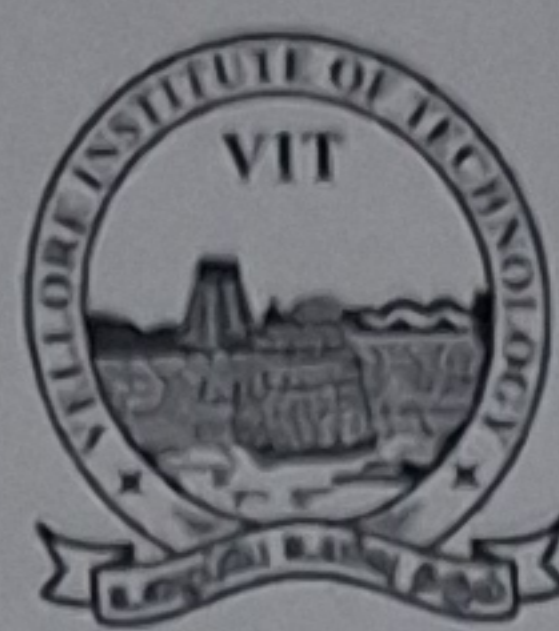




VIT

Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

REG.NO.: 24BHT0014

SCHOOL OF HEALTHCARE SCIENCE AND ENGINEERING
CONTINUOUS ASSESSMENT TEST -II
FALL SEMESTER 2025-2026

SLOT: F2+TF2

Programme Name & Branch : B.Tech BHT
Course Code : BHST204L
Course Name : Medical Electronics
Faculty Name(s) : Dr. Kishor Lakshminarayanan
Class Number(s) : VL2025260100964
Date of Examination : 22/08/2025
Exam Duration : 90 minutes

Maximum Marks: 50

Q. No	Question	Marks
1.	Explain the design of an instrumentation amplifier front-end for biopotential signals (ECG/EEG/EMG). In your answer, justify choices for: • Topology & gain distribution (INA vs. discrete diff amp; staged gain). • Input characteristics (very high input impedance, low bias current, input protection, ESD/defibs). • CMRR (electrode lead balancing, shielding/guarding, driven-right-leg or driven-reference). • Noise performance (input-referred voltage/current noise, bandwidth shaping, active electrodes).	10
2.	Differentiate between the working principle of ECG, EMG, and EEG.	10
3.	Evaluate the effectiveness of pulse oximetry as a non-invasive tool for measuring oxygen saturation in comparison to invasive techniques. Discuss the potential sources of error in pulse oximetry and suggest ways to minimize these errors in clinical practice.	10
4.	Design an experimental protocol to test the reliability of a spirometry-based pulmonary function analyzer for diagnosing early-stage chronic obstructive pulmonary disease (COPD). Include the key parameters you would measure and discuss how you would ensure the accuracy and reproducibility of your results.	10
5.	Analyze the differences between microshock and macroshock in terms of their effects on the human body. How do leakage currents contribute to each type of shock, and what preventive measures can be implemented in medical equipment to reduce the risk of these hazards?	10