

College of Engineering, Pune

END SEMESTER EXAM (2012-13)

IE404 - (Medical Instrumentation)

Year: Final Year B. Tech

Branch: Instrumentation and Control

Max. Marks-50

Duration – 3 hrs

Date:- 01/12/2012

Instructions:

1. All questions are compulsory
2. Number given at right indicates marks.
3. Use of programmable calculator is not allowed.

- Q. 1 A Explain the physiology of muscle contraction. Specify the single motor unit action event for duration and repetition rate. Suggest a suitable design of analog filter for EMG. 10
- B What is action potential? How it is generated? State the equation to measure equilibrium potential. 5
- Q. 2 A List the design characteristics that need to be considered while designing bio-potential amplifier. Design bio-potential amplifier for ECG. 8
- B Explain the physiology of Heart. Design a constant voltage pulsed generator for pacing the Heart, rated at 5V for 500 μ s. Calculate the delivered energy (assume load as 500 Ω). 7
- Q. 3 Solve any four 20
- A What is a biomaterial? State the need of biomaterials. What are the classes of biomaterials?
- B Write a short note on metallic biomaterials. What are its disadvantages? List any four metals used as biomaterials.
- C Differentiate between continuous wave Doppler and pulsed wave Doppler for blood flow measurement.
- D State and explain electric impedance method for Plethysmography.
- E Define the following terms and state its normal value.
- a) Systolic blood pressure
 - b) Diastolic blood pressure
 - c) Mean Arterial Pressure
 - d) Heart Rate
- F Draw the basic structural unit of nervous system. Explain the physiology of electrical impulse transmission.