Subject: **Botany**
Paper name: **Plant Biotechnology, Experimental Embryology**
Paper No: **BOT/VI/CC/23**
Semester: **6th Semester**

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

1. PCR reaction requires
   a) A DNA segment
   b) Heat stable polymerase
   c) Two oligonucleotides primer
   d) All of the above

2. Restriction enzymes
   a) are present in bacteria and are involved in host restriction system
   b) are called molecular scissor
   c) can cleave viral DNA
   d) All of the above

3. Enzymes required in recombinant DNA technology are
   a) Restriction enzymes
   b) Polymerases
   c) Ligase
   d) all of the above

4. Select the incorrect sentence about plasmid
   a) It is double stranded
   b) It is extrachromosomal
   c) Its replication depends on host cell
   d) It is closed and circular DNA

5. Which enzyme is used to join together two different types of DNA molecules?
   a) Protease
   b) Endonuclease
   c) Methylase
   d) Ligase

6. Which of the following enzyme is responsible for making a DNA copy from RNA
   a) DNA transcriptase
   b) DNA polymerase

c) DNA ligase
d) RNA polymerase

7. Which of the following statements is correct?
   a) Recombinant plasmid contains a drug resistant gene
   b) The cells with no recombinant plasmids are drug resistant
   c) Plasmid replication is dependent on host cell's division
   d) all are correct

8. Which of the following is a mismatch?
   a) Polymerase – Taq polymerase
   b) Template – double stranded DNA
   c) Primer – oligonucleotide
   d) Synthesis – 5' to 3' direction

9. Which technique is used to introduce genes into dicots?
   a) Electroporation
   b) particle acceleration
   c) microinjection
   d) Ti plasmid infection

10. Ti plasmid that is used as a plant vector is obtained from
    a) *Agrobacterium tumefaciens*
    b) *Agrobacterium radiobactor*
    c) *Agrobacterium rhizogenes*
    d) *Thermus aquaticus*

11. Ability of single cells to divide and produce all the differentiated cell in the organism is
    a) Unipotent
    b) Pluripotent
    c) Multipotent
    d) Totipotency

12. Which of the following is NOT a plant growth regulator?
    a) Auxin
    b) Cytokinins
    c) Abcisic acid
    d) Polyphenols

13. What do you mean by sterilization?
    a) Purification of products
    b) Recovery of products
    c) Elimination of contamination
    d) Formulation of media

14. DMSO (dimethyl sulfoxide) is used as
    a) Gelling agent
    b) Alkylating agent
    c) Chelating agent
    d) Cryoprotectant

15. The process of expression of foreign genes in a plant is called
    a) Gene expression
    b) Transgenesis
    c) Genetic transformation
    d) Cell hybridization

16. Those organisms with a gene or genetic construct of interest that has been introduced by molecular or recombinant DNA techniques are called
    a) Wild type
    b) Mutants
    c) Herbicide tolerant
    d) Transgenics

17. Bt cotton is a genetically modified plant which produces
    a) rodenticides
    b) bactericides
    c) insecticides
    d) herbicides

18. WideStrike^{TM} technology by Dow Agrosciences is associated with
    a) fibre modification
    b) insect resistance
    c) herbicide tolerance
    d) resistance to abiotic stress

19. Transgenic tomato ripe slower due to the antisense gene encoding the enzyme
    a) phytase
    b) polygalacturonase

c) ribozyme
d) lipase

20. In golden rice, the 20 carbon compound Geranylgeranyl diphosphate (GGDP) is converted to a 40 carbon compound Phytoene by the action of the enzyme
    a) phytoene synthase
    b) phytoene desaturase
    c) lycopene β-cyclase
    d) carotene desaturase

21. Cybrids have
    a) Nucleus from one parent, cytoplasm from both parents
    b) Nucleus from both parents, cytoplasm from one parent
    c) No nucleus, cytoplasm from one parent
    d) No nucleus, cytoplasm from both parents

22. Induced fusion method of protoplast fusion requires compounds like polyethylene glycol (PEG) to serve as a
    a) callus
    b) fusogen
    c) suspension medium
    d) buffer

23. Micropropagation may be done using
    a) Axillary budding
    b) Adventitious shoots
    c) Somatic embryogenesis
    d) All of the above

24. The first attempt to grow the embryos of angiosperms was made by
    a) Hanning (1904)
    b) Ingo Potrykus (1999)
    c) Murashige and Skoog (1962)
    d) Haberlandt (1902)

25. Protoplasts isolation by using cell wall degrading enzymes was done in plants for the first time by
    a) Kotte (1922)
    b) Stewart and Reinert (1958)
    c) Cooking (1960)
    d) Zaenen (1974)

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

1. The growth of plant tissues in artificial media is called _____
2. Use of very low temperatures to preserve the cells and tissues that are structurally intact is called _____
3. _____ is used as a solidifying agent for media
4. _____ is an example of reporter gene
5. _____ is a thermo stable polymerase.
6. _____is an enzyme that adds a methyl group to newly synthesized DNA to protect it from restriction activity.
7. An unorganized actively dividing mass of cell maintained on culture media is called_____.
8. Polymerase chain reaction (PCR) was developed by _____
9. Restriction enzymes recognizes a _____ and makes one cut in the DNA.
10. Buctril® and Roundup Ready® cotton are transgenics that show _____ resistance
11. The term _____ was created to describe the products of plants that have been genetically engineered to express antibodies and antibody fragments in plants.
12. Rice which is genetically enriched, i.e., bio-fortified with pro-vitamin A has been described as _____
13. _____ is the practice of rapidly multiplying stock plant material to produce a large number of progeny plants, using modern plant tissue culture methods.
14. _____ is a cell that lacks cell wall but contain nucleus and cytoplasm
15. Embryos are excellent materials for _____ clonal propagation.

Key Answers

A. Multiple choice questions

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

B. Fill up the blanks

1. Plant tissue culture
2. Cryopreservation
3. Agar
4. lacZ
5. Taq polymerase
6. DNA methylase
7. Callus
8. Karry Mullis
9. Specific sequence/ recognition sequences
10. herbicide
11. Plantibodies
12. Golden Rice
13. Micropropagation
14. Protoplast
15. *in vitro*