

**VIT**Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)**SCHOOL OF ELECTRICAL ENGINEERING**
FALL SEMESTER 2025-2026**CAT-I****SLOT: G2+TG2****Programme Name & Branch: B.Tech EIE & EEE****Course Code: BEIE301L****Course Name : Biomedical Instrumentation****Faculty Member : Dr. M. Monica Subashini Class Number: VL2025260101066****Date of the Examination : 23-08-25 Duration : 90 minutes Max. Marks : 50****General instruction(s):**

- Answer All Questions
- Rough work should not be done on question paper. It will be treated as malpractice.
- M - Max mark; CO – Course Outcome; BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)

Course Outcomes Statements:**CO. 1:** Analyze the physiological signals by applying principles of mathematics.**CO. 2:** Apply the knowledge to select appropriate diagnostic instruments and advanced techniques.

Q. No	Question	M	CO	BL
1.	a) If the cell membrane suddenly became highly permeable to sodium ions, predict what would happen to the resting potential and why (5M) b) Find the capacitance of a micro-electrode, if the pipette radius is 0.3 μm and inside tip radius 'r' is 0.15 μm (5 M)	10	CO1	2
2	A neurosurgeon needs to record electrical activity from a single neuron during brain surgery. Which electrode type would be most suitable? Compare it with the other types.	10	CO1	1&
3	In the pulmonary function lab, a male employee, age 54, underwent testing. During a recent physical examination in the doctor's office, several abnormal results were found using spirometry. How do abnormalities get evaluated? Tabulate the measurements used in evaluation.	10	CO2	2
4	a) At a certain point in time, an ECG wave has the values $a_{VF} = 0.4 \text{ mV}$ and $a_{VL} = 0.6 \text{ mV}$, what is the value of V_{III} ? Tabulate the lead potentials. (5 M) b) How to record the electromyography signal from limbs of a subject? Give the procedure and the standard equations followed in measuring the conduction velocity. (5 M)	10	CO2	3
5	Design and describe the 10-20 Electrode EEG configurations to measure bio potential EEG signals generated.	10	CO2	2