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3 (Sem-6/CBCS) BOT HC 2

2023

**BOTANY**

(Honours Core)

Paper : BOT-HC-6026

**(Plant Biotechnology)**

Full Marks : 60

Time : Three hours

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

1. Fill in the blanks : 1×7=7

(a) Molecules having new combination of sequences that were not present before are called as \_\_\_\_\_.

(b) A single stranded, radiolabelled molecule of nucleic acid is called as \_\_\_\_\_.

(c) Golden rice is a bioengineered crop with yellow coloured endosperm that contains \_\_\_\_\_.

Contd.

- (d) Digestion of DNA using two restriction enzymes in a single reaction is called as \_\_\_\_\_.
- (e) The two antibiotic resistant genes of vector p<sup>BR322</sup> imparts resistance against \_\_\_\_\_ and \_\_\_\_\_.
- (f) \_\_\_\_\_ is the first commercially produced human hormone using r-DNA technology.
- (g) \_\_\_\_\_ vectors are designed to replicate in cells of two different host species.

2. Answer the following very briefly : 2×4=8

- (a) What is the role of DMSO in cryopreservation ?
- (b) What are cosmids ?
- (c) What is the source of Luciferase gene ?
- (d) State the difference between somatic and zygotic embryogenesis.

3. Answer **any three** of the following : 5×3=15

- (a) Discuss the practical applications of somatic embryogenesis.
- (b) Write a note on Lambda phage vector.

- (c) Describe an engineered DNA molecule used to clone DNA sequences stating the common gene components present in it.
- (d) What is an adaptor molecule ? How does it differ from linkers ?
- (e) Why thermostable polymerase is used in PCR ? Mention *one* disadvantage of taq polymerase.

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

10×3=30

- (a) What are restriction endonuclease enzymes ? Describe the specific properties of type I and type II restriction endonucleases enzymes. Why are they so important for recombinant DNA technology ?  
1+6+3=10
- (b) Describe various steps for the construction of cDNA library.
- (c) Discuss elaborately the direct methods of gene transfer by electroporation and microinjection.  
5+5=10
- (d) What are organic supplements ? Give an account of organic supplements used in tissue culture media.

(e) What are secondary metabolites ? Describe a tissue culture strategy for the production of secondary metabolites.

(f) Give an account of role of transgenics in bioremediation.