

B.Sc. Botany [C.B.C.S. Curriculum]  
Paper = C-14, Subject = Plant Biotechnology

Group A (Very short questions (1 mark))

(1)(a) Basic principle of plant tissue culture is \_\_\_\_\_.

(b) Define protoplast \_\_\_\_\_.

(c) Explant used for production of haploid plants are \_\_\_\_\_ and \_\_\_\_\_.

(d) Endospore culture is used for production of \_\_\_\_\_ plant.

(e) Temperature of liquid nitrogen is \_\_\_\_\_.

(f) \_\_\_\_\_ is used for coating somatic embryos for production of synthetic seed.

(g) Give two examples of secondary metabolites \_\_\_\_\_ and \_\_\_\_\_.

(h) Generally, used media for plant tissue culture is called MS and S \_\_\_\_\_.



(I) Example for one synthetic and one natural auxin — and — .

(J) — is used for production of virus free plant.

(K) Hybrids where nucleus is derived from one parent and cytoplasm is derived from both the parents it is called — .

(L) Give example for two sterilizing agents used for sterilization of explant — and — .

(M) — and — two enzymes used for protoplast isolation.

### Answer Key

(a) Totipotency (b) Plant cell without cell wall (c) Anther and pollen

(d) Triploid (e)  $-196^{\circ}\text{C}$  (f) Sodium alginate

(g) Terpenoid and Alkaloid (h) Murashige and Skoog.

(i) 2, 4, D and IAA.

(j) Meristematic culture

(k) Cybrid.



(L) Sodium hypochloride and Mercuric chloride.

(M) Cellulase and pectinase.

Unit 7 (Group B)

each question carries 05 marks.

(1) List out the components of MS media?

(2) What is cellular totipotency give experimental proof behind this concept?

(3) What is micropropagation explain the various steps of micropropagation?

(4) Describe available methods for isolation and purification of protoplast?

(5) Describe the methods used for induction of protoplast fusion?

(6) Describe different methods for the production of haploid?

(7) List out applications of hybrid plants?

(8) Explain different steps involved in the production of haploid plants using anther culture?

(9) What is cryopreservation?



## Unit II - Recombinant DNA Technology

(a) PBR322, P \_\_\_\_\_, Br \_\_\_\_\_

(b) Give example for E. coli plasmid based vector system.

(c) Size of Ti plasmid is \_\_\_\_\_

(d) Disarmed Ti plasmid is vector system it is of two types \_\_\_\_\_ and \_\_\_\_\_

(e) YAC stands for \_\_\_\_\_

(f) If we want to clone single standard DNA vector system can be used.

(g) Causative agent for crown gall disease is \_\_\_\_\_

(h) Hairy root disease is caused by \_\_\_\_\_

(i) Components / genes present in T-DNA is \_\_\_\_\_



(I) Opine is derived from

Answer Key:-

- (a) plasmid, Bolivar and Rodriguez
- (b) PUC18 (c) more than 200 kb
- (d) Binary, co-integrated
- (e) yeast artificial chromosome
- (f) M13 phage
- (g) Agrobacterium tumefaciens
- (h) Agrobacterium schizogenes.
- (i) cytokinin synthesizing gene, Auxin synthesizing gene and opine synthesizing gene.
- (j) Amino acid.

Unit II (Part B) Short answer questions)  
as marks.

(1) Explain molecular events for transfer of T-DNA from Agrobacterium to plant?

(2) Explain one in planta method of Agrobacterium?

(3) Explain leaf disc method of Agrobacterium?

(4) What is reporter gene or marker gene. give two examples of selection methods?



(5) Different types of disarmed Ti plasmid based vector systems

(6) Describe the structure of Ti plasmid with particular emphasis on T-DNA structure.

(7) with a suitable diagram explain the structure of pUC18?

(8) what is BAC?

(9) what is restriction endonuclease explain different classes of restriction endonuclease?

(10) list out two differences between cloning and expression vector



Unit - III (Short answer question)  
1 mark questions :-

- (a) DNA formed by using RNA as a template is called \_\_\_\_\_.
- (b) Source of GFP gene is \_\_\_\_\_.
- (c) Full form of PCR is \_\_\_\_\_.
- (d) DNA polymerase used in PCR is called \_\_\_\_\_.
- (e) Give example for any two marker genes \_\_\_\_\_ and \_\_\_\_\_.
- (f) LacZ gene codes for an enzyme called \_\_\_\_\_.
- (g) Biolistics method of gene transfer is also called as \_\_\_\_\_.
- (h) Any two physical methods of gene transfer is \_\_\_\_\_ and \_\_\_\_\_.



- (J) cells which are capable of undergoing transformations are called competent cells.
- (K) ~~Two~~ Two types of probes used in PCR (T/F)
- (L) ~~c-DNA~~ c-DNA is intron free DNA (T/F)
- (M) Restriction endonuclease give always blunt end DNA (T/F)
- (N) pBR322 is E. coli plasmid based vector system (T/F).

Answer key -

- (a) c-DNA (b) Acetabularia victoria  
 (c) Polymerase chain reaction  
 (d) Tag, est esterase (lux) and Neomycin phosphotransferase  
 (e)  $\beta$ galactosidase (g) Microprojectile



(h) Microprojectile and microinjection

(i) T, (j) Competent cells. (k) T

(l) ~~TRUE~~ (L) T (M) F (N) T

Part B (05 marks questions).

(1) Explain the basic steps of PCR?

(2) What is c-DNA library?

(3) What are different types of PCR?

(4) List out the applications of PCR in Genetic Engineering.

Unit-4 (Methods of gene transfer)

State T/F

(a) Co-culturing method is not used for Agrobacterium mediated transformation (T/F)

(b) Physical method of gene transfer

(c) Phenolic signals produced by plant cells for Agrobacterium is called



(d) Small pulse of electric current is used as a mode of transformation is called \_\_\_\_\_.

(e) Give example for two powerful promoters \_\_\_\_\_.

(f) Give example for one implantation technique for Agrobacterium \_\_\_\_\_.

(g) Full form of GFP is \_\_\_\_\_.

(h) There are two types of Ti plasmid based vector systems \_\_\_\_\_ and \_\_\_\_\_.

(i) Agrobacterium mediated transformation is called as \_\_\_\_\_.

(j) Opine is derivative of \_\_\_\_\_.



Date: / /

### Answer key -

- (a) F (b) microprojectile. (c) Acetobacterium  
(d) Electroporation. (e) CamVASS and CamVAS  
(f) Co-culturing (g) Green fluorescent  
proteins. (h) Binary and co-integrat  
(i) Agroinfection (j) Amino acid.

### Part B (OS master questions)

- (1) Describe co-integrated and binary vector system?
- (2) What is reporter gene give two examples?
- (3) Write a short note on ciruse mediated transfer.
- (4) Explain  $\phi$  microinjection?
- (5) What is electroporation?
- (6) What is Agroinfection? ~~and~~ ~~and~~
- (7) What is leaf disc method of gene transfer?



## Unit 5

### Short answer questions:-

(p) Stress due to non living component of ecosystem is called as \_\_\_\_\_.

(b) Give example for biotic stress

(c) Full form of BT is \_\_\_\_\_.

(d) \_\_\_\_\_ plant is called queen of plant genetics.

(e) Edible vaccine give

example transgenic tobacco.



Answer Key: -

(a) Abiotic (b) Insects (c) Bacillus

(d) Arabidopsis thaliana.

(e) Transgenic tobacco.

part - B

(1) How Bt. Cotton is produced?

(2) List out Advantages of Bt  
transgenic plants?

(3) What are the disadvantages of  
transgenic plants?

(4) Write a short note of herbicide  
resistance.

(5) What is Satellite RNA and  
its role in production of  
virus resistant plant?

(6) What is golden rice?

(7) Explain flavor sensor tomato.?

(8) What is Edible vaccine?