

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

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

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
Seventh semester B.Tech degree examinations (S), September 2020

**Course Code: AE403**

**Course Name: BIOMEDICAL INSTRUMENTATION**

Max. Marks: 100

Duration: 3 Hours

**PART A**

*Answer any two full questions, each carries 15 marks.*

Marks

- |   |  |      |
|---|--|------|
| 1 | a) Describe the electrophysiology of the cardiovascular system.                                      | (6)  |
|   | b) Differentiate between unipolar and bipolar electrodes.  | (3)  |
|   | c) Explain the working of a suitable transducer for measuring a displacement event.                  | (6)  |
| 2 | a) Explain the working of a pacemaker with the help of a block diagram.                              | (8)  |
|   | b) What are evoked potentials?   | (2)  |
|   | c) Explain the principle of operation of a Plethysmograph.   | (5)  |
| 3 | a) With neat diagrams, explain the different types of electrodes used to measure bioelectric events. | (10) |
|   | b) Explain EEG with relevant waveforms for different mental activities.                              | (5)  |

**PART B**

*Answer any two full questions, each carries 15 marks.*

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|---|---|-----|
| 4 | a) Explain the mechanism of breathing. List the various components involved.      | (8) |
|   | b) What is an artificial respirator? What are the different types?                | (4) |
|   | c) What are the different types of hearing aids?                                  | (3) |
| 5 | a) Describe the physiological effects of electric shock.                          | (6) |
|   | b) With a suitable block diagram, describe the bedside patient monitoring system. | (9) |
| 6 | a) What is an artificial kidney? Explain any one method of dialysis.              | (9) |
|   | b) Explain a single channel telemetry system for ECG transmission.                | (6) |

**PART C**

*Answer any two full questions, each carries 20 marks.*

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|---|--|------|
| 7 | a) Explain the working of a colorimeter.   | (10) |
|   | b) What are blood gas analysers? Explain the blood pCO <sub>2</sub> measurement. | (10) |
| 8 | a) What are the applications of colour Doppler systems?                          | (3)  |
|   | b) Explain the principle of ultrasound imaging system.                           | (8)  |
|   | c) Explain the principle of magnetic resonance imaging.                          | (9)  |
| 9 | a) Explain the working of a flame photometer and its use in diagnosis.           | (10) |
|   | b) Explain the image reconstruction principle of computed tomography.            | (10) |

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