Name:
Enrolment No:

UPES
End Semester Examination, May 2025

Program: B. Pharm
Course: Pharmaceutical Biotechnology
Course Code: BP605T
Instructions: Attempt all sections.

Semester: VI
Duration: 03 Hours
Max. Marks: 75

SECTION A
(20Q×1M=20 Marks)
Attempt all questions. Each question carries one mark.

S. No.		Marks	COs
Q 1	The branch of biotechnology that focuses on medical applications like drug development is: a) Red Biotechnology b) Green Biotechnology c) White Biotechnology d) Blue Biotechnology	1	CO1
Q 2	Choose the first biotech drug approved by the FDA. a) Erythropoietin b) Monoclonal Antibodies c) Humulin d) Penicillin	1	CO1
Q 3	Who are the pioneers of recombinant DNA technology? a) Watson and Crick b) Louis Pasteur c) Kary Mullis d) Boyer and Cohen	1	CO1
Q 4	Select the enzyme that is widely used in wound cleaning preparations. a) Lipase b) Peroxidase d) Catalase d) Protease	1	CO1
Q 5	Sticky ends in DNA fragments are characterized by their— a) Straight cuts with no overhangs b) Ends that bind only RNA c) Staggered cuts d) Circular DNA structure	1	CO2
Q 6	An essential property for a cloning vector: a) Must have a selectable marker b) Should not replicate inside the host c) Must degrade after replication d) Should be RNA-based	1	CO2
Q 7	The source of the T4 DNA ligase enzyme is: a) Human cells b) E. coli c) Bacteriophage d) Yeast cells	1	CO2
Q 8	Golden rice is genetically modified due to: a) Enhanced taste b) Production of beta-carotene c) Increased protein content d) Improved resistance to pests	1	CO2
Q 9	The immune cells most active in graft rejection are: a) T cells b) B cells c) Natural killer cells d) Mast cells	1	CO3
Q 10	The antibody found in mucosal surfaces that protects against infections is: a) IgE b) IgM c) IgA d) IgG	1	CO3
Q 11	The vaccine component that directly triggers an immune response is: a) Preservative b) Adjuvant c) Antigen d) Stabilizer	1	CO3
Q 12	The function of the Fab region of an antibody is: a) Complement activation b) Antigen binding c) Opsonization d) Cytokine release	1	CO3
Q 13	The starting point for plasmid transfer during conjugation is: a) Tra genes b) Pilus c) oriT d) Complementary strand	1	CO4
Q 14	Select the type of DNA packaging that is found in eukaryotic cells. a) Nucleosomes with histones b) Supercoiled circular DNA c) Naked linear DNA d) Plasmids and RNA	1	CO4
Q 15	The purpose of blocking in Western blotting is: a) To separate proteins by size b) To transfer proteins to a membrane c) To prevent non-specific binding of antibodies d) To visualize protein bands	1	CO4

Q 16	What is a major application of conjugation? a) Diagnosis of viral infections b) Transfer of antibiotic resistance genes c) Identification of proteins d) Visualization of DNA fragments	1	CO4
Q 17	Select the phase in batch fermentation that involves rapid microbial growth under optimal conditions. a) Lag phase b) Exponential phase c) Stationary phase d) Death phase	1	CO5
Q 18	Choose the role of a sparger in a fermenter. a) To mix nutrients b) To prevent vortex formation c) To introduce air into the medium d) To monitor pH levels	1	CO5
Q 19	The primary carbon source in the medium for citric acid production is: a) Ammonium salts b) Lactose c) Sucrose d) Corn steep liquor	1	CO5
Q 20	Most commonly used sterilization method for liquid media in industrial fermentation is: a) UV radiation b) Filtration c) Autoclaving d) Chemical sterilization	1	CO5
SECTION B (20 Marks) (2Q×10M=20 Marks) Attempt 2 Question out of 3.			
Q 1	List different blotting techniques and explain the four types of ELISA briefly, with appropriate diagrams. (2+8)	10	CO4
Q 2	Elaborate on the production processes of penicillin through fermentation technology.	10	CO5
Q 3	Write short note on any two of the following: (5+5) a) Mechanism of innate immunity with a supporting diagram. b) Process of hybridoma technology. c) Immediate (Allergic) Hypersensitivity	10	CO3
SECTION C (35 Marks) (7Q×5M=35 Marks) Attempt 7 Question out of 9.			
Q 1	Compare the genetic organization of eukaryotes and prokaryotes.	5	CO4
Q 2	Define fermentation technology and outline the general requirements for a fermentation process.	5	CO5
Q 3	Differentiate between Class I and Class II MHC pathway.	5	CO3
Q 4	Define genetic engineering and list its applications. (1+4)	5	CO1
Q 5	Describe the process of physically immobilizing an enzyme on activated carbon, including the advantages and limitations of this method. (3+2)	5	CO1
Q 6	Explain biosensors in terms of their components and the coupling techniques used for bioelements.	5	CO1
Q 7	Explain the mechanism of action of restriction endonuclease.	5	CO2
Q 8	Outline the steps involved in insulin production through rDNA technology with a supporting diagram.	5	CO2
Q 9	Differentiate between Type I, Type II, Type III and Type IV restriction endonuclease.	5	CO2