



Name :

Roll No. :

Invigilator's Signature :

CS/B.TECH (EIE)/SEP. SUPPLE/SEM-8/EI-801D/2012

2012

BIOMEDICAL AND ECOLOGICAL MEASUREMENTS

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :

10 × 1 = 10

- i) Tachycardia means
 - a) slower heart rate b) faster heart rate
 - c) normal heart rate d) none of these.
- ii) the most suitable power sources for a pacemaker is
 - a) nuclear battery
 - b) mercury battery
 - c) lithium battery
 - d) magnetically coupled rechargeable battery.
- iii) Ventricular inhibited pacemaker means
 - a) R wave triggered pacemaker
 - b) R wave blocked pacemaker
 - c) both R wave triggered & blocked pacemakers
 - d) none of these.



- iv) the natural pacemaker of the heart is
 - a) SA node
 - b) AV node
 - c) Bundle of His
 - d) Purkinje fibre.
- v) Eutrophication means
 - a) Thermal change in water
 - b) filling up of water body with aquatic plants due to extra-nourishment
 - c) solid waste
 - d) none of these.
- vi) In the industrial area noise is measured by
 - a) L_{10} (18hrs) index
 - b) L_{eq}
 - c) $L_e P_n$
 - d) none of these.
- vii) Hemoglobin is contained in
 - a) WBC's
 - b) RBC's
 - c) platelets
 - d) protein.
- viii) Instrument measuring volume changes in any part of the body due to pulsations of blood occurring with each heart beat is
 - a) plethysmograph
 - b) Arithmetic unit
 - c) Ventilator
 - d) Cardiac pacemaker.
- ix) The triangle whose sides represent the line along which 3 projections of ECG are measured is
 - a) Galvani triangle
 - b) Einthoven triangle
 - c) Abbott triangle
 - d) Korotkoff triangle.
- x) Korotkoff sounds are used in
 - a) blood flow measurements
 - b) blood pressure measurements
 - c) heart valve functioning
 - d) as a reference for sound level measurement.



- xi) 'Radio Pill' is used to monitor
- a) Stomach pressure
 - b) Cardiovascular pressure
 - c) Arterial pressure
 - d) Veinous pressure.
- xii) The audio sense of a person is most sharp in the frequency range
- a) 2 – 5.5 kHz
 - b) 7 – 10 kHz
 - c) 12 – 15 kHz
 - d) 17 – 20 kHz.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. What is ECG ? Draw the ECG waveform, labelling the critical features including typical amplitudes & time intervals for a normal person. 2 + 3
3. Write down the Nernst equation. Give brief description on electrodes that are used to measure bio-electric potentials. 3 + 2
4. Write down the working principle of ultrasonic blood flow metres. 5
5. Explain activated sludge process of waste treatment process. 5
6. Describe the principle of CAT. Compare its method of visualisation with conventional X-Ray methods. 3 + 2



GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7.
 - a) Define polarization, depolarization & repolarization.
 - b) Write down the pressure transducers used for biomedical application.
 - c) Describe briefly about metal & micropipet microelectrodes. $6 + 3 + 6$
8.
 - a) Describe briefly about different types of method of invasive technique for blood pressure measurement.
 - b) What do you mean by fibrillation ? State the different types of fibrillation compare *ac* & *dc* defibrillation.
 - c) Explain the operation of pacemaker. $6 + 2 + 1 + 2 + 4$
9.
 - a) Explain with a neat sketch, the operation of dissolved oxygen measurement system.
 - b) What is smog ? 3
 - c) Write short note on 'Los Angeles Smog'
 - d) Discuss briefly about the effect of Global Warming. $6 + 2 + 3 + 4$
10.
 - a) Briefly describe the principle of generation of X-Ray.
 - b) What are the visualization techniques of X-Rays ?
 - c) Discuss about the physiological effect of electrical current. $5 + 5 + 5$
11. Write short notes on any three of the following : 3×5
 - a) Electrostatic precipitator
 - b) Biotelemetry
 - c) C T
 - d) Patient care monitoring unit.
 - e) ECG Amplifier.