

# Question Paper

Exam Date & Time: 14-Jul-2023 (10:00 AM - 01:00 PM)



## MANIPAL ACADEMY OF HIGHER EDUCATION

FOURTH SEMESTER B. Sc. BIOTECHNOLOGY DEGREE EXAMINATION - JULY 2023  
SUBJECT: BBT-202 - MICROBIOLOGY  
(OBE-2021 REGULATION - REPEATERS)

Marks: 70

Duration: 180 mins.

Answer all the questions.

Illustrate where necessary.

- |     |  |      |
|-----|--|------|
| 1A) | What are halophiles?   | (1)  |
| 1B) | What are primary and secondary metabolites? Give two examples for each.  | (1)  |
| 1C) | Name two free-living nitrogen-fixing microorganism.  | (1)  |
| 1D) | What are mycorrhizae?  | (1)  |
| 1E) | Name any two thermostable polymerases.   | (1)  |
| 1F) | Differentiate between transition and transversion?   | (1)  |
| 1G) | What are composite transposons?  | (1)  |
| 1H) | Name the father of antiseptic surgery in the field of microbiology.  | (1)  |
| 1I) | What is inspissation?  | (1)  |
| 1J) | Name the causative agent for malaria and microfilaria.   | (1)  |
| 2A) | Explain the mechanism of biological nitrogen fixation.   | (5)  |
| 2B) | Give a brief note on endosymbiotic theory.   | (5)  |
| 2C) | Write a note on Baltimore's system of classification of viruses.   | (5)  |
| 2D) | Explain the difference between generalised and specialised transduction.   | (5)  |
| 2E) | Explain flagella with a neat, labelled diagram.  | (5)  |
| 2F) | Explain briefly the basic ingredients of culture media and add a note on enriched media and differential media.    | (5)  |
| 3A) | With illustration explain in detail different types of electron microscopes.                                       | (10) |
| 3B) | Explain the term mutualism giving suitable examples.   | (10) |
| 3C) | What is sterilization? Briefly explain the moist heat and dry heat sterilization using autoclave and hot air oven. | (10) |

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# Question Paper

Exam Date & Time: 17-Jul-2023 (10:00 AM - 01:00 PM)



## MANIPAL ACADEMY OF HIGHER EDUCATION

FOURTH SEMESTER B. Sc. BIOTECHNOLOGY DEGREE EXAMINATION - JULY 2023  
SUBJECT: BBT-204 - PHARMACOLOGY AND PHARMACOGENOMICS  
(OBE 2021 REGULATION - REPEATERS)

Marks: 70

Duration: 180 mins.

Answer all the questions.

Illustrate where necessary.

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|-----|--|------|
| 1A) | Name any one contribution of Francois Magendie.  | (1)  |
| 1B) | Give two examples for vinca alkaloids.   | (1)  |
| 1C) | How integrase inhibitor reduces viral infection?   | (1)  |
| 1D) | What is microarray?  | (1)  |
| 1E) | Give an example for a next-generation sequencing platform.   | (1)  |
| 1F) | What is <i>ADRB2</i> ?   | (1)  |
| 1G) | What are thrombolytic agents?  | (1)  |
| 1H) | Define hematopoietic growth factors.   | (1)  |
| 1I) | Define hybridoma technology.   | (1)  |
| 1J) | Name any two viral vector system in gene therapy.  | (1)  |
| 2A) | Write an essay on the pharmacogenomics of anti-asthmatic drugs with examples.  | (5)  |
| 2B) | Name four anti-tubercular drugs. Explain the mechanism of action of anyone.  | (5)  |
| 2C) | Explain the mechanism of action of Interferon $\alpha$ against virus.  | (5)  |
| 2D) | Write a note on population specific genetic variations for personalised medicine giving examples.  | (5)  |
| 2E) | Explain the advantage and disadvantage of gene therapy.  | (5)  |
| 2F) | Write a note on Institutional Ethics Committees.   | (5)  |
| 3A) | Explain the factors influencing drug response.   | (10) |
| 3B) | Briefly discuss the pharmacogenomics of anticancer therapy with examples of key drug response genes for thiopurines, irinotecan, platinum agents and 5-fluorouracil. | (10) |
| 3C) | Describe the major routes of drug excretion.   | (10) |

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## MANIPAL ACADEMY OF HIGHER EDUCATION

FOURTH SEMESTER B. Sc. BIOTECHNOLOGY DEGREE EXAMINATION - JULY 2023  
SUBJECT: BBT-208 - BIOINFORMATICS  
(OBE-2021 REGULATION - REPEATERS)

Marks: 70

Duration: 180 mins.

Answer all the questions.

- 1A) List any two applications of Systems Biology. (1)
- 1B) Explain the motif written as regular expression. (1)
- 1C) What is a ligand molecule? (1)
- 1D) Which journal publishes a database edition every year in January? (1)
- 1E) What is a protein domain? (1)
- 1F) List the qualities of a drug. (1)
- 1G) What does 'NM' stand for in RefSeq database? (1)
- 1H) What is PAM Matrix? (1)
- 1I) Define sticky end digestion. (1)
- 1J) What is bootstrapping? (1)
- 2A) What are the different methods applied in gene prediction? (5)
- 2B) Write the features and importance of PDB database. (5)
- 2C) Describe the features of OMIM database. (5)
- 2D) Add a note on secondary structure prediction methods. (5)
- 2E) How do we calculate the score and E-value in BLAST? (5)
- 2F) Explain the concept of ortholog, paralog and homolog with example. (5)
- 3A) Classify different types of biological databases with examples. Elaborate on the unique features of the Gene database from NCBI. (10)
- 3B) Define primer. List the good qualities of a primer. List the advantages of *in silico* PCR. (10)
- 3C) Explain the following methods of phylogenetic tree prediction. (10)
- i) Distance based method.
- ii) Character based method.

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# Question Paper

Exam Date & Time: 20-Jul-2023 (10:00 AM - 01:00 PM)



## MANIPAL ACADEMY OF HIGHER EDUCATION

FOURTH SEMESTER B. Sc. BIOTECHNOLOGY DEGREE EXAMINATION - JULY 2023  
SUBJECT: BBT-210 - IMMUNOLOGY  
(OBE-2021 REGULATION - REPEATERS)

Marks: 70

Duration: 180 mins.

**Answer all the questions.**

**Draw a well labelled diagram wherever necessary.**

- 1A) Define monoclonal antibodies with a suitable example. (1)
- 1B) Which immunoglobulin has the highest antigen-binding capacity? (1)
- 1C) Explain the complete adjuvant. (1)
- 1D) What is antibody avidity? (1)
- 1E) Which cytokines cause Th2? (1)
- 1F) Define immunodiffusion. (1)
- 1G) What is clonal ignorance? (1)
- 1H) What is Atopy? (1)
- 1I) What is the Rheumatoid factor? (1)
- 1J) Define allograft with a suitable example. (1)
- 2A) Identify and describe the components of blood. (5)
- 2B) Explain the process of phagocytosis and the mechanism. (5)
- 2C) Define cytokines and chemokines. Describe the properties of cytokines. (5)
- 2D) Describe the process of T-cell maturation and thymic selection. (5)
- 2E) Briefly describe how the classical complement pathway is activated. (5)
- 2F) Describe the mechanism for Type IV hypersensitivity and give two examples. (5)
- 3A) What is innate immunity? Discuss how the immune system works in relation to three lines of defense. (10)
- 3B) With the aid of a clearly labelled diagram discuss the structure and function of Immunoglobulins. (10)
- 3C) Describe the major pathway by which antigen-presenting cells process and present exogenous and endogenous antigens to T cells. (10)

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