VILLUPURAM DIST.

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COMMON QUARTERLY EXAMINATION - 2024 - 25

[Max. Marks: 70 **BOTANY** Time Allowed: 3.00 Hours] PART - I 15x1=15 Answer All the questions. 1. In which techniques Ethidium Bromide is used? a) Southern Blotting techniques b) Western Blotting techniques c) Polymerase Chain Reaction d) Agrose Gel Electroporosis 2. The prevention of large scale loss of biological interity b) Bioethics a) Biopatent c) Biosafety d) Biofuel Match list I with list II List I List II A. 2n + 2Monosomy B. 2n + 1 ii) Tetrasomy C. 2n - 1 iii) Trisomy D. 2n - 1 -1 iv) double monosomy a) A-i, B-iii, C-ii, D-iv b) A-ii, B-iii, C-iv, D-I c) A-ii, B-iii, C-i, D-iv d) A-iii, B-ii, C-i, D-iv 4. Persistent nucellus in the seed is known as a) Hilum b) Tegman c) Chalaza d) Perisperm 5. Majority of plants pollen is liberated at a) 1 celled stage b) 2 celled stage c) 3 celled stage d) 4 celled stage 6. Match the columns i) Hind III a) Chlorella ii) pBR 322 b) Restriction enzyme iii) SCP c) Antibiotic resistance gene iv) ampR d) Cloning vector a) i-c, ii-a, iii - d, iv - b b) 1-c, ii -d, iii - b, iv - a c) i-b, ii-d, iii - a, iv - c d) i-b, ii-d, iii-c, iv-a 7. EcoRI cleaves DNA at a) AGGGTT b) GTATATC c) GAATTC d) TATAGC 8. In his classic experiments on Pea plants, Mendel did not use a) Flowering position b) Seed colour c) Pod length d) Seed shape 9. Choose the incorrect pair from the following a) Bt toxin Bacillus thuringiensis Seperation of DNA fragments b) Electrophoresis c) Golden rice Vitamin K d) Hind II Endonuclease enzyme 10. Which one of the following pairs of codons is correctly matched with their function or the signal for the particular amino acid? a) UUA, UCA - Leucine b) GUU, GCU - Alanine c) UAG, UGA - Stop d) AUG, ACG - Start / Methionine 11. Crossing over is a precise process that includes stages like a) Tetrad formation, crossover, synopsis, terminalisation b) Terminalisation, cross over, tetrad formation, synopsis c) Crossing over, tetrad formation, synopsis, terminalisation

> b) Endoplasmic reticulum and mitrochondria d) Lysososmes and ribosomes

> > V/12/Bot/1

d) Synopsis, tetrad formation, crossover and terminalisation 12. Extra nuclear inheritance is a consequence of presence of genes in

a) Mitrochondria and chloroplasts

c) Ribosomes and chloroplast

Gamma rays are generally use to induce mutation in wheat varieties. Because they carry lower energy to non-ionize electrons from atom 13. Assertion (A) Reason (R) b) A is correct. R is wrong a) A and R are correct d) A and R are wrong c) A is wrong. R is correct 14. Cryopreservation means it is a process to preserve plant cells, tissues or organs a) at very low temperature by using ether. b) at very high temperature by using liquid nitrogen c) at very low temperature of -196 by using liquid nitrogen d) at very low temperature by using liquid nitrogen 15. Size of pollen grain in Myosotis a) 10 micrometer b) 20 micrometer d) 2000 micrometer c) 200 micrometer PART - II 6x2=12 II. Answer any Six of the following questions. Question No. 24 is Compulsory 16. What is lethal allele? 17. What are the materials used to grow microorganism like Spirulina? 18. What is Cantharophily? 19. Describe - Castor Aruna. 20. What is polyembryony? 21. Give the names of the scientists who rediscovered Mendelism. 22. Name the chemicals used in gene transfer. 23. What is TATA box? 24. What is cybrid? PART - III 6x3=18 III. Answer any Six of the following question Question No 33 is compulsory. 25. Differentiate secretory and invasive tapetum. 26. What is meant by capping and tailing? 27. Draw the structure of T.S. of mature anther and label its parts. 28. Name the seven contrasting traits of Mendel. 29. Compare the various types of Blotting techniques. 30. What is Cryopreservation? 31. What is the difference between missense and nonsense mutation? 32. Write short note on Intellectual property right (IPR). 33. Draw the structure of pBR332. 5x5=25 IV. Answer any two of the following question. 34. a) With a suitable diagram explain the structure of an ovule. (OR) b) Explain the basic concepts involved in plant tissue culture. 35. a) Explain Incomplete Dominance with an example. (OR) b) Is their any possibilities to transfer a suitable desirable gene to host plant without vector? Justify your answer. 36. a) What is gene mapping? Write its uses. (OR) b) Write the characters of anemophilous plant. 37. a) What is Single cell protein? Write its applications. (OR) b) Bring out the inheritance of chloroplast gene with an example. 38. a) Write the applications of Plant tissue culture. (OR) b) What attributes make Arabidopsis a suitable model plant for molecular genetic research? V/12/Bot/2

School Education - Villupuram district Higher Secondary Second year - Quarterly Examination - 2024 Botany - Key Answer

I. Answer All the questions

15 x 1=15

Q. NO		Part - I	Marks
1	d)	Agrose Gel Electroporosis	1
2	c)	Biosafety	1
3	c)	A-ii, B-iii, C-i, D-iv	1
4	d)	Perisperm	1
5	b)	2 celled stage	1
6	c)	i -b, ii -d, iii - a, iv – c	1
7	c)	GAATTC	1
8	c)	Pod length	1
9	c)	Golden rice - Vitamin K	1
10	c)	UAG, UGA – Stop	1
11	d)	Synopsis, tetrad formation, crossover and terminalisation	1
12	a)	Mitrochondria and chloroplasts	1
13	b)	A is correct. R is wrong	1
14	c)	At very low temperature of -196 by using liquid nitrogen	1
15	a)	10 micrometer	1

II. Answer any six questions. Question No. 24 is Compulsorv.

 $6 \times 2 = 12$

ci any	six questions. Question No. 24 is Compulsory.	6 X Z =12
	Part - II	
16.	Lethal allele An allele which has the potential to cause the death of an organism is called lethal allele. Ex : Snapdragon	2
17.	 Waste water from potato processing plants Straw Molasses Animal manure and even sewage (Any 3) 	2
18.	Cantharophily Pollination takes place by beetle is called cantharophily.	2
19.	 Castor Aruna. Castor Aruna is mutant variety of castor. Which is developed by treatment of seeds with thermal neutrons. It induce very early maturity. 120 days instead of 270 days as original variety. 	1 1
20.	Polyembryony Presence of more than one embryo in a seed is called polyembryony.	2
21.	Rediscovered Mendelism – Scientists Name Hugo de Vries Carl Correns Erich von Tschermak	2
22.	Chemicals used in gene transfer Polyethylene glycol (PEG) Dextran sulphate	1 1
23.	TATA Box A specific sequence of DNA nucleotides called the Promoter is necessary for transcription. It consists of TATA nitrogen bases	2

	Cybrid The fusion pro	oduct of protoplasts with	out nucleus of different cells is	s called a cybrid	2
		p	ART - III		
	Answer any si	ix questions. Question 1			6 x 3=1
25.		petum (parietal / glandu retains the original posi	ılar / cellular) tion and cellular integrity and	l nourishes the developing	1 1/2
	Invasive tapetum (periplasmodial) The cells loose their inner tangential and radial walls and the protoplast of all tapetal cells coalesces to form a periplasmodium.				
26.	Capping Modification methylguanos	at the 5' end of the triphosphate is cal		ranscript (hnRNA) with	1 1/2
		•	n endonuclease and a string of a		1 1/2
27.		*	Connective Epidermis Endothecium Middle layer		Dig -
		* * * * * * *	Tapetum Stomium Pollen grain		Parts -
				(Any 4 Parts)	
28.	Name the sev	en contrasting traits of	Mendel.		
	S.NO	Character	Dominant	Recessive	
	S.NO 1.	Character Plant height	Tall Tall	Recessive Dwarf	
	1. 2.				
	1. 2. 3.	Plant height	Tall	Dwarf	
	1. 2. 3. 4.	Plant height Flower position Flower colour Pod form	Tall Axial	Dwarf Terminal White Constricted	
	1. 2. 3. 4. 5.	Plant height Flower position Flower colour Pod form Pod colour	Tall Axial Purple Inflated Green	Dwarf Terminal White Constricted Yellow	3
	1. 2. 3. 4. 5. 6.	Plant height Flower position Flower colour Pod form Pod colour Seed shape	Tall Axial Purple Inflated Green Round	Dwarf Terminal White Constricted Yellow Wrinkled	3
	1. 2. 3. 4. 5.	Plant height Flower position Flower colour Pod form Pod colour	Tall Axial Purple Inflated Green	Dwarf Terminal White Constricted Yellow	3
29.	1. 2. 3. 4. 5. 6. 7.	Plant height Flower position Flower colour Pod form Pod colour Seed shape	Tall Axial Purple Inflated Green Round	Dwarf Terminal White Constricted Yellow Wrinkled	3
29.	1. 2. 3. 4. 5. 6. 7.	Plant height Flower position Flower colour Pod form Pod colour Seed shape Cotyledon colour	Tall Axial Purple Inflated Green Round	Dwarf Terminal White Constricted Yellow Wrinkled	3
29.	1. 2. 3. 4. 5. 6. 7.	Plant height Flower position Flower colour Pod form Pod colour Seed shape Cotyledon colour ting techniques. Southern	Tall Axial Purple Inflated Green Round Yellow Northern blotting Northern a misnomer	Dwarf Terminal White Constricted Yellow Wrinkled Green	3
29.	1. 2. 3. 4. 5. 6. 7. Types of Blot	Plant height Flower position Flower colour Pod form Pod colour Seed shape Cotyledon colour ting techniques. Southern blotting Southern name of the inventor	Tall Axial Purple Inflated Green Round Yellow Northern blotting	Dwarf Terminal White Constricted Yellow Wrinkled Green Western blotting	3
29.	1. 2. 3. 4. 5. 6. 7. Types of Blot	Plant height Flower position Flower colour Pod form Pod colour Seed shape Cotyledon colour ting techniques. Southern blotting Southern name of the inventor of DNA	Tall Axial Purple Inflated Green Round Yellow Northern blotting Northern a misnomer	Dwarf Terminal White Constricted Yellow Wrinkled Green Western blotting Western a misnomer	3
29.	1. 2. 3. 4. 5. 6. 7. Types of Blot Name Separation	Plant height Flower position Flower colour Pod form Pod colour Seed shape Cotyledon colour ting techniques. Southern blotting Southern name of the inventor of DNA	Tall Axial Purple Inflated Green Round Yellow Northern blotting F Northern a misnomer RNA	Dwarf Terminal White Constricted Yellow Wrinkled Green Western blotting Western a misnomer Proteins	3
29.	1. 2. 3. 4. 5. 6. 7. Types of Blot Name Separation Denaturation	Plant height Flower position Flower colour Pod form Pod colour Seed shape Cotyledon colour ting techniques. Southern blotting Southern name of the inventor of DNA Needed Nitrocellulose / nylon	Tall Axial Purple Inflated Green Round Yellow Northern blotting F Northern a misnomer RNA Not needed	Dwarf Terminal White Constricted Yellow Wrinkled Green Western blotting Western a misnomer Proteins Proteins	3
29.	1. 2. 3. 4. 5. 6. 7. Types of Blot Name Separation Denaturation Membrane	Plant height Flower position Flower colour Pod form Pod colour Seed shape Cotyledon colour ting techniques. Southern blotting Southern name of the inventor of DNA Needed Nitrocellulose / nylon on DNA-DNA Autoradiogram	Tall Axial Purple Inflated Green Round Yellow Northern blotting Northern a misnomer RNA Not needed Amino benzyloxy methyl	Dwarf Terminal White Constricted Yellow Wrinkled Green Western blotting Western a misnomer Proteins Proteins Nitrocellulose	3

31.	S.NO	Missense mutation	Nonsense mutation		
	1.	The mutation where the codon for one amino acid is changed into a codon for another amino acid is called Missense mutations.	The mutations where codon for one amino acid is changed into a termination or stop codon is called Nonsense mutation.	3	
32.	 Intellectual property right (IPR). IPR is a category of property. It includes intangible creation of the human intellect, and primarily consists of copyrights, patents, and trademarks. It also includes other types of rights, such as trade secrets, publicity rights, moral rights, and rights against unfair competition. 				
33.	pBR 322	Hind III BamH amp ^R - Ampicillin Res	sistance Gene Resistance Gene	Dig - 2 Parts - 1	
34.		Part - all the questions Structure - Explanation	- IV	5 x 5=25	
		Raphe Raphe Nucellus Embryo s Hilum Micropyle Funicle Vascular	ac ac	Dig - 2	
34. (OR)	Totipote Different	The property of live plant cells that the nutrient medium to give rise to a completiation The process of biochemical and structure	by have the genetic potential when cultured in the individual plant. The real changes by which cells become specialized	2	
	>]	In form and function. Meristematic tissue into mature cells. The entiation		1	
	> 7 > 1 > 1	The reversion of mature cells to the neallus is called dedifferentiation. Mature cells into the meristematic tissue Formation of callus is called dedifferentiation.		1	
	> 7	rentiation The component cells of callus have the medium is called redifferentiation.	e ability to form a whole plant in a nutrient	1	

	Example: 4 o'	clock plant / Mirabilis	s jalapa	1		
	Explan	ation (OR) Diagram		3		
	Parent	$\mathbf{Red} \\ \mathbf{R}^1 \mathbf{R}^1$	White R^2R^2			
	Gametes	\mathbb{R}^1	R^2			
	$F_1 =$	R^1R^2 (pink c	colour)			
	F_1 (Selfed) =	R^1R^2	$x R^1R^2$			
	F ₂ =	Gametes R				
		R^1 R^1				
		R^2 R^1 Pir				
	Phenotypic Ra	tio : 1 : 2	2 : 1	1		
35.	Direct gene transfer m	ethod				
(OR)	Yes	4 e		1		
	Certain chemics		glycol (PEG) and dextran sulphate induce D)NA		
			grycor (1 EG) and dextrain surpliate induce E	7111		
	uptake into plant protoplasts. Microinjection					
	The DNA is directly injected into the nucleus using fine tipped glass needle or micro					
	pipette to transform plant cells.					
	Electroporation Methods					
			protoplasts, cells or tissues which makes trans	sient		
	pores in the plasmamembrane through which uptake of foreign DNA occurs.					
	Liposome mediated me		ster I vesicles are useful in gene transfer.			
	_		liposome into vacuole of plant cells.	4		
	_		usion resulted in gene transfer.			
		called lipofection.	solon resulted in gene transfer.			
	Biolistics					
			surface minute gold or tungsten particles (1-3			
		onto the target tissue	or cells using a particle gun. (Any 4 Metho	ids)		
36.	Gene mapping					
	The diagrammatic representation of position of genes and related distances between the adjacent genes is called genetic mapping.					
	Uses	ies is canted genetic if	apping.	2		
		etermine gene order.	, identify the locus of a gene and calculate	the		
	distances betwe		,			
	➤ It is useful in predicting results of dihybrid and trihybrid crosses.					
	_	eneticists to understa	and the overall genetic complexity of partic	cular 3		
	organism.					
36.	Characters of Anemop		enilra inflarescones			
(OR)		ulous, catkin like or s				
	 The perianth is absent or highly reduced. The flowers are small, colourless, not scented, do not secrete nectar. 					
			s are long, exerted and versatile.	5		
			s. compared to number of ovules available	for		
	pollination.) I 8-3111	1			
	pommunom.					

37.	Single cell protein (SCP).	
	The dried cells of microorganisms that are used as protein supplement in human foods	2
	or animal feeds are called Single cell proteins.	2
	Applications of Single-Cell Protein	
	➤ It is used as protein supplement.	
	➤ It is used in cosmetics products for healthy hair and skin.	
	It is used as the excellent source of proteins for feeding cattle, birds, fishes etc.	
	It is used in industries like paper processing, leather processing as foam stabilizers.	3
	It is used in food industry as aroma carriers, vitamin carrier, emulsifying agents to	
	improve the nutritive value of baked products, in soups, in ready-to-serve-meals, in	
	diet recipes. (Any 3 Points)	
37.		
(OR)	Inheritance of chloroplast gene Example : 4 O' Clock plant / Mirabilis jalapa	1
Oly		•
	Explanation (OR) Diagram	
	Pale Green Dark Green Pale Green	
	leaved Plant X leaved Plant leaved Plant X leaved Plant	
	(Male) (Female) (Male) (Female)	4
	F, Dark Green F1 Pale Green	
	leaved	
20		
38.	Applications of Plant tissue culture	
	Improved hybrids production through somatic hybridization.	
	Somatic embryoids produce synthetic seeds. These synthetic seeds help in	
	conservation of plant biodiversity.	
	> Production of disease resistant plants through meristem and shoot tip culture.	5
	> Production of stress resistant plants like herbicide tolerant, heat tolerant plants.	3
	Micropropagation technique to obtain both crop and tree species. It is useful in forestry	
	within a short span of time and all through the year.	
	Production of secondary metabolites from cell culture utilized in pharmaceutical,	
	cosmetic and food industries. (Any 5 Points)	
38.	Arabidopsis a suitable model plant for molecular genetic research	
(OR)		
•	Explanation	5
	(Any 5 Points)	
	(Any 5 Tollits)	