

BITS-PILANI, DUBAI
DUBAI INTERNATIONAL ACADEMIC CITY
COMPREHENSIVE EXAMINATION

MEDICAL INSTRUMENTATION - INSTR C481

Date : 27/12/09

Time : 3 Hrs

Max marks:40

Weightage : 40%

1. (a) Patient monitoring equipment is not without its problems or limitations.
What are the different problems. Discuss. (4M)
- (b) What is Fibrillation. Draw the circuit of a DC defibrillator and
explain its working . Show the discharge waveform. (4M)

2. (a) (i) Differentiate between Inhalators and Ventilators. (2M)
- (ii) What are the conditions for the inflation of the lungs to continue
once inspiration has been triggered. (2M)
- (b) What are the important characteristics to consider in selecting a
thermistor for a specific biomedical application. (4M)

- 3 (a) Explain the different display modes used in Ultrasonic imaging. (4M)
- (b) What are Electromyography (EMG) measurements. Explain. (4M)

4. Explain how biofeedback system can be used to suppress
(i) The abnormal EEG activity during epileptic seizure. (4M)
- (ii) Tachycardia (4M)

5. Design a system that is capable of telemetering ECG from extended coronary
care patients. (8M)

BITS PILANI – DUBAI
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TEST-2 (OPEN BOOK)

MEDICAL INSTRUMENTATION -INSTR C481

Date: 6/12/09
Time: 50mts

Weightage: 20%
Max Marks: 20

Answer ALL Questions

1. A patient is being brought in an ambulance and blood pressure has to be monitored continuously at intervals of 10 minutes. Suggest the block diagram of such an instrument which can simultaneously display the value and also print the value of blood pressure. (5M)
2. A patient is being monitored in an ICU and his ECG and other parameters are to be faithfully reproduced and displayed. Suggest and explain a CRT display that can do this. (5M)
3. Obstructions in the large airways can be detected by measuring Total lung capacity (TLC) and Vital capacity (VC). Describe the setup to measure TLC and VC and explain the same. (5M)
4. Suggest a telemetry system to monitor ECG of (i) A hospital bed patient (ii) An athlete being measured on a tread mill. (5M)

BITS PILANI
DUBAI INTERNATIONAL ACADEMIC CITY
IV Year EIE – I Semester 2009-10
TEST1
MEDICAL INSTRUMENTATION - INSTR C481

Date: 11/10/09
Max. Marks: 25

Time: 50mts
Weightage: 25%

Answer ALL Questions

- 1.(a) Explain any TWO of the following used as specifications of a medical instrumentation system.
Linearity, Frequency response, Stability, Isolation. (2M)
- (b) Explain how the following can affect measurement in a living system.
 - (i) Inaccessibility of variable to measurement
 - (ii) Artifacts (3M)
2. Describe Two methods of measuring Force with the help of diagrams. (5M)
3. (a) Explain Polarization, Depolarization and Repolarization. (2M)
- (b) Briefly explain any THREE of the bioelectric potentials that can be recorded from human body. (3M)
- 4.(i) Name THREE basic types of bio potential electrodes. (1M)
- (ii) Show the equivalent circuit of a surface electrode. (1M)
- (iii) Why were Floating electrodes developed. Explain its construction with a figure. (3M)
- 5.(i) A patient has a cardiac output of 4 liters/min, a heart rate of 86 beats/min and a blood volume of 5 liters. Calculate the stroke volume and mean circulation time. (2.5M)
- (ii) Draw the figure to show the relationship of heart sounds to the function of the cardiovascular system. (2.5M)

BITS PILANI DUBAI CAMPUS
DUBAI INTERNATIONAL ACADEMIC CITY, DUBAI
IV Year EIE – I Semester 2009-10
Quiz 2
MEDICAL INSTRUMENTATION - INSTR C481

Date: 14/12/09
Max. Marks: 10

Time: 20mts
Weightage: 7%

1. Draw a spirogram and mark TLC, IRV, VC and RV.
2. The total lung capacity in a normal adult is _____.
3. What is Tidal volume.
4. Name the modes in which respirators are operated.
5. Name Two respiratory therapy equipment.

6. Differentiate between Systemic temperature and Skin surface temperature.
7. Draw the Resistance-Temperature characteristics of a Thermistor.
8. What is a Thermograph.
9. Name Two basic modes of ultrasound transmission.
10. Name the factors that must be considered for an echocardiographic investigation.

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DUBAI INTERNATIONAL ACADEMIC CITY, DUBAI
IV Year EIE – I Semester 2009-10

Quiz 1

MEDICAL INSTRUMENTATION – INSTR C 481

Date: 26/10/09
Max. Marks: 16

Time: 20mts
Weightage: 8%

1. From engineering point of view, what is systemic circulation.
2. What is the heart rate of (i) Normal adult (ii) When a person stands up and sits down (iii) In a woman (iv) In an Infant
3. Define Systolic and Diastolic pressures giving their range of values.
4. Draw the normal heart sounds and give their frequency ranges.

5. Give the normal durations and amplitudes of ECG.

6. Name the different lead configurations to record ECG.

7. Show ECG in Lead II and aVR.

8. Draw the circuit of a ECG amplifier.