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MID SEMESTER EXAMINATION-2015

B.Tech VI th Semester

COURSE CODE: 10B11BT513 **MAX. MARKS: 30**

COURSE NAME: Food and Agricultural Biotechnology

COURSE CREDITS: 04 **MAX. TIME: 2 HRS**

Note: All questions are compulsory.

Section A (Marks: 0.5X12=6)

Q. 1

i. Putrefaction is degradation of proteins via aerobic/anaerobic pathway? Give an example of bacterial species involved.

ii. Which pasteurization treatment does not need any additional barrier? Why?

iii. Milk itself contains antimicrobial agents. (T/F). Justify your answer.

iv. What are the different methods to reduce the water activity in foods?

v. What is role of *Agrobacterium* chromosomal genes in its ability to cause infection?

vi. How opine synthase region of T-DNA provide an advantage to *Agrobacterium*?

vii. Name the insect orders that cause crop damage to major crops worldwide.

viii. Enzyme___ is inhibited by herbicide glyphosate as it binds more tightly with it in comparison to its substrate _____.

ix. Enzyme _____ isolated from a soil organism _____ degrade glyphosate to ____.

x. ____ is activator of *vir* gene___ product which activate ____ product which ultimately act as transcriptional inducer of other virulence gens of Ti plasmid.

xi. Which property of virulence region of T-DNA was exploited in construction of binary vectors?

xii. Mention any three specific reasons which contributed towards rapid development and adoption of herbicide resistant crops.

Section B (Marks: 3X3= 9)

Q.2 Nutrient composition of various types of food items as listed in the following table:

Food item	Water (%)	Fat (g/100g)	Protein (g/100g)	Carbohydrate (g/100g)
A	95.0	10.0	10.0	80
B	45.0	20.0	60.0	20.0
C	10.0	10.0	15.0	75.0

a. Classify the different food materials in order of their susceptibility to spoilage.

b. Which one of the food items is more perishable than the others? Give reasons to support your answer.

Q.3 You have been asked to work in the apple juice industry. What kind of hurdles you would like to use to extend the shelf life of apple juice?

Q.4 Assume that you are the president of a plant breeding company and want to improve one of your lead elite crop variety. The variety is very popular as it has maximum desirable

agronomic traits but susceptible to a new race of pathogen, against which a resistance providing gene has been identified in inferior genotype of crop. Discuss pro and cons of conventional plant breeding and genetic engineering to produce plants with the desired characteristics without disturbing the good traits of elite variety?

Section C (Marks: 3X5=15)

Q.5

What is Ti plasmid? Describe its various functional regions and molecular basis of crown gall disease development in infected plants. 5.0

Q.6

a. Write a brief note on plants specific processes which are generally target of herbicides. A company is developing herbicide tolerant transgenic plant by adopting strategy of over expression of target enzyme. The target enzyme plays a very important role in chloroplasts of the plant cells. The company has isolated the gene encoding it from a resistant bacterium species. What essential feature the company should ensure to be included in the gene expression cassette. Cite example of glyphosate tolerance experience of Monsanto to support your answer. 3.0

b. What were the problems with aroA gene from *Salmonella typhimurium* or *E.coli* in the development of glyphosate resistant crops? Mention the sources of resistant EPSPS encoding genes and their advantage in current range of Monsanto's dicotyledonous and dicotyledonous Roundup Ready crops. 2.0

Q. 7

a. How crystal proteins produced by *B. thuringensis* are classified? What could be the scientific basis of different classes of crystal protein being toxic to specific order/classes of insects? Give examples. 2.0

b. Which risk factors contribute towards evolution of pest populations against Bt resistance? Explain how homozygous resistant insect population can rapidly grow in Bt field under selection pressure. Enlist the strategies which can be used for resistance management and explain basis of gene pyramiding technique. Give suitable example. 3.0