

Roll No.

--	--	--	--	--	--	--	--	--	--	--	--

## ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. / B. Tech / B. Arch (Full Time) - END SEMESTER EXAMINATIONS, Nov/Dec 2023

## DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Semester VII

## EE 5028 – Medical Instrumentation

(Regulation 2019)

Time: 3hrs

Max.Marks: 100

CO 1	Able to understand the fundamental art of biomedical engineering.
CO 2	Able to understand the non-electrical parameters measurement and diagnostic procedures
CO 3	Able to understand the concept of bio medical data acquisition and the working of EEG, ECG etc..
CO 4	Able to understand about imaging modalities and analysis through computer tomography.
CO 5	Able to understand the life assisting, therapeutic and robotic devices and their technical applications.

**BL – Bloom's Taxonomy Levels**

(L1 - Remembering, L2 - Understanding, L3 - Applying, L4 - Analysing, L5 - Evaluating, L6 - Creating)

**PART- A (10 x 2 = 20 Marks)**

(Answer all Questions)

Q. No	Questions	Marks	CO	BL
1	Write the importance of collagen fibre in soft tissues	2	CO1	L1
2	Mention the applications of piezo electric transducers in medical instrumentation	2	CO1	L2
3	When will the Korotkoff sound appear and how is this sound picked up?	2	CO2	L3
4	Write a short note on blood pH Measurement	2	CO2	L2
5	Differentiate between Limb electrodes, floating electrodes and pregelled disposable electrodes	2	CO3	L4
6	Why is the low frequency response limited in RC coupled amplifiers? How is it overcome in signal conditioning of bio electrical signals?	2	CO3	L4
7	How can the fluoroscopic image be obtained?	2	CO4	L2
8	Which parameter plays a major role in defining the image in ultrasonography and How?	2	CO4	L2
9	Write a short note on the necessity of a defibrillator	2	CO5	L2
10	Write the principle of surgical diathermy	2	CO5	L1

**PART- B (5 x 13 = 65 Marks)**

Q. No	Questions	Marks	CO	BL
11 (a)	Describe the structure and function of cardio vascular system with a neat diagram	13	CO1	L2
<b>OR</b>				
11 (b) (i)	Explain the method of temperature measurement using thermistors	6	CO1	L3
(ii)	Describe the construction and working of fibre optic temperature sensor with neat diagram	7	CO1	L3
12 (a)	Describe any two methods which are used to measure the cardiac output with neat diagrams	13	CO2	L3
<b>OR</b>				
12 (b)	Explain the methods to measure the partial pressure of CO <sub>2</sub> and O <sub>2</sub> with neat diagram	13	CO2	L3

13 (a)	Explain the electrical activity of heart with the normal wave pattern of ECG with a neat diagram	13	CO3	L4
<b>OR</b>				
13 (b)	Describe the method of obtaining electrical signals for EEG and EMG recording	13	CO3	L3
14 (a)	Explain the theory of operation of imaging techniques using computer tomography method with neat diagram	13	CO4	L3
<b>OR</b>				
14 (b)	Write the importance of retinal imaging and describe a method to obtain the retinal image with neat diagram.	13	CO4	L4
15 (a)	Describe the working of ventricular synchronous demand pace maker and programmable pace maker	13	CO5	L3
<b>OR</b>				
15 (b)	Describe the working of heart lung machine with neat diagram	13	CO5	L3

**PART- C (1 x 15 = 15 Marks)**  
(Q.No.16 is compulsory)

Q. No	Questions	Marks	CO	BL
16.	Design the transmitter and receiver section for temperature telemetry system	15	CO4	L5

