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3 (Sem-6/CBCS) BOT HC 2

2022

BOTANY

(Honours)

Paper : BOT-HC-6026

(Plant Biotechnology)

Full Marks : 60

Time : Three hours

**The figures in the margin indicate
full marks for the questions.**

1. Answer **any seven** of the following :

1×7=7

- (a) Who invented PCR technique in 1985 ?
- (b) Define phagemids.
- (c) Is GUS a Reporter gene ?
- (d) What is somaclonal variation ?
- (e) What kind of plant growth regulator can be used in plant tissue culture technique ?

Contd.

- (f) The term 'restriction endonuclease' was coined by ___ and ___ (1964) to describe the nuclease enzymes that destroy ('restrict') any foreign DNA entering the host cell. *(Fill in the blanks)*
- (g) ___ utilizes overlapping fragments of a particular chromosome to isolate gene of interest which may be present upstream and downstream from the original DNA fragment. *(Fill in the blanks)*
- (h) What do you understand by 'gene construct' ?
- (i) The use of very low temperatures to preserve structurally intact living cells and tissues is known as _____. *(Fill in the blanks)*
- (j) Mention *at least one* feature of a type II restriction enzyme useful in recombinant DNA technology.

2. Answer very briefly **any four** of the following :
2×4=8

- (a) What are retroviruses ?
- (b) Define organogenesis.
- (c) "The plasmids are named on the basis of certain criteria." Explain by citing an example.
- (d) What are the *two* aspects that are considered while using a cosmid for gene cloning in *E.coli* ?

- (e) Why is selectable marker very essential ?
- (f) What is the role of media in plant tissue culture ?
- (g) What are shuttle vectors ?
- (h) What is the purpose of microinjection ?

3. Answer **any three** of the following : $5 \times 3 = 15$

- (a) Advantages of germplasm storage
- (b) Role of transgenics in bio-remediation
- (c) Application of restriction endonucleases
- (d) Distinction between yeast artificial chromosomes (YACs) and bacterial artificial chromosomes (BACs) vectors.
- (e) Ti plasmid
- (f) Totipotency
- (g) cDNA library
- (h) Gene therapy

4. Answer **any three** of the following :

$10 \times 3 = 30$

- (a) What are haploid plants ? Give an account of different methodologies that could be employed for production of haploid plants. State their applications.

$2 + 6 + 2 = 10$

- (b) What is protoplast fusion ? Discuss the techniques involved in protoplast isolation, purification and fusion. $2+8=10$
- (c) What are genetically modified crops ? Discuss their advantages and disadvantages. $2+4+4=10$
- (d) "Transgenic plants are plants whose DNA is modified using genetic engineering techniques." Explain the steps involved in the production of transgenic plants.
- (e) Describe in detail the direct methods of gene transfer by electroporation and microprojectile bombardment. $5+5=10$
- (f) What is PCR ? What are the requirements of PCR ? Add a note on the applications of PCR. $2+5+3=10$
- (g) "Vectors are the DNA molecules that act as a vehicle for carrying a foreign DNA fragment when inserted into a host cell." Explain with the help of examples. Discuss about pUC 18, pUC 19, and pBR322.
- (h) Which media is commonly used in plant tissue culture ? Describe the process involved in the preparation of tissue culture media.