



Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
B.Tech Degree S6 (R,S) Examinations April 2026 (2019 Scheme)

Course Code: MRT322

Course Name: BIOMEDICAL INSTRUMENTATION

Max. Marks: 100

Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks.

Marks

- | | | |
|----|---|-----|
| 1 | Draw a neat diagram of a typical cell. Label the main parts. | (3) |
| 2 | What is a transducer? | (3) |
| 3 | Define "Half-Cell Potential" in an electrode. | (3) |
| 4 | List different types of electrodes. | (3) |
| 5 | Define stroke volume and its relationship to cardiac Output. | (3) |
| 6 | Explain the doppler shift principle as applied to blood flow measurement. | (3) |
| 7 | What is the difference between monopolar & bipolar diathermy modes? | (3) |
| 8 | What is the importance of the cooling system in an x-ray tube? | (3) |
| 9 | List the three types of leakage currents. | (3) |
| 10 | What is a spectrophotometer? | (3) |

PART B

Answer any one full question from each module, each carries 14 marks.

Module I

- | | | |
|----|---|-----|
| 11 | a) Explain the working principle of piezo-electric & ultrasonic transducers. | (7) |
| | b) Explain how electrical signals are generated & how these signals travel from one cell to another through nerve fibers. | (7) |

OR

- | | | |
|----|--|-----|
| 12 | a) Explain the biomedical instrument system with a neat block diagram. | (7) |
| | b) Describe the process of gas exchange in the lungs. | (7) |

Module II

- | | | |
|----|--|-----|
| 13 | a) Explain the Einthoven triangle and the standard 12-lead system used in ECG recording. | (7) |
| | b) Sketch the PQRS wave, and explain the physiological event associated with each segment. | (7) |

OR

- 14 a) Describe the principles of Electromyography (EMG). (7)
b) Write short notes on (a) ECG (b) EMG (c) EEG (7)

Module III

- 15 a) Explain the principle and operation of Ultrasonic Blood Flowmeters? (7)
b) Explain in detail about different methods of blood pressure measurement (7)

OR

- 16 a) Discuss the working principle of any two methods used to monitor respiration rate. (7)
b) Explain the indirect method of blood pressure measurement using an sphygmomanometer. (7)

Module IV

- 17 a) What is the need for infant incubators? (7)
b) Discuss the different types of Radiation Therapy used in cancer treatment. (7)

OR

- 18 a) What is the principle of Haemodialysis, explaining the components of a dialyzer? (7)
b) Explain the function of the oxygenator and heat exchanger in a heart lung machine. (7)

Module V

- 19 a) What are the various tests on blood cells? (7)
b) Define Telemedicine and describe its fundamental components. (7)

OR

- 20 a) Distinguish between Macro shock and Micro shock. (7)
b) Elaborate on the strategies for electrical accident prevention in a hospital. (7)
