

Enrollment No./Seat No.:

GUJARAT TECHNOLOGICAL UNIVERSITY
Bachelor of Engineering - SEMESTER - VII EXAMINATION - WINTER 2025

Subject Code: 3171721

Date: 15-11-2025

Subject Name: Biomedical Instrumentation

Time: 10:30 AM TO 01:00 PM

Total Marks: 70

Instructions

- 1. Attempt all questions.**
- 2. Make suitable assumptions wherever necessary.**
- 3. Figures to the right indicate full marks.**
- 4. Simple and non-programmable scientific calculators are allowed.**

	Marks
Q.1 (a) State any 3 physiological system in human body	03
(b) Discuss Cell Structure	04
(c) Explain in detail blood circulatory system	07
Q.2 (a) State the full form of ECG, EEG and EMG	03
(b) Draw functional block diagram of generalized medical instrumentation system	04
(c) Explain operational mode of biomedical instrumentation system	07
OR	
(c) Discuss medical measurement constraint	07
Q.3 (a) Write GHK and Nernst equation	03
(b) Explain action potential and resting potential	04
(c) Explain polarizable and non-polarizable electrodes and also write working of silver/silver chloride electrode.	07
OR	
(a) What is motion artifact?	03
(b) Discuss electrode - electrolyte interface	04
(c) Discuss various layers of skin. Discuss equivalent circuit for electrode-skin interface in detail	07
Q.4 (a) What is micro-shock hazard?	03
(b) Discuss following heart problems: (i) Myocardial infarction (ii) Tachycardia-Bradycardia	04
(c) Explain in detail physiological effect of electricity of human body	07
OR	
(a) What is macroshock hazard?	03

- (b) Discuss following heart problems: 04
(i) Premature Ventricular contraction (ii) Fibrillation
- (c) Explain electrical safety codes and standards for medical instruments 07
- Q.5** (a) Explain cerebral angiography. 03
- (b) Explain EEG system simplified block diagram. 04
- (c) Explain standard lead system for ECG in detail. 07
- OR**
- (a) Explain Cranial X-Rays 03
- (b) Explain EEG Pre-amplifier in detail. 04
- (c) Explain 10-20 Leads of EEG in detail. 07
