DIRECTORATE OF GOVERNMENT EXAMINATIONS, CHENNAI-6

HIGHER SECONDARY SECOND YEAR EXAMINATION MARCH/APRIL-2023

KEY ANSWER FOR BOTANY

NOTE :

1. **Answer written only in BLACK or BLUE should be evaluated**
2. **Choose the correct answer and write the option code**
3. **If one of them (option or answer) is wrong, then award zero mark only**

Maximum Marks: 70

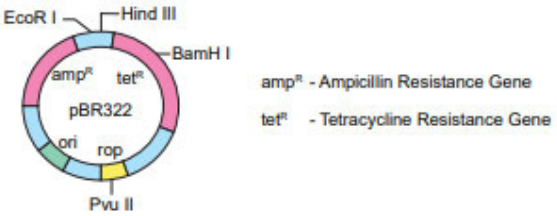
Part - I

Marks should be given only the option code on the corresponding answer is written.
Answer all questions: 15×1=15

Q.No.	Answer - A	Answer - B	Mark
1	c. (I) (iii), (2)-(iv), (3)-(i), (4)-(ii)	a. Capillary water	1
2	a. 9 : 7	d. Functional megaspore	1
3	c.. Dr. M.S.Swaminathan	c. (I)-(iii), (2)-(iv), (3)-(i), (4)-(ii)	1
4	d. Functional megaspore	b. Tropical African region	1
6	a. Capillary water	c. Agar	1
7	c.. Brazil	c.. Dr. M.S.Swaminathan	1
8	b. Tropical African region	c.. Ozone	1
9	c. Agar	d. Areca catechu	1
10	b. Blue Red	a. Law of Segregation	1
11	b. DNA -> RNA -> Protein	c.. Brazil	1
12	a. Law of Segregation	d Soil	1
13	c. AUG	b. DNA -> RNA -> Protein	1
14	d. Areca catechu	c. AUG	1
15	d. Soil	b. Blue , Red	1

PART – II

Answer any six questions. Question number. 24 is compulsory. **6×2=12**

16	**Cantharophily:** Pollination by beetle	**2**
17	**Names of scientists rediscovered Mendelism:** Hugo de vries, Carl Correns, Erich von Tschermak.	**2**
18	**Intragenic gene interactions:** Interaction takes place between the alleles of same gene .i.e alleles at the same locus is called intragenic or intralocus gene interaction. **Classify gene interaction:** 1.Intralocus interactions(Allelic interactions) 2.Interlocus interactions(Non-allelic interactions)	**1** **1**
19	**Gene mapping:**	**2**
20	 Diagram labeling the parts	**2**
21	**Somatic Hybridization:** The fusion product of protoplast without nucleus of different cell is called cybrid. Following this nuclear fusion happen. This process is called Somatic Hybridization.	**2**
22	**Seed ball:** Seeds in a mixture of clay and soil humus(also in cow dung) and scattering them on to suitable ground, not Planting of trees manually.	**2**
23	**Green manuring:** Is defined as the growing of green manure crops and use of these crops directly in the field of ploughing**.**	**2**

24	1. Differentiation 2. ReDifferention 3. Dedifferentiation **(Any two)**	**2**

PART – III

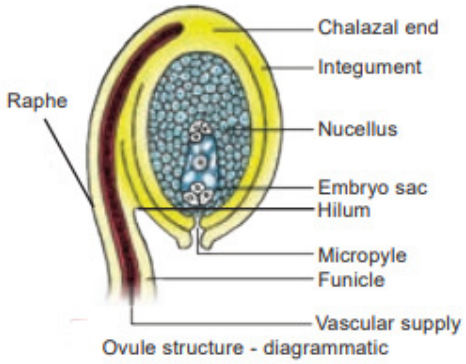
Answer any six questions. Question number 33 is compulsory **6 x 3 = 18**

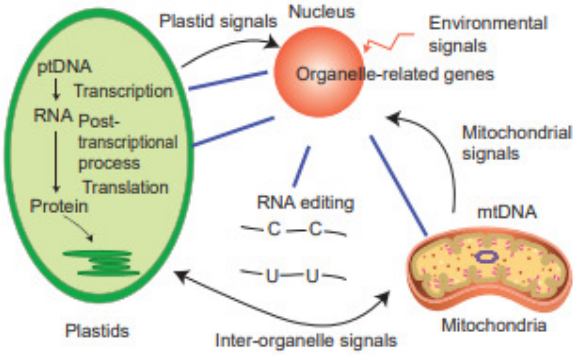
25	**Differentiate Grafting and Layering:** **Grafting**: parts of two different plants are joined so that they continue to grow as one plant. Of the two plants, the plant which is in contact with the soil is called **stock.** and the plant used for grafting is called **scion.** **Layering**: The stem of a parent plant is allowed to develop roots while still intact. when the root develops the rooted part is cut and planted to grow as a new plant**.**	**3**
26	**Different types of aneuploidy :** Diagram **(Any 6)**	**6×½=3**
27	**Capping:** Modification at the 5' end of the primary RNA transcript(hnRNA) with methyl guanosine triphosphate is called Capping. **Tailing:** The 3' end of the hnRNA is cleaved by an endonuclease and a string of adenine nucleotides is ordered to the 3' end of hnRNA(free mRNA) is known as poly(A) tail-polyadnylation.	**1 ½** **1 ½**
28	**Benefits and Risks of genetically modified food:** **Benefits**: 1. yield without pest 2. 70% reduction of pesticide usage. 3. reduce soil pollution problem **4.** conserve microbial population in soil.	**1 ½**

	Any three only **Risks:** 1. affect Liver,kidney function and cancer. 2 hormonal imbalance and physical disordered 3. anaphylactic shock(sudden hyper sensitive reaction) and allergies 4. Adverse effect in immune system because of bacterial protein. 5. Loss of viability of seeds show in terminator seed technology of GM crops. **Any three only**	**1 ½**
29	**Objectives of afforestation :** Any three Objectives	3
30	**Ecological Hierarchy :** The interaction of organisms with their environment results in the establishment of grouping of organisms which is called Ecological Hierarchy. **Levels of Hierarchy:** Biosphere ↑ Biome ↑ Landscape ↑ Ecosystem ↑ Community ↑ population ↑ individual ↑ organism	1 2
31	**Microbial inoculants used to increase the soil fertility:** ➢ Efficient in fixing nitrogen ➢ Efficient in solubilising phosphate ➢ Efficient in decomposing cellulose ➢ Improves soil fertility ➢ Improves plant growth ➢ Improves the number and biological activity of beneficial micro organisms in the soil ➢ They are eco-friendly organic agro inputs ➢ More efficient and cost effective than chemical fertilizers	3

	(Any Three Points)	
32	**Pyramid of energy is always upright:** The bottom of the pyramid of energy is occupied by the producers. there is a gradual decrease of energy transfer at successive tropic levels from producers to the upper levels. therefore the pyramid of energy is always upright. **(or)** Diagram	3

33	**Differentiate Embryoids and Artificial Seeds:**		3
	Embryoids	**Artificial Seeds**	
	The callus cells undergoes differentiation and produces somatic embryos known as Embryoids.	Artificial Seeds or synthetic seeds(synseeds) are produced by using embryoids (somatic embryos) obtained through in vitro culture .	

	PART – IV **Answer all the questions.** **5x5=25**	
34 (a)	**Structure of ovule:** **Diagram**  Ovule structure - diagrammatic **Label** **(OR)**	**3** **2**
34 (b)	**Significance of plant succession:** Any 5 points	**5**

35 (a)	**Inheritance of chloroplast gene :** Example 4 O' clock plant (Mirabilis jalapa) Explanation Flowchart/Diagram **(OR)**	**1** **2** **2**
35 (b)	**RNA editing in plants:** 1. RNA editing definition 2. Types of RNA Editing i Substitution editing ii. Insertion / Deletion editing 3. RNA editing diagram  	**3** **2**
36 (a)	**Applications of Bio Technology:** Any 5 applications **(OR)**	**5**
36 (b)	**Steps involved in Protoplast culture :** 1. Isoloation of protoplast (macrozyme, cellulose enzyme sorbitol (or) mannitol at pH 5.4) 2. Fusion of protoplast (PEG) 3. Culture of protoplast (MS liquid medium, fluorescein diacetate) 4. Selection of Somatic hybrids(Cybrid, somatic hybridization) 5. Protoplast culture diagram	**1** **1** **1** **1** **1**
37 (a)	**Solution to water crisis and explain its advantages:** 1. Solution to water crisis 2. environmental benefits **(Any four only)** **(OR)**	**2** **3**

37 (b)	**Different types of Hydrophytes with examples:** 1. Free floating hydrophytes Explanation , Any one example 2. Rooted floating hydrophytes Explanation Any one example 3. Sub merged floating hydrophytes Explanation , Any one example 4. rooted – sub merged hydrophytes Explanation , Any one example 5. Amphibious hydrophytes Explanation , Any one example	1 1 1 1 1
38 (a)	**Breeding Techniques involved developing new traits in plant breeding**: 1. cutting and modifying the genome during the repair process by tools like **CRISPR/ CaS.** 2. genome editing to introduce changes in base pairs during a technique called **Oligonucleotide –directed** mutagenesis (ODM). 4. organising process that alter gene activity without altering the DNA itself **(epigenetic methods)** **(OR)**	**1** **2** **1** **1**

38 (b)	**Economic Importance of Rice and Teak:** **Rice** 1. Calorie rich cereal food 2. Flaked the rice/ parched rice 3. Rice brain oil 4. Husks **Teak** 1. It is one of the best timbers of the world. carpenter friendly wood. 2. Railway carriage , Ship building , Bridge building 3. Making boats, toys **4.** Making plywood, door frames	**2½** **2½**