

BITS PILANI-DUBAI
DUBAI INTERNATIONAL ACADEMIC CITY
IV Year EEE&EIE – II Semester 2007-08
COMPREHENSIVE EXAM
MEDICAL INSTRUMENTATION
EEE UC432/INSTR UC481

Date: 26/5/08

Max. Marks: 50

Time: 3 Hrs

Weightage: 40%

Answer ALL Questions

Design a system for indirectly measuring blood pressure every 5 minutes. Show the block diagram and describe the system operation including power source, sensor and storage.

(10M)

2. (a) Explain the following:
Tidal volume, Residual volume, Vital capacity, Inspiratory capacity, Respiratory minute volume (5M)
- (b) Describe the modes by which inspiration is initiated in Respirators. (3M)
- (c) What are the conditions until which the inflation continues after inspiration has been triggered. (2M)
3. (a) With the help of a diagram bring out the differences between A- scan and M- scan. (4M)
- (b) Differentiate between Somatic nervous system and Autonomic nervous system. (3M)
- (c) What are the differences in amplification and bandwidth requirement of amplifiers for ECG, EMG and EEG. (3M)
4. (a) Give the block diagram of a device to measure and record Basal skin resistance (BSR) and Galvanic skin response (GSR). (5M)
- (b) Explain the 10-20 EEG electrode configuration. (5M)
5. Design a telemetry system for a hospital explaining why you would telemeterize the functions you have selected. (10M)

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IV Year EEE&EIE – II Semester 2007-08
TEST2 (OPEN BOOK)
MEDICAL INSTRUMENTATION
EEE UC432/INSTR UC481

Date: 27/04/08
Max. Marks: 20

Time: 50mts
Weightage: 20%

Answer ALL Questions

You are employed by a researcher team on a project to measure the blood pressure and blood flow in the femoral artery of an anesthetized dog lying on an operating table.

Design a system to do this by

- (i) Describing the transducers you would use. (3M)
- (ii) Specifying necessary instrumentation. (4M)
- (iii) Discussing the methods used to ensure that your physiological measurements are taken correctly. (3M)

2. (a) Discuss possible causes of a patient monitoring system falsely indicating
- (i) High heart rate
 - (ii) Low heart rate. (3M)

(b) Discuss various electrodes used for Dibrillation.

3. Suggest the block diagram of an Electronic Spirometer and explain the same. (5M)

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IV Year EEE&EIE – II Semester 2007-08
TEST1
MEDICAL INSTRUMENTATION
EEE UC432/INSTR UC481

Date: 16/3/08
Max. Marks: 40

Time: 50mts
Weightage: 25%

Answer ALL Questions

- Explain the following in detail with suitable diagrams
- a. Piezoelectric effect (4M)
 - b. Thermo electric effect (3M)
 - c. Photoelectric effect. (3M)
2. (i) How does Resting potential and Action potential originate
(ii) Draw the waveform of an action potential and demarcate the different regions. (3M)
(ii) Show the ECG waveform and explain how it is caused. (4M)
3. (a) Draw the wave shape of blood pressure variation as a function of time. Explain.
(b) Give the normal values for amplitudes and durations of ECG parameters.
4. (a) Suggest an amplifier which can simultaneously amplify ECG and EMG. Give required specifications. (4M)
(b) Explain the various lead configurations to record ECG. Show the ECG in each of the configurations. (