

Q.4. Answer ANY ONE of the following

- a. *In-vitro* culture of plants has an advantage over *in-vivo* culture. Explain the importance of *in-vitro* culture of plant tissue and write a note on the different types of explants used in *in-vitro* propagation. (6)
- b. Somaclonal variations occur as a result of genetic heterogeneity in plant tissue cultures. Write a note on three types of selection systems involved in the isolation of somaclonal variants. (6)

OR

- a. Plant tissue culture is carried out in a sterile environment. Explain the ideal set-up of a plant tissue culture laboratory. (6)
- b. Production in high-yield of a naphthoquinone by a hairy root culture of *Lithospermum erythrorhizon* is an important landmark. Write a note on hairy root system and its characteristics. (6)

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