

Reg No.: _____

Name: _____

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



Course Code: EET312

Course Name: BIOMEDICAL INSTRUMENTATION

Max. Marks: 100

Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks.

Marks

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|----|--|-----|
| 1 | Draw and explain the equivalent circuit of skin electrode interface. | (3) |
| 2 | What are microelectrodes? Mention their application in biomedical instrumentation. | (3) |
| 3 | Describe the role of the sinoatrial (SA) node in the heart's conduction system. | (3) |
| 4 | Compare the direct and indirect methods of blood pressure measurement. | (3) |
| 5 | What is the clinical significance of nerve conduction studies? | (3) |
| 6 | Describe the tidal volume and inspiratory reserve volume in evaluating lung function. | (3) |
| 7 | What is the principle of ultrasound scanning? | (3) |
| 8 | What is haemodialysis? Discuss its role and significance in managing renal failure. | (3) |
| 9 | Describe the concept of telemedicine and list two of its benefits. | (3) |
| 10 | Explain the accident prevention techniques of electrical safety measures in hospitals. | (3) |

PART B

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

Module I

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|----|--|-----|
| 11 | a) Illustrate the process of signal acquisition from the human body using different types of surface electrodes. | (8) |
| | b) Discuss the different types of bioelectric signals and their significance in biomedical instrumentation. | (6) |

OR

- 12 a) Explain the structure and function of the human respiratory system (6)
- b) Illustrate and explain the electrical conduction system of the heart, focusing on the generation and propagation of impulses. (8)

Module II

- 13 a) Explain the ultrasonic method for blood flow measurement. (7)
- b) With a block diagram, describe the principle of plethysmography and its application in blood flow monitoring. (7)

OR

- 14 a) Compare the oscillometric and auscultatory methods for blood pressure measurement. (7)
- b) Explain the 12-lead ECG system with a neat diagram and describe its clinical significance. (7)

Module III

- 15 a) Explain the working principle of electromyography (EMG) and describe its clinical applications. (6)
- b) Discuss the different frequency bands of EEG signals and their diagnostic significance. (8)

OR

- 16 a) Explain the concept of brain-computer interfacing (BCI) and its applications in medical diagnostics. (5)
- b) Describe the measurement of Electroencephalogram with the help of a neat block diagram. (9)

Module IV

- 17 a) Describe the principle and components of a computed tomography (CT) scanner with relevant diagrams. (9)
- b) Explain the principle of PET scanning and discuss its applications in medical diagnostics. (5)

OR

- 18 a) Explain the principle of ultrasound imaging and discuss its applications in medical diagnostics. (7)
- b) Compare shortwave and microwave diathermy in terms of principle, (7)

mechanism, and applications in therapeutic treatments.

Module V

- 19 a) With a block diagram, describe the working of an infant incubator and its importance in neonatal care. (8)
- b) Explain the principle and applications of a spectrophotometer in clinical laboratories. (6)

OR

- 20 a) Discuss the physiological effects of electric current on the human body and the measures to prevent electrical hazards in hospitals. (8)
- b) Explain the working principle of a blood cell counter with a neat diagram and describe its applications in clinical diagnostics. (6)
