

Question Bank on Fundamentals of Plant Biotechnology (ASPB 2201)

S. NO	MCQ	Instructions (Choose the correct answer)	
1.		Critical factor that needs to be taken care of in PCR:	
	a)	Primer concentration	
	b)	Annealing temperature	
	c)	Prevention of primer dimerization	
	d)	All the above	YES
2.		Technique employed for the detection of Covid 19:	
	a)	RT PCR	YES
	b)	Asymmetric PCR	
	c)	Anchored PCR	
	d)	Microarray	
3.		Double digest involves digestion by:	
	a)	Two restriction enzymes	YES
	b)	One rare cutter and a frequent cutter	
	c)	Two frequent cutters	
	d)	Two rare cutters	
4.		Callus is:	
	a)	differentiated non-dividing mass of cells	
	b)	differentiated actively dividing mass of cells	
	c)	Undifferentiated non-dividing mass of cells	
	d)	Undifferentiated actively dividing mass of cells	YES
5.		Sterilization method used to sterilize media, glasswares and accessory equipments:	
	a)	Moist heat sterilization	YES
	b)	Dry heat sterilization	
	c)	Filter sterilization	
	d)	UV mediated sterilization	

6.		A nucleic acid probe is used to:		
	a)	Insert genes into a host cell		
	b)	Make DNA for gene cloning		
	c)	Find a nucleotide sequence	YES	
	d)	Cut pieces of DNA down to manageable size		
7.		In agarose gel electrophoresis:		
	a)	DNA migrates towards the negative electrode		
	b)	Supercoiled plasmid migrates slower than their nicked counterparts		
	c)	Larger molecules migrate faster than smaller molecules		
	d)	EtBr is used to visualize the DNA	YES	
8.		The substrate for restriction enzyme is:		
	a)	ss RNA		
	b)	partially ds RNA		
	c)	cell wall proteins		
	d)	ds DNA	YES	
9.		Enzymes widely employed in PCR:		
	a)	Invertases		
	b)	Lyases		
	c)	Ligases		
	d)	Polymerases	YES	
10.		A widely used surface disinfectant:		
	a)	Ethanol	YES	
	b)	SDS		
	c)	Phenol		
	d)	Chloroform		

11.		Cryopreservation involves preservation in		
	a)	Formalin		
	b)	Glycerol		
	c)	Ethanol		
	d)	Liquid nitrogen at -196°C	YES	
12.		An O.D. value of 2.2 indicates		
	a)	Contamination of proteins		
	b)	Contamination of RNA	YES	
	c)	Contamination of cellular debris		
	d)	Pure DNA		
13.		Widely employed restriction enzymes in gene cloning:		
	a)	Type II & Type III		
	b)	Type IV		
	c)	Type I		
	d)	Type II	YES	
14.		Periodic subculturing is required to prevent:		
	a)	the blackening of media		
	b)	fungal infestation		
	c)	limiting nutrient stress		
	d)	All the above	YES	
15.		Which among the following is true about Auxins and cytokinins:		
	a)	serve as growth regulators		
	b)	should be added in definite proportions		

	c)	Initiate the formation of roots and shoots		
	d)	All the above	YES	
16.		A plasmid is:		
	a)	Covalently closed circular DNA		
	b)	Found in bacteria & Yeast		
	c)	Widely employed gene cloning vehicle		
	d)	All of the above	YES	
17.		Ti plasmid contains:		
	a)	T DNA	YES	
	b)	r DNA		
	c)	mt DNA		
	d)	cp DNA		
18.		Enzymes widely employed in PCR:		
	a)	Invertases		
	b)	Lyases		
	c)	Ligases		
	d)	Polymerases	YES	
19.		Widely employed restriction enzymes in recombinant DNA technology:		
	a)	Type II & Type III		
	b)	Type IV		
	c)	Type I		
	d)	Type II	YES	
20.		An important feature that needs to be possessed by a molecular marker is:		
	a)	Co-dominant inheritance		
	b)	Polymorphism		
	c)	Even distribution		

	d)	All the above	YES	
21.		Which is a non PCR based marker?		
	a)	RFLP	YES	
	b)	AFLP		
	c)	VNTRs		
	d)	SSR		
22.		Father of plant tissue culture:		
	a)	Haberlandt	YES	
	b)	Frederick Sanger		
	c)	Winogradsky		
	d)	S. Nathans		
23.		Cryopreservation involves preservation in:		
	a)	DMSO		
	b)	Glycerol		
	c)	Ethanol		
	d)	Liquid nitrogen at -196 ⁰ C	YES	
24.		Vector-less method of gene delivery is:		
	a)	Microinjection		
	b)	Particle bombardment		
	c)	Electroporation		
	d)	All the above	YES	
25.		Plasmid containing a cos site is:		
	a)	Cosmid	YES	
	b)	Phagemid		
	c)	BAC		
	d)	PAC		
26.		Callus is:		
	a)	differentiated non-dividing mass of cells		

	b)	differentiated actively dividing mass of cells		
	c)	Undifferentiated non-dividing mass of cells		
	d)	Undifferentiated actively dividing mass of cells	YES	
27.		Genetically modified plants have been used for:		
	a)	Bioremediation		
	b)	Antigen production		
	c)	Synthesis of cry toxins		
	d)	All the above	YES	
28.		A multiple cloning site:		
	a)	Contains many copies of a cloned gene		
	b)	Allows flexibility in the choice of restriction enzymes for cloning	YES	
	c)	Allows flexibility in the choice of organism for cloning		
	d)	Contains many copies of the same restriction enzyme site		
29.		The substrate for restriction enzyme is:		
	a)	ss RNA		
	b)	partially ds RNA		
	c)	cell wall proteins		
	d)	ds DNA	YES	
30.		Plant tissue culture is important to study the factors controlling:		
	a)	Growth and differentiation		
	b)	Mutation, aging and production of biopharmaceuticals		
	c)	Both (a) and (b)	YES	
	d)	None of these		

31.		A cryptic plasmid		

	a)	Confers no property on the host	YES	
	b)	Lost after a period of time		
	c)	Nondegradative		
	d)	None of the above		
32.		Vector employed for c DNA cloning		
	a)	YAC		
	b)	PAC		
	c)	Bacteriophage		
	d)	P _{BLUESCRIPT}	YES	
33.		Which of the following forms of genetic engineering is the most common form?		
	a)	Insertion of a functional gene at an unspecified location in the host genome	YES	
	b)	Knocking out specific genes via engineered nuclease		
	c)	Gene targeting		
	d)	None of the above		
34.		Restriction enzymes widely employed in gene cloning		
	a)	Type II & Type III		
	b)	Type IV		
	c)	Type I		
	d)	Type II	YES	
35.		Sanger's method of DNA sequencing makes use of		
	a)	Monoclonal antibodies		
	b)	Synthetic primers		
	c)	Dideoxynucleotides	YES	
	d)	Radiolabelled probes		
36.		Which of the following classes of proteins are produced with molecular farming?		
	a)	Parental therapeutics		
	b)	Industrial enzymes		
	c)	Antigens for edible vaccines		

	d)	All of the above	YES	
37.		Curing refers to:		
	a)	Purification of a vector		
	b)	Engineering a vector		
	c)	Loss of a plasmid from a bacterium due to the absence of a selection pressure	YES	
	d)	Addition of replication origins to vectors		
38.		Genetic colonization refers to:		
	a)	Gene interaction		
	b)	Production of opines in the host	YES	
	c)	Production of acetosyringone		
	d)	The mechanism of transfer of genes		
39.		Vector-less method of gene delivery that makes use of microprojectiles		
	a)	Microinjection		
	b)	Particle bombardment	YES	
	c)	Electroporation		
	d)	All the above		
40.		Hairy roots serve as a source of:		
	a)	Secondary metabolites	YES	
	b)	Opines		
	c)	Primary metabolites		
	d)	Both a and c		
41.		A non PCR based marker is:		
	a)	RAPD		
	b)	RFLP	YES	
	c)	VNTR		
	d)	SCAR		

42.		A cloning vector consisting of cos site inserted in a plasmid which is used to clone DNA fragments of lambda phage is:		
	a)	Phagemid		
	b)	Cosmid	YES	
	c)	Plasmid		
	d)	YAC		
43.		A multiple cloning site		
	a)	contains many copies of a cloned gene		
	b)	Allows flexibility in the choice of restriction enzymes for cloning	YES	
	c)	Allows flexibility in the choice of organism for cloning		
	d)	Contains many copies of the same restriction enzyme site		
44.		Most genetically modified plants are generated by		
	a)	Biolistic method		
	b)	<i>Agrobacterium tumefaciens</i>		
	c)	lentivirus		
	d)	Both (a) and (b)	YES	
45.		Testing on GMOs on food and feed is routinely done by:		
	a)	DNA microarrays		
	b)	q PCR		
	c)	Both (a) and (b)	YES	
	d)	None of these		
46.		Which among the following GM crops is not developed by Monsanto?		
	a)	Bollgard		
	b)	Golden rice	YES	
	c)	Triple-stack corn		
	d)	Bt crops		
47.		Which of the following is an example of new generation marker system?		

	a)	Sequence tagged sites		
	b)	Single nucleotide polymorphism		
	c)	Short Tandem Repeats		
	d)	All of the above	YES	
48.		Which of the following statements regarding the findings of the human genome project is incorrect?		
	a)	Genetic screening of families for inheritable diseases may become possible		
	b)	A large amount of the human genome contains DNA sequences that do not code for cell protein		
	c)	97% of the human genome is made up of support DNA that functions in chromosome stabilizing and division, gene regulation and ribosome assembly		
	d)	Human chromosomes are capable of “walking”	YES	
49.		Why does the environmental protection agency closely monitor the release of transgenic bacteria used for agricultural purposes?		
	a)	They want to monitor the destruction of crops by the GMOs		
	b)	They want to observe the effect of GMOs on crops		
	c)	They want to ensure that GMOs do not proliferate in the environment and pose a threat to humans		
	d)	They want to ensure the people that GMOs have played a role in the production of a particular food product		
50.		Blue-white screening is used to:		
	a)	Reveal the identity of a cloned DNA fragment		
	b)	Express the product of a cloned gene		
	c)	Test the presence of a plasmid in bacteria		
	d)	Test for the presence of a cloned insert in a plasmid	YES	
51.		Which is a palindromic sequence?		
	a)	5'-ACGGATTCGC-3'		

	b)	5'-ATG-3'		
	c)	5'-CCATT-3'		
	d)	5'-AGGCCT-3'	YES	
52.		The first recombinant crop approved for sale in the U.S		
	a)	Flavr Savr tomato	YES	
	b)	Bt cotton		
	c)	Bt Brinjal		
	d)	Bt tobacco		

S. No.	TXT	Instructions (Fill in the Blanks)		
1		An important property of restriction endonucleases is : site specificity		
2		DBT stands for: department of biotechnology		
3		The ability by which plant cells can regenerate giving rise to the total plant: totipotency		
4		Crown gall tumour is caused by: <i>Agrobacterium tumefaciens</i>		
5		A cytoplasmic hybrid is: cybrid		

S.No.	MATCH	Left side	Right side	
	1	DNA fingerprinting	Forensic analysis	
	2	Polyethylene glycol	Fusogen	
	3	Auxins & cytokinins	Plant growth regulators	

	4	Protoplast	Cell without cell wall	
	5	NBPGR	Plant germplasm repository	

I. Explain the following terms very briefly:

- a. Plasmid
- b. Primer
- c. Protoplast
- d. Totipotency
- e. Reverse transcription

II. Expand the abbreviations:

- a. DBT, b. NBPGR, c. CDFD, d. NRRI, e. SSR, f. CSIR, g. NIPGR, h. DST, i. rDNA, j. RFLP, k. RAPD, l. VNTRs

III. Fill in the blanks:

- a. Blotting technique used for DNA is (Eastern, Southern)
- b. Thermal cycler is a machine in which is carried out. (PCR, Blotting)
- c. Cryopreservation involves the usage of (liquid nitrogen at -196°C, vapour nitrogen at -150°C)
- d. An example of a natural vector is (Ti plasmid, pUC 8)
- e. The process of development of structures like root, shoot, flower, buds etc .is called (differentiation, organogenesis)
- f. A hormone that initiates rooting is
- g. Widely employed media in plant tissue culture is
- h. Father of biotechnology is
- i. Marker widely employed in biodiversity studies is
- j. An example of a commonly used cytokinin is
- k. The loss of a plasmid from a bacterial cell due to the absence of selection pressure is called

IV. State whether the following statements are true or false:

- A balanced ratio between auxin to cytokinin is required during the induction of callus.
- Hardening is not required for invitro raised plantlets.
- *Agrobacterium* is a potential bacterium used in agricultural biotechnology.
- Cybrids are cytoplasmic hybrids.
- The pH of media used in plant tissue culture should be maintained around 7.2-7.4.

V. Match the following:

- | | |
|---------------------------|---|
| • a. Callus | (i) Site specificity |
| • b. RFLP | (ii) Vectorless method of gene delivery |
| • c. NAA | (iii) Isoschizomers |
| • d. Anther culture | (iv) An unorganized mass of cells |
| • e. Particle bombardment | (v) Root stabilizing media |
| | (vi) Haploid culture |
| | (vii) Molecular marker |

VI. Short Answer Type Questions:

- What role do growth regulators play in plant tissue culture media?
- Give a brief note on the scopes offered by plant tissue culture.
- What is cryopreservation? Give few examples of cryoprotectants.
- What is protoplast? Suggest two advantages associated with the use of protoplasts.
 - Briefly explain the principle of autoclaving.
 - What are restriction endonucleases?
 - What are the factors that contribute to the subculturing of the media?

VII. Long Answer Type Questions:

- a. What are restriction endonucleases? Mention the source and the roles played by it in gene cloning.
- b. What are molecular markers?. Describe the steps involved in the construction of RAPD marker.
- c. What are transgenic plants? How do they serve as bioreactors?
- d. What is somaclonal variation? Add a note on the factors contributing to it.
- e. What is gene cloning? Briefly explain the steps invoved in it.
- f. Describe the genetic organization of Ti plasmid.

- g. What is DNA fingerprinting? Briefly explain the role of this technique in forensic investigation.
- h. What is media? Explain briefly the composition of a tissue culture media studied by you.
- i. What is somatic hybridisation? Suggest the advantages associated with the technique.
- j. Briefly explain a vectorless method of gene delivery studied by you.
- k. Suggest two methods available for the isolation of protoplasts.
- l. What is micropropagation? Add a note on the stages associated with it.
- j. Suggest two methods for the fusion of protoplasts?
- k. What is biotechnology? How has it enriched the sphere of biological sciences?
- l. What is blotting? Briefly describe the technique of Southern blotting and its importance.