

ANSWER KEY

Code No SY 526

SECOND YEAR HIGHER SECONDARY EXAMINATION MARCH 2023**PART - III****SUBJECT: BOTANY****30 SCORES****1 HOUR**

Qn. No.	Sub Qn.	Answer Key / Value Points	Score	Total Score
		PART I 1 - 5 (Any 3)	3 x 1 = 3	
1		Perisperm	1	1
2		Fragmentation / Decomposition	1	1
3		Gel electrophoresis / Agarose gel electrophoresis / Electrophoresis	1	1
4		Commensalism	1	1
5		<i>cry 1Ab</i>	1	1
		PART II 6 - 16 (Any 9)	9 x 2 = 18	
6		Grazing Food Chain / GFC	1 + 1	2
		Detritus Food Chain / DFC		
		Begins with Green plants / producers. Major conduit for energy transfer in aquatic ecosystems.		
		(Any one points in each type) or (Flow chart showing GFC and DFC give 1 score each)		
7		<ul style="list-style-type: none"> ◆ Pollen release and stigma receptivity are not synchronized / (Anther & stigma mature at different time). ◆ Anther and stigma are placed at different position. ◆ Self-incompatibility / (genetic mechanism to prevent pollen germination / genetic mechanism to prevent pollen tube formation) ◆ Production of unisexual flowers. ◆ Male and female flowers are present on different plant / (dioecy) <p style="text-align: right;">(Any 2 points)</p>	1 + 1	2
8		<ul style="list-style-type: none"> ◆ Bacterial cells are treated with specific concentration of divalent cation such as Ca_2^+ (to increase cell permeability). ◆ Then these cells are treated with recombinant DNA (rDNA) on ice. ◆ The cells and rDNA in ice are allowed to heat at 42°C (heat shock at 42°C). ◆ Put them back on ice (which enables bacteria to take up the Recombinant DNA). 	$\frac{1}{2} \times 4$	2

9	(a)	Funicle	½	2
	(b)	Micropyle	½	
	(c)	Embryo sac / Female gametophyte	½	
	(d)	Chalaza	½	
10	(a)	Taq polymerase	1	2
	(b)	<i>Thermus aquaticus</i>	1	
11		Rate of biomass / Organic matter production is called productivity.	1	2
		<p>Factors affecting primary productivity</p> <p>The plant species inhabiting a particular area</p> <p>Environmental factors (Sunlight/Temperature/Water /CO₂)</p> <p>Availability of nutrients</p> <p>Photosynthetic capacity of plants. (any 2 factors)</p>	½ x 2	
12		<p>The Bt toxin is produced by the bacteria as inactive protoxin.</p> <p>When an insect ingest the inactive toxin, it is converted into an active toxin due to the alkaline pH of the gut which solubilise the crystals.</p> <p>The activated toxin binds to the surface of midgut epithelial cells and create pores that cause cell swelling and lysis and eventually leads to death of the insect.</p>	1+1	2
13	(a)	Mutualism	½	2
	(b)	Parasitism	½	
	(c)	Commensalism	½	
	(d)	Mutualism / Symbiosis	½	
14		<p>When energy flow from a particular trophic level to the next level some energy is lost as heat at each step.</p> <p>Only 10% of the energy is transferred to each trophic level from the lower trophic level. (Any 1 point give full score)</p>	2	2
15		Genetically Modified Organism (GMO) - Organisms whose genes have been altered by manipulation are called Genetically Modified Organisms.	1	2
		<ul style="list-style-type: none"> ◆ Made crops more tolerant to abiotic stresses ◆ reduce the reliance on chemical pesticides (Pest resistant crops) ◆ Helped to reduce post harvest losses ◆ Increased efficiency of mineral usage by plants ◆ Enhanced nutritional value of food / Golden rice / Vitamin A enriched rice. 	1	
		◆ Used to create tailor made plants to supply alternative resources to industries. (any 1 merit)		

16	(a)	(a) Exponential growth / Geometric growth curve / J shaped curve	$\frac{1}{2}$	2
		(b) Logistic growth / Verhulst-Pearl Logistic Growth / Sigmoid Growth curve / S shaped curve	$\frac{1}{2}$	
	(b)	K – Carrying capacity	1	
PART III 17 - 20 (Any 3)			3 x 3 = 9	
17		<ul style="list-style-type: none"> ◆ Eli Lilly prepared DNA sequences corresponding to A and B chains of insulin. ◆ Introduced them in plasmid of <i>E.coli</i> to produce insulin chains. ◆ Chain A and B were produced separately. ◆ Chain A and B were extracted and combined by creating disulfide bonds to form human insulin 	1 x 3	3
18		<ul style="list-style-type: none"> ◆ Pollen grains are light and non-sticky. ◆ Flowers possess well exposed stamens. ◆ Large feathery stigma ◆ Single ovule in each ovary ◆ Numerous flowers packed into an inflorescence. ◆ Plants produces large amount of pollen ◆ Flowers are colourless ◆ Odourless (Do not have smell) ◆ Nectarless <p style="text-align: right;">(Any three points)</p>	1 x 3	3
19	(i)	(a) - Mortality / D (b) - Emigration / E	$\frac{1}{2}$ $\frac{1}{2}$	3
	(ii)	Natality / B Immigration / I	$\frac{1}{2}$ $\frac{1}{2}$	
	(iii)	Natality refers to the number of births during a given period	1	
20		<ul style="list-style-type: none"> ◆ The first letter 'E' comes from the genus / <i>Escherichia</i> ◆ The second two letters come from the species of the prokaryote / bacteria / <i>coli</i> ◆ The letter 'R' is derived from the name of strain / RY 13 ◆ Roman number indicates the order in which the enzyme isolated from that strain of bacteria. (Any 3 points carries 1 score each) 	1+1+1	3

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