

Subject: **Botany**
Paper name: **Plant Biotechnology and Experimental Embryology**
Paper No: **XII (Bot/VI/CC/23)**
Semester: **VI Semester**

A. Multiple choice questions [25 (5 from each unit)]

Unit 1

1. Ligases repair broken
 - a) phosphodiester bonds
 - b) glycosidic bonds
 - c) hydrogen bonds
 - d) all of the above
2. What type of restriction endonuclease is used in genetic engineering
 - a) type I
 - b) type II
 - c) type III
 - d) type IV
3. The first step in a PCR cycle involves
 - a) primer annealing
 - b) primer extension
 - c) denaturation
 - d) renaturation
4. The methyl transferase encoded by the *dam* gene modifies the sequence GATC at the base
 - a) guanine
 - b) adenine
 - c) thymine
 - d) cytosine
5. The plasmid vector pBR322 has resistance for the antibiotic
 - a) ampicillin
 - b) kanamycin
 - c) penicillin
 - d) streptomycin

Unit 2

6. A popular example of a reporter gene is
 - a) *gfp* gene

- b) *crtI* gene
 - c) *cryIAb* gene
 - d) *cryIAc* gene
7. An enzyme capable of synthesizing DNA from an RNA template is
- a) RNA polymerase
 - b) DNA polymerase
 - c) reverse transcriptase
 - d) all of the above
8. The section of a Ti plasmid integrated into the host DNA is the
- a) *vir* region
 - b) origin of replication
 - c) T-DNA region
 - d) the whole Ti plasmid
9. Which of the following method of gene transfer involves a microprojectile coated with DNA
- a) gene gun method
 - b) electroporation
 - c) microinjection
 - d) *Agrobacterium* mediated gene transfer
10. Which of the following organism is called '*nature's genetic engineer*'
- a) *Escherichia coli*
 - b) *Bacillus thuringiensis*
 - c) *Thermus aquaticus*
 - d) *Agrobacterium tumefaciens*

Unit 3

11. In tissue culture medium, agar is used to
- a) adjust the *pH* of the medium
 - b) sterilize the medium
 - c) solidify the medium
 - d) induce cell division
12. Explants can be sterilized with the help of
- a) membrane filter
 - b) hot air oven
 - c) alcohol
 - d) sodium hypochlorite

13. The hydrogel commonly used for encapsulation of synthetic seed is
- sodium hypochlorite
 - sodium alginate
 - sodium chloride
 - sodium bicarbonate
14. Totipotency is the potential of a single cell to form a
- callus
 - vascular system
 - whole organism
 - none of the above
15. Cryoprotectants prevent damage caused to cells during
- freezing only
 - thawing only
 - both freezing and thawing
 - none of the above

Unit 4

16. The transgenic plant which has been transformed with *cryIAc* gene is
- Golden Rice
 - Bt cotton
 - Flavr Savr tomato
 - Endless Summer tomato
17. What is the first genetically modified crop approved for human consumption
- Bt brinjal
 - Flavr Savr tomato
 - Endless Summer tomato
 - Golden Rice
18. In Golden Rice the *phytoene synthase(psy)* gene is derived from
- Narcissus pseudonarcissus*
 - Erwinia uredovora*
 - Bacillus thuringiensis*
 - Oryza sativa*
19. Antisense RNA technology has been used for the production of
- Roundup Ready cotton
 - Bt cotton
 - Endless Summer tomato
 - Flavr Savr tomato

20. A plantibody is produced by transgenic plants modified with
- a) bacterial DNA
 - b) fungal DNA
 - c) animal DNA
 - d) plant DNA

Unit 5

21. Protoplast are the cells devoid of
- (a) Cell membrane
 - (b) Cell Wall
 - (c) Cytoplasm
 - (d) Nucleus
22. Somatic hybridization is achieved through
- (a) Anther culture
 - (b) Embryo culture
 - (c) Cell fusion
 - (d) Protoplast fusion
23. Synthetic seed is produced by encapsulating somatic embryo with
- (a) Sodium chloride
 - (b) Sodium alginate
 - (c) Sodium nitrate
 - (d) Sodium acetate
24. Cybrids are produced by
- (a) Fusion of two different nuclei from two different species
 - (b) Fusion of two different nuclei from same species
 - (c) Nucleus of one species but cytoplasm from both the parent species
 - (d) None of the above
25. Hormone pair required for a callus to differentiate are
- (a) Auxin and cytokinin
 - (b) Auxin and ethylene
 - (c) Auxin and gibberellin
 - (d) Cytokinin and gibberellin

B. Fill up the blanks [15 (3 from each unit)]

Unit 1

1. In PCR, the heat induced separation of DNA strand is called _____.
2. Some restriction enzymes make a staggered cut resulting in single stranded overhangs known as _____ ends.
3. _____ vectors are vectors which have the characteristics of both plasmid and phage λ .

Unit 2

4. The T-DNA region of a Ti plasmid is flanked by left and right _____ repeats
5. The *gus* gene is used in genetic engineering as a _____ gene.
6. J Sanford *et al* invented the _____ method of gene transfer

Unit 3

7. Cryopreservation can be done in liquid Nitrogen at a temperature of _____.
8. _____ is a tissue arising from a disorganized proliferation of cells.
9. Sterilization can be done in an autoclave at _____ psi at a temperature of 121⁰C

Unit 4

10. The *cryIAc* gene in Bt cotton is from the organism _____
11. Virus free plants can be obtained from regenerating plants from the _____ which are generally free of infection
12. Ingo Potrykus and Peter Beyer created a genetically modified plant known as _____

Unit – 5

- 13 _____ is an excised piece of leaf, stem, or any part of plant use in micropropagation.
14. Cell division in the explant forms a _____
15. The ability of plant cells to regenerate into complete plants is called _____

Key Answers

A. Multiple choice questions

1. a)
2. b)
3. c)
4. b)
5. a)
6. a)
7. c)
8. c)
9. a)
10. d)
11. c)
12. d)
13. b)
14. c)
15. c)
16. b)
17. b)
18. a)
19. d)
20. c)
21. b)
22. d)
23. b)
24. c)
25. a)

B. Fill up the blanks

1. denaturation
2. sticky
3. cosmid
4. border
5. reporter
6. gene gun
7. -196°C

8. callus
9. 15
10. *Bacillus thuringiensis*
11. meristem
12. Golden Rice
13. Explant
14. Callus
15. Totipotency