A 301

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2005.

Fifth Semester

Industrial Biotechnology

IB 035 – PLANT BIOTECHNOLOGY

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List DNA manipulating and modifying enzymes and their use in Genetic Engineering.

2. What are selectable markets in rDNA technology? Write two selectable markers for plasmid, yeast, plant and mammals.

3. What are helper plasmids? Give their role in bacmid vector system.

4. What are the methods by which plant cell can be transformed?

5. Give the major classification of plan viruses with example.

6. What is SAR (Systemic Acquired Resistance)?

7. Which genes are the target to increase the shelf life of Tomato?

8. Write the applications of hydrogenase genes.

9. What are the role of osmo-protectants in transgenesis for abiotic stress tolerance?

10. Give the role of ribozymes in transgenics.

PART B — (5 × 16 = 80 marks)

11. (i) Why the natural Ti plasmid can not be used as a vector? How will you rectify/modify to develop into a suitable plant gene cloning vector? (8)

(ii) What are reporter genes? Give few examples and the one present in co-integrate *Agrobacterium* vector. Give the detailed structure and mechanism of co-integrate and binary *Agrobacterium* vectors. (8)

12. (a) (i) Give the structure of a plant/eukaryotic gene and label the regulatory elements. (8)

(ii) How plant genes are regulated? (8)

Or

(b) Give a detailed account of factors that affect transcription initiation, elongation and termination of an eukaryotic gene. (16)

13. (a) (i) Write the nodulation gene products of Rhizobium and their function. (8)

(ii) Explain how nodulation genes can be engineered. (8)

Or

(b) What are Nif genes where do you find them? How they are regulated? Can you engineer a plant to fix nitrogen. (16)

14. (a) (i) Natural disease resistance pathways

(ii) Cellular response to pathogen attack explanation with figure

(iii) Describe the factors influencing resistance and susceptibility.

(iv) Recognition dependent disease resistance. (4 × 4 = 16)

Or

(b) (i) Elaborate the strategies for engineering herbicide resistance. (8)

(ii) Give an example for transgenic crop development for herbicide resistance and the approach used in it. (8)

15. (a) (i) What is (PDR) Pathogen derived resistance? How PDR and RNA interference is used to develop virus resistant plants? (8)

(ii) Give the structure of TMV genome. What are the various proteins produced? (8)

Or

(b) (i) What are cry proteins do they have a common structure if so explain it and write about the various cry proteins and their toxicity insects. (8)

(ii) How Bt toxin is exploited to develop American bollworm resistant cotton. (8)
