2013

M.Sc.

4th Semester Examination

BIOTECHNOLOGY

PAPER—BIT-401

Full Marks : 40

Time : 2 Hours

The figures in the right-hand margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

Answer *all* questions.

(Special Paper)

(Agriculture Biotechnology)

Group — A

1. Answer any *five* questions from the following : 5×2

(a) Name two secondary metabolites having hypotensive and anticarcinogenic activities.

(b) What do you mean by bioaugmentation ?

(c) What do you mean by bioconversion ? Cite example.

(d) Point out two major advantages of micropropagation.

(e) Name two fungal resistance transgenic crop with resistance gene and pathogen.

(f) Name two biocontrol agents that destroys phyto-pathogenic fungi.

(g) What do you mean by Syngas ? State its uses.

(h) What is the need for genetic manipulation of forest plants ?

Group — B

Answer any *two* questions from the following : 2×5

2. What do you mean by polygenictrait ? How would ycu improve these traits by biotechnological approach ? 1+4

3. Enumerate the different biotechnological approaches for the improvement of forest trees. 5

4. What is IPR ? How do patents differ from IPRs ? 2+3

5. Discuss the approaches of biocontrol of bacterial diseases in plants. 5

Group — C

Answer any *two* questions from the following : 10×2

6. Describe the different strategies for the improvement of Modern wheat in India. What do you mean by QTL mapping? 8+2

7. Explain the techniques employed in plant cell culture for the production of secondary metabolites. Describe a bioreactor system for mass cultivation of plant cells. 6+4

8. Enumerate briefly the mass cultivation of Rhizobium and its use as biofertilisers. Discuss in brief the lignin degradation mechanism in fungi. 5+5

9. Discuss different biotechnological approaches for weed control. 10

(Special Paper)

(Food Biotechnology)

Group — A

1. Attempt any *five* of the following : 2×5

(a) What do you mean energy food?

(b) Why do astronauts require special food?

(c) What is gluten? State its utility in food biotechnology.

(d) State the advantages of biofortification of food.

(e) Mention the role of phosphate are in pasteurization of milk.

(f) What is BIS? How are they useful to us?

(g) Explain how salt acts as preservative of food.

(h) What is organic milk?

Group — B

Answer any *two* questions from the following : 5×2

2. What is cold point in food masses? Describe the types of spoilages in canned food. 2+3

3. List some principle factors influencing destruction of microorganisms by irradiation. What are post-mortem changes of meat? 3+2

4. Compare between slow freezing and quick freezing. Give some extra benefit of fermented food compared to general cooked food. $2\frac{1}{2}+2\frac{1}{2}$

5. "Recently it came in the newspaper that beef mixed with pork meat is sold in the market." How it is possible to test that mixture contains meat from both cow and pork? 5

Group — C

Answer any *two* questions from the following : 10×2

6. What is thermal death time? State the significance of thermal death time curve. Discuss how various factors in food can influence the heat resistance of contaminating microbes. 2+3+2

7. What is food hazards? What are major objects of packaging? Give example of some packaging material. How mis-packaging may affect the nutritive value of food?

2+2+2+4

8. Write short notes on —

Edible film, Ice crystal damage of food,

Stabilizer and thickness, flavouring agents.

$2\frac{1}{2}\times4$

9. Briefly discuss about how cheese is prepared and processed from milk? Define gelatinization and retrogradation. What kind of sugar is present in milk and mention its composition. 6+2+2

(Special Paper)

(Pharmaceutical Biotechnology)

Group — A

1. Answer any *five* questions from the following : 2×5

(a) What are the major components of growth media for mammatian cell culture ?

(b) Name two commercially available interleukins.

(c) What are Protein inclusion bodies ?

(d) Mention the role of interferon-ν.

(e) What do you mean by pharmacodynamics of Protein therapeutics ?

(f) How does cytokines differ from hormones ?

(g) Mention two clinical aspects of hematopoietic growth factor.

(h) "SDS-gel electrophoresis of insulin was run inabsence and presence of β–mercaptoethornal" Will you find any differences in its migration in gel ? Give reason.

Group — B

Answer any *two* questions from the following : 5×2

2. Briefly discuss the different contaminants associated with production of biotech compounds.

3. Discuss the physiological roles of GM–CSF and stem cell factor (SCF). $2\frac{1}{2}+2\frac{1}{2}$

4. Write down the steps involved in isolation and Purification of recombinant proteins.

5. Write short notes $2\frac{1}{2}+2\frac{1}{2}$

   (i) Interferon–β

   (ii) Expression systems used to produce biotech products.

Group — C

Answer any *two* question from the following : 10×2

6. Briefly describe the production Protocol of recombinant insulin. Write down the Pharmacology and formulation of commercial insulin. 5+5

7. Describe in detail the major elimination Pathways for Protein drugs after administration.

8. (i) How does one sterilize biotech products for parenteral administration ?

(ii) Why is it not necessarily wise to work at the lowest possible chamber pressures during biotech product formulations ?

(iii) Why the information on the way cells communicate is important in the drug formulation process ?

(iv) What are the differences between the endocrine, paracrine and antocrine methods of cell communication ? 2+2+3+3

9. What is glycosylation ? How does patterns of glycosylation significantly affect the biological activity of therapeutic proteins ? What chemical modification are required to enhance bioaveailability and stability of Protein drugs ? 2+4+4
