

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[LO 964]

MAY 2019

Sub. Code: 2964

**M.PHARM. DEGREE EXAMINATION**  
**(PCI New regulations 2016)**  
**SEMESTER-I**  
**BRANCH IV–PHARMACEUTICAL BIOTECHNOLOGY – MPB**  
**PAPER IV – ADVANCED PHARMACEUTICAL BIOTECHNOLOGY**

*Q.P. Code : 262964*

**Time : Three hours**

**Maximum : 75 Marks**

**I. Elaborate on:**

**(2 x 20 = 40)**

1. Describe the classification of enzymes and dynamics of enzyme activity. Add note on pharmaceutical and therapeutic applications.
2. a) Explain different types of biosensors.  
b) Production of Hepatitis – B Vaccine.

**II. Write notes on:**

**(7 x 5 = 35)**

1. Cloning vectors.
2. Gene therapy.
3. Cell signaling pathways.
4. Oncogenes.
5. Production of single-cell protein.
6. Types of Microbial biotransformation.
7. Production of Insulin.

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