

BITS, PILANI-DUBAI
ACADEMIC CITY, DUBAI

TEST1

MEDICAL INSTRUMENTATION
EEE UC423/INSTR UC481

Date:21/10/07
Time: 50 Mts

Max Marks:40
Weightage: 25

Answer All Questions

1. (a) What is the effect of a transducer on biomedical measurement. (4M)
(b) Name the sensor or method to measure the following parameters.
Give the frequency range.
 - (i) Blood pressure(invasive) (ii) ECG (iii) EEG
 - (iv) EMG (invasive) (v) ERG (vi) Respiratory rate (6M)

2. (a) Show the equivalent circuit of a Piezoelectric transducer when connected to an amplifier. Show the output signal of the piezoelectric transducer when time constant $\tau \gg T$, $\tau \ll T$ and $\tau = T$, where T is the time the force is applied. (6M)
(b) Suggest a simple system to measure dynamic displacement changes. (4M)

3. (a) Design an amplifier for EOG with a gain of 100 and bandwidth of 100Hz. (6M)
(b) Show the relationship of heart sounds to the function of the cardiovascular System (4M)

4. (a) Explain the different lead configurations to record ECG. (4M)
(b) Show the ECG in Lead 1, Lead 2, aVR, aVL and V₁, V₅ leads. (6M)

BITS, PILANI-DUBAI
ACADEMIC CITY, DUBAI
IV Year EEE&EIE – I Semester 2007-08
Test2 (Open book)

MEDICAL INSTRUMENTATION
(EEE UC432/INSTR UC481)

Date: 6/12//07
Max. Marks: 25

Time: 50mts
Weightage: 20%

Answer ALL Questions
All questions carry equal marks

1. Suggest a non invasive system for measuring the velocity of propagation of blood in unrestrained animals.
2. Compare the different defibrillator waveforms.
3. We want to measure tissue density of a human being from which we can estimate the volume of body fat. Describe a suitable method.
4. Suggest an instrumentation system for continuous monitoring of airway pressure, temperature and oxygen content in inspired air. Show the block diagram.
5. Discuss the various ultrasonic transducers.

BITS, PILANI-DUBAI
ACADEMIC CITY, DUBAI
IV Year EEE&EIE – I Semester 2007-08
Comprehensive Examination

MEDICAL INSTRUMENTATION
EEE UC432/INSTR UC481

Date: 2/1//08
Max. Marks: 50

Time: 3 Hrs
Weightage: 40%

Answer ALL Questions
All Questions carry equal marks

1. (a) Explain the different types of ECG recorders.
(b) Explain the principle of direct method of measuring blood pressure.
2. (a) Draw the circuit of DC fibrillator circuit and explain its working. Show the waveforms.
(b) Describe an instrument for measuring mechanics of breathing.
3. (a) What are the display modes in ultrasonic imaging. Explain in detail.
(b) Explain how Electromyographic measurements are performed.
4. (a) Describe a system for blood pressure telemetry.
(b) Design a system that is capable of transmitting ECG from home to hospital.
5. Design the cardiology department of a small hospital to include facilities for intensive care monitoring, surgery and diagnostics.