



Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**

B.Tech Degree S8 (R,S) Exam April 2025 (2019 Scheme)

**Course Code: MRT428****Course Name: BIO MECHATRONICS****Max. Marks: 100****Duration: 3 Hours****PART A***Answer all questions, each carries 3 marks.*

Marks

- |    |                                                                                   |     |
|----|-----------------------------------------------------------------------------------|-----|
| 1  | Define Half -cell potential? What are polarisable and non-polarisable electrodes? | (3) |
| 2  | Write short note on electrode electrolyte interface                               | (3) |
| 3  | Sketch a typical PQRST complex waveform with respect to ECG and explain           | (3) |
| 4  | Explain about the action potentials in cardiac muscle                             | (3) |
| 5  | Explain the different stages of evoked potential                                  | (3) |
| 6  | Sketch the physiological nature of EEG waveform                                   | (3) |
| 7  | Write a short note on phonocardiography                                           | (3) |
| 8  | What is blood pressure? What are the factors affecting its measurement?           | (3) |
| 9  | Write a short note on DC defibrillator                                            | (3) |
| 10 | Explain the hazards associated with biomedical instruments                        | (3) |

**PART B***Answer any one full question from each module, each carries 14 marks.***Module I**

- |    |                                                                                                   |     |
|----|---------------------------------------------------------------------------------------------------|-----|
| 11 | a) Draw an action potential waveform and discuss in detail about polarization and repolarization. | (8) |
|    | b) With relevant diagrams explain electrical activity of excitable cells in detail                | (6) |

**OR**

- |    |                                                                              |      |
|----|------------------------------------------------------------------------------|------|
| 12 | a) Give a detailed narration of different bio electrodes used for biomedical | (14) |
|----|------------------------------------------------------------------------------|------|

## Instrumentation.

**Module II**

- 13 a) Describe the standard 12 lead system and recording method of ECG (14)

OR

- 14 a) Explain the block diagram of ECG machine. Also explain Einthoven triangle (14)

**Module III**

- 15 a) What are brain waves? Write notes on measurement of EEG with necessary block diagram (14)

OR

- 16 a) Describe in detail about 10-20 electrodes placement system of EEG (7)  
b) Explain brain waves and its characteristics (7)

**Module IV**

- 17 a) Explain in detail about blood pressure measurement by ultrasonic method (7)  
b) With relevant figure explain electromagnetic blood flow meter (7)

OR

- 18 a) Sketch and explain in detail about the direct and indirect blood pressure measurement (14)

**Module V**

- 19 a) Explain heart lung machine with the help of neat diagram (10)  
b) Explain the working of MRI scanner (4)

OR

- 20 a) Summarize (10)  
(i) Asynchronous cardiac pace maker  
(ii) synchronous cardiac pacemaker  
b) Describe the concept of centralized patient monitoring system (4)

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