

Ref. No. : Ex/PG/BME/T/115A/2024

Name of the Examinations: MASTER OF BIO-MEDICAL ENGINEERING FIRST YEAR FIRST SEMESTER - 2024

Subject : HUMAN BODY SYSTEMS

Time : 3 Hours

Full Marks : 100

Instructions : Use Separate Answer scripts for each Part

Part-I (Marks: 50)

Answer any five questions

1. Describe paediatric long bone. Outline principles of use of fixative devices. 5+5
2. Describe Hyaline Cartilage. Use of Biomedical Engineering concepts for management of large chondral defects. 5+5
3. Describe hip joint. Use of Biomedical Engineering concepts for replacement arthroplasty. 5+5
4. Describe Autonomic Nervous System. 5+5
5. Outline anatomy of gastrointestinal system. Role of Biomedical Engineering principles for management of gastrointestinal disorders. 5+5
6. Describe Bronchovascular Segments of lungs. Give a short account on extra-corporeal circulation. 5+5
7. Describe conductive system of heart. Role of Biomedical Engineering principles on conductive system disorders. 5+5
8. Outline Auditory pathway. Enumerate causes of Deafness. Use of Biomedical Engineering concepts for management of deafness. 4+3+3

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Part II (Marks: 50)

Answer any ten questions

1. Write down the immunological functions of macrophages, phagocytes, mast cells, basophils and dendritic cells. 5
2. Define naïve lymphocytes. Differentiate between the functions of B and T lymphocytes. 2+3
3. Describe the functions of TLR with examples. What are interleukins? 3+2
4. What are infectious carcinogens? Define oncogenes, tumor-suppressor genes and apoptosis genes. 2+3
5. What are onco-fetal tumor antigens? Describe the mechanism for generation of TSAs and TAAs. 2+3
6. Define operon, promoter, operator, inducer and corepressor. 5
7. Describe rho-dependent and rho-independent termination. Discuss the role of sigma factor in transcription. 3+2
8. Define replication bubble. Discuss the significance of the formation of leading strand and lagging strand during DNA replication. 3+ 2
9. Describe different blood coagulation pathways. 2.5 +2.5
10. Describe the role of molecular chaperons in protein folding. What are prion diseases. 3+2
11. What is β -turn? Differentiate between parallel and antiparallel β -sheets?
12. What are nucleosides? Give examples. Give two examples of nucleoside analogs, which can act as reverse transcriptase inhibitors.
13. Differentiate between B, A and Z forms of DNA. Describe the mechanism of action of drug doxorubicin. 3+2
14. What do you mean by hemostasis in human body system? Write short notes on Rh factors and atherosclerosis. 1+2+2
15. Describe the functions of the following enzymes: 1X 5
 - a. Helicase
 - b. Primase
 - c. Ligase
 - d. DNA polymerase I
 - e. DNA polymerase III