



Name :

Roll No. :

Invigilator's Signature :

**CS/B.Tech(EIE)/SEPARATE SUPPLE/SEM-8/EI-801D/2011
2011**

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 the following :

10 × 1 = 10

- i) Faster heart rate is known as
 - a) Bradycardia
 - b) Trachycardia
 - c) Dralycardia
 - d) None of these.
- ii) Gas which is responsible for acid rain is
 - a) CO₂
 - b) SO₂
 - c) CH₄
 - d) CO.



iii) What type of current range in biomedical application is known as 'let-go' ?

- a) 1 – 5 mA b) 5 – 8 mA
- c) 8 – 20 mA d) > 20 mA.

iv) The number of electrodes required to record an electrocardiogram is usually

- a) 6 b) 12
- c) 5 d) None of these.

v) Unit of X-Ray is

- a) Curie b) Volt
- c) Farad d) None of these.

vi) The character wavelength of absorption of infrared of CO₂ gas is

- a) 4·8 micro meter
- b) 4·8 mm
- c) 8·8 micro meter
- d) 4·8 nm.



vii) Systole refers to the

- a) Maximum blood pressure
- b) Minimum blood pressure
- c) Maximum blood flow
- d) Minimum blood flow
- e) None of these.

viii) Normal action potential in the heart originates from

- a) Sinoatrial Node
- b) Vasomotor centre
- c) Purkinje fibre
- d) Atrioventricular node
- e) None of these.

ix) The transducer for phonocardiogram is

- a) Microphone
- b) Strain gauge
- c) LVDT
- d) Piezoelectric transducer.
- e) None of these.



x) The valve right ventricle is known as

- a) Mitral
- b) Aortic
- c) Pulmonary
- d) Tricuspid.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following.

3 × 5 = 15

2. What is Electroencephalography ? List the brain waves and their frequencies. 3 + 2
3. What are the types of measurements of blood pressure ? How is the blood pressure measured in the indirect method ? 1 + 4
4. Explain the principle of sphygmomanometer.
5. Give the characteristics X-Ray radiation. What is meant by soft and hard X-Ray ? $2 + 1\frac{1}{2} + 1\frac{1}{2}$
6. Name two ways in which electricity can harm the body. List the various effects of current that occur with increasing current intensity. 2 + 3



GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following.

3 × 15 = 45

7. a) What are the methods involved in indirect blood pressure measurement ?
b) What is meant by mean arterial pressure (MAP) ?
c) Explain the two ways involved in measurement of blood pressure with a catheter ?
d) Describe some possible uses of EMG ?
e) What is meant by ultrasonic imaging ?
3 + 2 + 5 + 3 + 2
8. a) List some advantages and disadvantages of Biotelemetry.
b) Draw a block diagram to send an Electrocardiogram from an ambulance to a hospital by telemetry.
c) What are medical transmitting frequencies ? 4 + 9 + 2
9. a) What are the different modes of operation of differential amplifier ? Explain.
b) What is CMRR and SLEW Rate in a differential amplifier ?
c) What is noise figure ?
d) What is Offset Voltage ?
e) Write the characteristic of an ideal op-amp (no description needed).
4 + 4 + 2 + 2 + 3



10. a) Give the name of the instrument used for measuring airflow and explain its principle.

b) Define MVV.

c) What is FVC ?

d) What is FRC ?

e) Differentiate between tidal volume and residual volume

f) Define total lung capacity. $5 + 2 + 2 + 2 + 2 + 2$

11. a) What is a defibrillator ?

b) Explain ventricular fibrillation and how can it be eliminated ?

c) What are the different types of defibrillators ?

d) What are the applications of ventricular inhibited pacemaker ?

e) Explain different lead systems for recording ECG.

$2 + 2 + 2 + 2 + 7$

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12. Write short notes on any *three* of the following : 3 × 5



- a) Sound Level Meter
- b) Pacemaker
- c) Plethysmography
- d) Causes of global warming and its effects.

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