

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/
COMMERCIAL PRACTICE, APRIL - 2025**

BIOMEDICAL INSTRUMENTS

[Maximum marks: 100]

[Time: 3 Hours]

PART – A

Maximum marks: 10

I. (Answer *all* the questions in one or two sentences. Each question carries **2** marks)

1. List any four physiological systems of a human body.
2. What are the expansions of EMG and EEG?
3. Draw the typical ECG waveform and mark the important parameters.
4. Define the pacemaker.
5. Define the term biotelemetry.

(5 x 2 = 10)

PART – B

Maximum marks: 30

II. (Answer any *five* of the following questions. Each question carries **6** marks)

1. Write the working principle of optical-fiber temperature sensor.
2. Describe the resting potential and action potential with reference to a cell.
3. Draw the three bipolar limb – lead systems for ECG measurement.
4. Give the four frequency ranges of EEG.
5. With the help of a diagram, explain the working of a short wave diathermy unit.
6. Compare implantable pacemakers and external pacemakers.
7. List the effects of electricity on the human body.

(5 x 6 = 30)

PART – C

Maximum marks: 60

(Answer *one full* question from each unit. Each full question carries **15** marks)

UNIT – I

III. (a) Explain the working of a transmission type photoelectric pulse transducer, with a diagram. (8)

(b) Explain the ultrasonic blood flow meter, with the help of a schematic diagram. (7)

OR

- IV.** (a) Describe indirect method of blood pressure measurement. (8)
(b) Describe the working of an electromagnetic blood flow meter, with a schematic diagram. (7)

UNIT – II

- V.** (a) Describe the Einthoven's Triangle. (8)
(b) Describe the block diagram of an EEG machine. (7)

OR

- VI.** (a) Explain the different electrodes used for EMG measurement. (8)
(b) Describe the block diagram of an ECG machine. (7)

UNIT - III

- VII.** (a) Draw and explain the DC Defibrillator circuit. (8)
(b) Explain the working of an electrical conductivity blood cell counter. (7)

OR

- VIII.** (a) Explain the working of ventricular synchronous-demand pacemakers. (8)
(b) Describe the use of respirators. Explain any two types of respirators. (7)

UNIT – IV

- IX.** (a) Describe the working principle of CAT scanner. (8)
(b) List the precautions to be taken while handling biomedical instruments. (7)

OR

- X.** (a) Explain the construction and operation of an X-ray machine with a block diagram. (8)
(b) Explain the block diagram of a biotelemetry system. (7)
