

DIRECTORATE OF GOVERNMENT EXAMINATION, CHENNAI-6
CHENGALPATTU DISTRICT

HALFYEARLY EXAMINATION. DEC-2024

XII

BIOLOGY

PART- I. BIO- BOTANY – KEY ANSWER

Max. Marks: 35

SECTION - 1

Note: - Answer all the questions.

8 X 1 = 8

Q. No	Option	Answer
1.BB	B	Embryo sac
2.B.IN	D	Acclimatization.
3.BB	C	The Law of Segregation
4.BB	B	Callus undergoes differentiation and produces somatic embryoids
5. BB	C	1-(ii), 2-(iii), 3-(i), 4-(iv)
6. BB	D	Confer resistance to antibiotics
7. BB	D	Pusa Komal - Brassica
8. B.IN	A	Predation

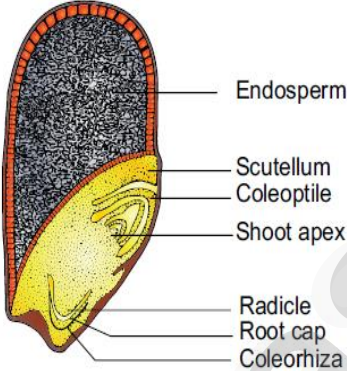
SECTION – 2

Note :- Answer any 4 questions:

4 X 2 = 8

Q. No	Answers	Marks	
9. B.IN	Emasculation: ➤ Process of removal of anthers to prevent self-pollination before dehiscence of anther	2	2
10. B.IN	Dobson unit: ➤ Unit of measurement for total ozone ➤ One dobson unit is 0.001 atm. Cm.	1 1	2
11. B.IN	Significance of Ploidy: <p align="center">(any two)</p> ➤ Many polyploids are more vigorous and more adaptable than diploids. ➤ Many ornamental plants are autotetraploids and have larger flowers and longer flowering duration than diploids. ➤ Autopolyploids usually have higher in fresh weight due to more water content. ➤ Aneuploids are useful to determine the phenotypic effects of loss or gain of different chromosomes. ➤ Many angiosperms are allopolyploids and they play a role in the evolution of plants.	2 X 1	2
12. BB	Productivity of profundal zone: ➤ Deeper region of a pond below the limnetic zone. ➤ Productivity of this zone will be low due to less penetration of light.	1 1	2

13. B.IN	Differentiate secretary and invasive tapetum:			1 1	2																												
		Secretary tapetum	Invasive tapetum																														
	1	The tapetum retains the original position and cellular integrity	The cells lose their inner tangential and radial walls																														
	2	Cellular integrity and nourishes the developing microspores.	Protoplast of all tapetal cells coalesces to form a periplasmodium.																														
14. BB	Chemicals used in gene transfer: <ul style="list-style-type: none"> ➤ i). Polyethylene glycol (PEG) ➤ ii). Dextran sulphate 			2X1½	3																												
SECTION - 3																																	
Note:- Answer any 3 questions, Q.No. 19 is compulsory				3X3=9																													
15. B.IN	Importance of Crossing Over: (any three) <ul style="list-style-type: none"> ➤ Exchange of segments leads to new gene combinations which plays an important role in evolution. ➤ Studies of crossing over reveal that genes are arranged linearly on the chromosomes. ➤ Genetic maps are made based on the frequency of crossing over. ➤ Crossing over helps to understand the nature and mechanism of gene action. ➤ If a useful new combination is formed it can be used in plant breeding. 			3 X 1	3																												
16. BB	Various types of blotting techniques: (any three) <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Southern blotting</th> <th>Northern blotting</th> <th>Western blotting</th> </tr> </thead> <tbody> <tr> <td>Name</td> <td>Southern name of the inventor</td> <td>Northern a misnomer</td> <td>Western a misnomer</td> </tr> <tr> <td>Separation of</td> <td>DNA</td> <td>RNA</td> <td>Protein</td> </tr> <tr> <td>Denaturation</td> <td>Needed</td> <td>Not Needed</td> <td>Needed</td> </tr> <tr> <td>Membrane</td> <td>Nitrocellulose</td> <td>Amino benzyloxymethyl</td> <td>Nitrocellulose</td> </tr> <tr> <td>Hybridization</td> <td>DNA – DNA</td> <td>RNA – DNA</td> <td>Protein - antibody</td> </tr> <tr> <td>Visualizing</td> <td>Autoradiogram</td> <td>Autoradiogram</td> <td>Dark room</td> </tr> </tbody> </table>				Southern blotting	Northern blotting	Western blotting	Name	Southern name of the inventor	Northern a misnomer	Western a misnomer	Separation of	DNA	RNA	Protein	Denaturation	Needed	Not Needed	Needed	Membrane	Nitrocellulose	Amino benzyloxymethyl	Nitrocellulose	Hybridization	DNA – DNA	RNA – DNA	Protein - antibody	Visualizing	Autoradiogram	Autoradiogram	Dark room	3 X 1	3
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17. B.IN	Geographic Information System (GIS): (any six) <ul style="list-style-type: none"> ➤ Environmental impact assessment ➤ Disaster management ➤ Zoning of landslide hazard ➤ Estimation of flood damage ➤ Management of natural resources ➤ Soil mapping ➤ Wetland mapping ➤ Irrigation management and identification of volcanic hazard ➤ Vegetation studies and mapping of threatened and endemic species. 			6 X ½	3																												

18. BB	<p>Help to protect ecosystem: (any six)</p> <ul style="list-style-type: none"> ➤ Buy and use only ecofriendly products and recycle them. ➤ Grow more trees ➤ Choose sustained farm products ➤ Reduce the use of natural resources ➤ Recycle the waste and reduce the amount of waste you produce. ➤ Reduce consumption of water and electricity. ➤ Reduce or eliminate the use of house-hold chemicals and pesticides. ➤ Maintain your cars and vehicles properly. ➤ Create awareness and educate about ecosystem protection among your friends and family members. 	6 X ½	3
19. B.IN	<p>Monocot seed:</p>  <p>Endosperm Scutellum Coleoptile Shoot apex Radicle Root cap Coleorhiza</p> <p>Draw & Label</p>	2 +1	3
SECTION - 4			
Note:- Answer all questions.		2X5=10	
20. (a) BB	<p>Preparation of Organic Pesticide:</p> <ul style="list-style-type: none"> ➤ Mix 120g of hot chillies with 110 g of garlic or onion. Chop them thoroughly. ➤ Blend the vegetables together manually or using a grinder until it forms a thick paste. ➤ Add the vegetable paste to 500 ml of warm water and stir them thoroughly. ➤ Pour the solution into a glass container and leave it undisturbed for 24 hours. ➤ If possible, keep the container in a sunny location. If not, at least keep the mixture in a warm place. ➤ Strain the mixture. This filtrate is the pesticide. ➤ Either discard the vegetables or use it as a compost. ➤ Pour the pesticide into a squirt bottle. Make sure that the spray bottle has first been cleaned with warm water and soap to get rid it of any potential contaminants. ➤ Spray your plants with the pesticide. ➤ Treat the infected plants every 4 to 5 days with the solution. ➤ After 3 or 4 treatments, the pest will be eliminated. <p style="text-align: center;">(OR)</p>		

<p>21. (a) BB</p>	<p>Various types of parasitism:</p> <ul style="list-style-type: none"> ➤ Parasitism is classified into two types <p>(i). Holoparasite (ii). Hemiparasite</p> <p>1. Holoparasites</p> <ul style="list-style-type: none"> ➤ The organisms which are dependent upon the host plants for their entire nutrition. ➤ They are also called total parasites. <p>Examples: (any one)</p> <ul style="list-style-type: none"> ➤ <i>Cuscuta</i> is a total stem parasite of the host plant <i>Acacia</i>, <i>Duranta</i> and many other plants. ➤ <i>Balanophora</i>, <i>Orobancha</i> and <i>Rafflesia</i> are the total root parasites found on higher plants. <p>2. Hemiparasites</p> <ul style="list-style-type: none"> ➤ The organisms which derive only water and minerals from their host plant while synthesizing their own food by photosynthesis. ➤ They are also called partial parasites. <p>Examples: (any one)</p> <ul style="list-style-type: none"> ➤ <i>Viscum</i> and <i>Loranthus</i> are partial stem parasites. ➤ <i>Santalum</i> (Sandal Wood) is a partial root parasite. ➤ The parasitic plants produce the haustorial roots inside the host plant to absorb nutrients from the vascular tissues of host plants. <p style="text-align: center;">(OR)</p>	<p>1 1 1 1 1</p>	<p>5</p>
<p>(b). BB</p>	<p>Basic concept of plant tissue culture:</p> <p>1. Totipotency</p> <ul style="list-style-type: none"> ➤ The property of live plant cells that they have the genetic potential when cultured in nutrient medium to give rise to a complete individual plant. <p>2. Differentiation</p> <ul style="list-style-type: none"> ➤ The process of biochemical and structural changes by which cells become specialized in form and function. <p>3. Redifferentiation</p> <ul style="list-style-type: none"> ➤ The further differentiation of already differentiated cell into another type of cell. ➤ For example, when the component cells of callus have the ability to form a whole plant in a nutrient medium. <p>4. Dedifferentiation</p> <ul style="list-style-type: none"> ➤ The reversion of mature cells to the meristematic state leading to the formation of callus. 	<p>1 1 1 1 1</p>	<p>5</p>

B. LOGANATAN
GHSS, MAMBAKKAM,
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SECTION - 1

Note: - Answer all the questions.

8 X 1 = 8

Q. No	Option	Answer
1.B.IN	C	Spermache
2.BB	C	Ig E
3.B.IN	A	Article 21
4.B.IN	D	Lipase
5. BB	D	(+ -)
6. B.IN	C	Glutamic Acid
7. BB	C	50%
8. BB	A	1400 cc

SECTION – 2

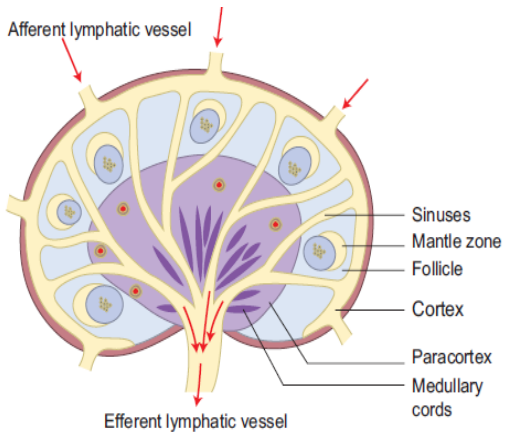
Note:- Answer any 4 questions:

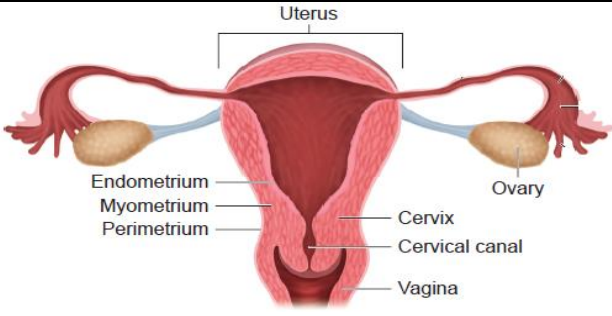
4X2=8

Q. No	Answers	Marks		
9. B.IN	Spermatogenesis and Spermiogenesis: -		1 1 2	
		Spermatogenesis		Spermiogenesis
	1	The process of formation of male gametes in testes		The spermatids are transformed into mature spermatozoa (sperms)
	2	LH acts on the Leydig cells and stimulates the synthesis of testosterone which in turn stimulates the process of spermatogenesis.	FSH stimulates testicular growth and enhances the production of Androgen Binding Protein (ABP) by the Sertoli cells and helps in the process of spermiogenesis	
10. B.IN	Nonsense Codon in Genetic Code		1 1 2	
	<ul style="list-style-type: none"> ➤ Three codons do not code for any amino acid and function as stop codon (Termination). ➤ UAA, UAG and UGA 			
11. B.IN	Haematopoiesis:		2 2	
	<ul style="list-style-type: none"> ➤ The process of production of blood cells in the bone marrow. 			
12. B.IN	Gene Knock Out: -		1 1 2	
	<ul style="list-style-type: none"> ➤ It is a genetically engineered organism. ➤ Which carries one or more genes in its chromosomes that have been made inoperative. 			

Kindly Send Me Your Key Answer to Our email id - Padasalai.net@gmail.com

13. BB	Characters of Biome: (any three) <ul style="list-style-type: none"> ➤ Location, Geographical position ➤ Climate and physiochemical environment ➤ Predominant plant and animal life ➤ Boundaries between biomes are not always sharply defined. ➤ Transition or transient zones are seen as in case of grassland and forest biomes 	3 X 1	3																		
14. BB	BOD: - <ul style="list-style-type: none"> ➤ The amount of the oxygen that would be consumed, ➤ If all the organic matter in one litre of water were oxidized by bacteria. ➤ The greater the BOD of the waste water more is its polluting potential. 	3 X 1	3																		
SECTION - 3 Note:- Answer any three of the followings including Q.No.19 is compulsory																					
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15. B.IN	Differentiate Monozygotic and Dizygotic Twins: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 5%;"></th> <th style="width: 45%;">Monozygotic twins</th> <th style="width: 45%;">Dizygotic twins</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td>It is also called Identical twins</td> <td>It is also called Fraternal twins</td> </tr> <tr> <td style="text-align: center;">2</td> <td>Twins are produced when a single fertilized egg splits into two during the first cleavage.</td> <td>Twins are produced when two separate eggs are fertilized by two separate sperms.</td> </tr> <tr> <td style="text-align: center;">3</td> <td>They are of the same sex, look alike and share the same genes</td> <td>The twins may be of the same sex or different sex and are non-identical</td> </tr> </tbody> </table>		Monozygotic twins	Dizygotic twins	1	It is also called Identical twins	It is also called Fraternal twins	2	Twins are produced when a single fertilized egg splits into two during the first cleavage.	Twins are produced when two separate eggs are fertilized by two separate sperms.	3	They are of the same sex, look alike and share the same genes	The twins may be of the same sex or different sex and are non-identical	1 1 1	3						
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16. BB	Sex determination in human beings: <ul style="list-style-type: none"> ➤ Sex determination is associated with chromosomal differences between the two sexes, typically XX females and XY males. ➤ 23 pairs of human chromosomes include 22 pairs of autosomes (44AA) and one pair of sex chromosomes (XX or XY). ➤ Females are homogametic producing only one type of gamete (egg), each containing one X chromosome. ➤ While the males are heterogametic producing two types of sperms with X and Y chromosomes. <p style="text-align: center; color: red;">(OR)</p> <div style="text-align: center;"> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;"></td> <td style="width: 45%; text-align: center;"> Male (Heterogametic) 44AA + XY </td> <td style="width: 40%; text-align: center;"> Female (Homogametic) 44AA + XX </td> </tr> <tr> <td style="text-align: right;">Parents</td> <td></td> <td></td> </tr> <tr> <td style="text-align: right;">Gametes</td> <td style="text-align: center;">Sperms</td> <td style="text-align: center;">Ova</td> </tr> <tr> <td></td> <td style="text-align: center;">(22A+X) (22A+Y)</td> <td style="text-align: center;">(22A+X) (22A+X)</td> </tr> <tr> <td style="text-align: right;">Offsprings/ Progeny (F₁)</td> <td style="text-align: center;">(44AA+XX) (Female)</td> <td style="text-align: center;">(44AA+XX) (Female)</td> </tr> <tr> <td></td> <td style="text-align: center;">(44AA+XY) (Male)</td> <td style="text-align: center;">(44AA+XY) (Male)</td> </tr> </table> </div>		Male (Heterogametic) 44AA + XY	Female (Homogametic) 44AA + XX	Parents			Gametes	Sperms	Ova		(22A+X) (22A+Y)	(22A+X) (22A+X)	Offsprings/ Progeny (F ₁)	(44AA+XX) (Female)	(44AA+XX) (Female)		(44AA+XY) (Male)	(44AA+XY) (Male)	1 1 ½ ½ /	3
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<p>17. B.IN</p>	<p>Lymph Node</p>  <p>Draw & Label</p>	<p>2 +1</p>	<p>3</p>
<p>18. BB</p>	<p>Advantages of cloning: (any three)</p> <ul style="list-style-type: none"> ➤ Offers benefits for clinical trials and medical research. ➤ It can help in the production of proteins and drugs in the field of medicine. ➤ Aids stem cell research. ➤ It helps to save endangered species 	<p>3 X 1</p>	<p>3</p>
<p>19. B.IN</p>	<p>Methods of disposal of radioactive wastes: (any three)</p> <ul style="list-style-type: none"> ➤ 1. Limit generation - The first and most important consideration in managing radioactive wastes. ➤ 2. Dilute and disperse - For wastes having low radioactivity, dilution and dispersion are adopted. ➤ 3. Delay and decay – It is frequently an important strategy because much of the radioactivity in nuclear reactors and accelerators is very short lived. ➤ 4. Concentrate and confine process- Concentrating and containing is the objective of treatment activities for longer-lived radioactivity. The waste is contained in corrosion resistant containers and transported to disposal sites. Leaching of heavy metals and radionuclides from these sites is a problem of growing concern. 	<p>3 X 1</p>	<p>3</p>
<p>SECTION - 4</p>			
<p>Note:- Answer in Details</p>		<p>2 X 5= 10</p>	
<p>20. (a) B.IN</p>	<p>Describe the structure of Uterus:</p> <ul style="list-style-type: none"> ➤ The uterus or womb is a hollow, thick-walled, muscular, highly vascular and inverted pear-shaped structure. ➤ Its lying in the pelvic cavity between the urinary bladder and rectum. ➤ The major portion of the uterus is the body and the rounded region superior to it, is the fundus. ➤ The uterus opens into the vagina through a narrow cervix. ➤ The wall of the uterus has three layers of tissues. ➤ The outermost thin membranous serous layer called the perimetrium. ➤ The middle thick muscular layer called myometrium ➤ The inner glandular layer called endometrium. ➤ The endometrium undergoes cyclic changes during the menstrual cycle. ➤ The myometrium exhibits strong contractions during parturition. 	<p>4</p>	<p>5</p>

	 <p style="text-align: center;">(OR)</p>	1																									
(b). BB	<p>In <i>E. coli</i> - enzymes β- galactosidase, permease and transacetylase: -</p> <ul style="list-style-type: none"> ➤ The metabolism of lactose in <i>E.coli</i> requires three enzymes <ul style="list-style-type: none"> - permease, - β-galactosidase (β-gal) and - transacetylase. ➤ The enzyme permease is needed for entry of lactose into the cell. } 1 ➤ β-galactosidase brings about hydrolysis of lactose to glucose and galactose. } 1 ➤ Transacetylase transfers acetyl group from acetyl Co A to β-galactosidase. } 1 ➤ If lactose is available as an energy source for the bacteria, then lactose enters the cell as a result of permease enzyme. } 1 ➤ Lactose acts as an inducer and interacts with the repressor to inactivate it. ½ ➤ In the absence of Lactose, the repressor protein binds to the operator of the operon and prevents RNA polymerase from transcribing the operon, as result, β-galactosidase is not produced. 1 ½ 	1 1 1 1 ½ 1 ½	5																								
21. (a). BB	<p>Major threats to Biodiversity caused by human activities:</p> <ul style="list-style-type: none"> ➤ Apart from natural causes, human activities, both directly and indirectly are today's main reason for habitat loss and biodiversity loss. ➤ Fragmentation and degradation due to agricultural practices. ➤ Extraction - mining, fishing, logging, harvesting ➤ Development - settlements, industrial and associated infrastructures lead to habitat loss. ➤ Fragmentation leads to formation of isolated, small and scattered populations and as endangered species. <p style="text-align: center;">(Or)</p>	5 X 1	5																								
(b). B.IN	<p>Differences between r- selected and K selected species: -</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 5%;"></th> <th style="width: 45%; text-align: center;">r - selected species</th> <th style="width: 45%; text-align: center;">k - selected species</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td>Smaller sized organisms</td> <td>Larger sized organisms</td> </tr> <tr> <td style="text-align: center;">2</td> <td>Produce many offspring</td> <td>Produce few offspring</td> </tr> <tr> <td style="text-align: center;">3</td> <td>Mature early</td> <td>Late maturity with extended parental care</td> </tr> <tr> <td style="text-align: center;">4</td> <td>Short life expectancy</td> <td>Long life expectancy</td> </tr> <tr> <td style="text-align: center;">5</td> <td>Each individual reproduces only once or few times in their life time</td> <td>Can reproduce more than once in lifetime</td> </tr> <tr> <td style="text-align: center;">6</td> <td>Only few reach adulthood</td> <td>Most individuals reach maximum life span</td> </tr> <tr> <td style="text-align: center;">7</td> <td>Unstable environment, density independent</td> <td>Stable environment, density dependent</td> </tr> </tbody> </table>		r - selected species	k - selected species	1	Smaller sized organisms	Larger sized organisms	2	Produce many offspring	Produce few offspring	3	Mature early	Late maturity with extended parental care	4	Short life expectancy	Long life expectancy	5	Each individual reproduces only once or few times in their life time	Can reproduce more than once in lifetime	6	Only few reach adulthood	Most individuals reach maximum life span	7	Unstable environment, density independent	Stable environment, density dependent	5 X 1	5
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Question paper - Analysis

Q. Type	Bio – Botany (55)		Bio -Zoology (55)	
	Book Back	Book In	Book Back	Book In
1 Marks	6 (6)	2 (2)	4 (4)	4 (4)
2 Marks	4 (2)	8 (4)	4 (2)	8 (4)
3 Marks	6 (2)	9 (3)	6 (2)	9 (3)
5 Marks	20 (4)	-	10 (2)	10 (2)
Total	36	19	24	31
Percentage	65%	35%	44%	56%
BB – 55% & B.IN - 45%				

B. LOGANATHAN,
GHSS, MAMBAKKAM,
CHENGALPTTU DIST.