

GUJARAT TECHNOLOGICAL UNIVERSITY**Diploma Engineering – SEMESTER – 4 (NEW) – EXAMINATION – Summer-2023****Subject Code: 4341705****Date: 20-07-2023****Subject Name: Biomedical Instrumentation****Time: 10:30 AM to 01:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Use of programmable & communication aids are strictly prohibited.
5. Use of non-programmable scientific calculator is permitted.
6. English version is authentic.

	Marks
Q.1 (a) List sources of biomedical signals. Biomedical signals ની sources ની યાદી આપો.	03
(b) Explain the working principle of ECG with a block diagram. વિવિધ બ્લોક ડાયગ્રામ સાથે ECG નું વર્કિંગ principle સમજાવો.	04
(c) Classify medical instruments based on different principles વિવિધ principles ના આધારે મેડિકલ ઇન્સ્ટ્રુમેન્ટ્સ નું classification કરો..	07
OR	
(c) Explain the working of the indirect blood pressure measurement instrument Indirect blood pressure measurement instrument ના કાર્ય વિષે સમજાવો.	07
Q.2 (a) Explain the generation of biopotential in the human body. હ્યુમન બોડી માં generation of biopotential સમજાવો.	03
(b) Explain phono-cardiograph. Phono-cardiograph સમજાવો.	04
(c) Explain 10-20 electrode placement system. 10-20 electrode placement system સમજાવો.	07
OR	
Q.2 (a) Explain the generalized block diagram of the medical instrumentation system Generalized block diagram of the medical instrumentation system સમજાવો.	03
(b) Explain unipolar and bipolar leads. Unipolar and bipolar leads વિષે સમજાવો.	04
(c) Explain EMG electrodes with diagrams. EMG electrodes ડાયગ્રામ સાથે સમજાવો.	07
Q.3 (a) List the characteristics of X-ray. X-ray ની characteristics ની યાદી આપો.	03
(b) Explain Magnetic Resonance Imaging (MRI) Magnetic Resonance Imaging (MRI) વિષે સમજાવો.	04
(c) Describe the working of a CT scan machine with a block diagram. CT scan machine બ્લોક ડાયગ્રામ સાથે સમજાવો.	07

OR

- Q.3** (a) List properties of ultrasound. **03**
 Ultrasound ની ગુણધર્મો ની યાદી આપો.
- (b) Explain Positron Emission Tomography (PET) **04**
 Positron Emission Tomography (PET) વિષે સમજાવો.
- (c) Describe the working of X-ray machine with a block diagram. **07**
 X-ray machine બ્લોક ડાયગ્રામ સાથે સમજાવો.
- Q.4** (a) List the electrodes used with an electrosurgery machine. **03**
 Electrosurgery machine માટે use થતી electrodes ની યાદી આપો.
- (b) Explain function of natural and artificial kidney **04**
 Natural and artificial kidney નું ફંક્શન સમજાવો.
- (c) Explain working of Ventilators with a neat diagram. **07**
 Ventilators નું વર્કિંગ ડાયગ્રામ સાથે સમજાવો
- OR**
- Q.4** (a) State the need for cardiac pacemaker. **03**
 Cardiac pacemaker ની જરૂરિયાત વિષે સમજાવો.
- (b) Explain working of a Muscle Stimulator machine with a block diagram. **04**
 Muscle Stimulator machine ને બ્લોક ડાયગ્રામ સાથે સમજાવો.
- (c) Explain Haemodialysis machine with block diagram.. **07**
 Haemodialysis machine ને બ્લોક ડાયગ્રામ સાથે સમજાવો. .
- Q.5** (a) List the pathological (clinical) test Instruments for medical diagnosis. **03**
 Medical diagnosis માટે વપરાતી Pathological (clinical) test Instruments ની યાદી આપો.
- (b) Explain in-vivo oximetry. **04**
 In-vivo oximetry સમજાવો.
- (c) Explain working of auto-analyzer. **07**
 Auto-analyzer નું વર્કિંગ સમજાવો.
- OR**
- Q.5** (a) Draw the block diagram of blood cell counter. **03**
 Blood cell counter નો બ્લોક ડાયગ્રામ દોરો.
- (b) Explain in-vitro oximetry. **04**
 In-vitro oximetry સમજાવો.
- (c) Write steps to manage biomedical waste at hospitals. હોસ્પિટલ માં બાયોમેડિકલ વેસ્ટ ને manage કરવાના સ્ટેપ્સ લખો. **07**