii) Extension of primers (b) Taq polymerase (c) Which remain active during the high temperature induced denaturation of double stranded DNA.	<b>1½</b> <b>½</b> <b>1</b>	<b>3</b>
<b>18</b>	(a) $r$ = Intrinsic rate of natural increase/ (b-d). K= carrying capacity. (b) It is a very important parameter chosen for assessing impacts of any biotic or abiotic factor on population growth. (c) a = exponential, b = logistic.	<b>½ + ½</b> <b>1</b> <b>½ + ½</b>	<b>3</b>
<b>19</b>	(a) Explant is any part of a plant taken out and grown in a test tube, under sterile conditions in special nutrient media. (b) The capacity to generate a whole plant from any cell/explant is called totipotency. (c) Each plant of micropropagation will be genetically identical to the original plant from which they were grown and are called somaclones.	<b>1</b> <b>1</b> <b>1</b>	<b>3</b>
<b>20</b>	(a) The method of embryo sac formation from a single megaspore is termed monosporic development. (b) Antipodals. (c) Synergids.	<b>1</b> <b>1</b> <b>1</b>	<b>3</b>

Key by Sudheesh kumar N , GHSS MCC KKD, for CBTA



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