



**Instructions**

Answer **Three** questions including **Question 1**

No. of questions : Seven (07)

No. of pages : Two (02)

Total marks allocated : 60%

Time : One hour (1hr)

Index No: .....

**Part III - Essay**

**Question 1**

1. What is DNA finger printing?  
(5 Marks)
2. What is the use of DNA finger printing?  
(5 Marks)
3. Write short notes on
  - a. A method of DNA fingerprinting that can be used when sequence data are not available  
(10 Marks)
  - b. A method of DNA fingerprinting that can be used when sequence data are available  
(10 Marks)

**Question 2**

1. What are genetically modified (GM) organisms and GM foods?  
(4 Marks)
2. What is the importance of transgenic crops?  
(4 Marks)
3. By using techniques of genetic engineering, scientists are able to modify genetic materials so that a particular gene of interest from one organism can be incorporated into a different organism.
  - a. Describe a procedure by which this can be done.  
(7 Marks)

### Question 3

1. What is waste / waste water?  
(4 Marks)
2. What is bioremediation?  
(4 Marks)
3. Describe briefly how you manage industrial waste using biotechnological applications.  
(7 Marks)

### Question 4

1. What is biofuel?  
(4 Marks)
2. What are the types of biofuel?  
(4 Marks)
3. Describe how you produce biofuel using biotechnological applications.  
(7 Marks)

### Question 5

1. What is molecular pharming?  
(4 Marks)
2. What are the types of pharmaceutical proteins produced by molecular pharming?  
(4 Marks)
3. Describe how you produce vaccines in a transgenic plant.  
(7 Marks)

### Question 6

1. What are the industrial microbial products produced using biotechnological applications?  
(4 Marks)
2. What are the different types of micro-organisms modified to produce above products?  
(4 Marks)
3. Describe how you produce human interferon hormone using modified micro-organism.  
(7 Marks)

### Question 7

1. Write short note on " Ethical considerations on the utilization of GMOs / GMFs".  
(15 Marks)